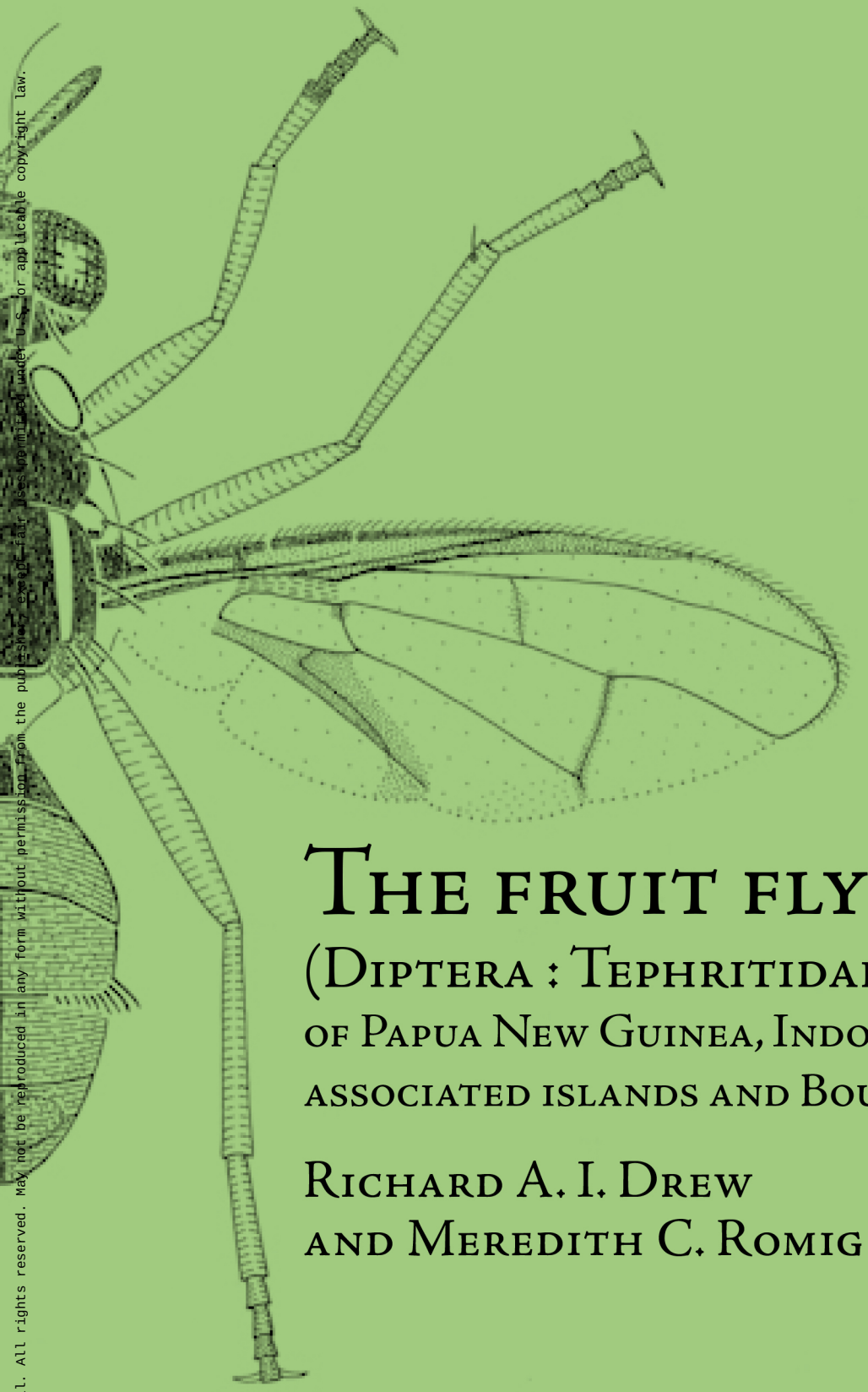

The fruit fly fauna

(Diptera : Tephritidae : Dacinae) of Papua New Guinea, Indonesian Papua, associated islands and Bougainville

Richard A. I. Drew
and Meredith C. Romig

The Fruit Fly Fauna (Diptera: Tephritidae: Dacinae) of Papua New Guinea, Indonesian Papua, Associated Islands and Bougainville

Bactrocera decipiens (Drew). Photo courtesy Steve Wilson.

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Abstract

The species within the Tribe Dacini from Papua New Guinea, Indonesian Papua (West Papua, Central Papua, Papua), associated islands and Bougainville are recorded. In all, 296 species are recorded including 65 new species described herein. The new species are treated under two genera, *Bactrocera* Macquart (eight subgenera) and *Dacus* Fabricius (three subgenera). The following new species are described and illustrated: *Bactrocera (Bactrocera) atriscuta*, *B. (B.) bisianumu*, *B. (B.) bogiae*, *B. (B.) bubiae*, *B. (B.) bukaensis*, *B. (B.) caccabata*, *B. (B.) centraliae*, *B (B.) dysoxyli*, *B. (B.) expandosa*, *B. (B.) fumica*, *B. (B.) gabensiae*, *B. (B.) kaiauiae*, *B. (B.) kauiae*, *B. (B.) keravatiae*, *B. (B.) kokodiae*, *B. (B.) kunvawaensis*, *B. (B.) labubulu*, *B. (B.) laensis*, *B. (B.) manusiae*, *B. (B.) meraiensis*, *B. (B.) monostriata*, *B. (B.) neoabdonigella*, *B. (B.) neoaeroginosa*, *B. (B.) ohuiae*, *B. (B.) paraendiandrae*, *B. (B.) paraochracea*, *B. (B.) pometiae*, *B. (B.) raunsepnaensis*, *B. (B.) rounaensis*, *B (B.) rutilana*, *B. (B.) saramandiae*, *B. (B.) sari*, *B. (B.) sylvania*, *B. (B.) tikelingiae*, *B. (B.) trivirgulata*, *B. (B.) waidoriae*, *B. (B.) yayamiae*, *Bactrocera (Bulladacus) curiosa*, *Bactrocera (Calodacus) insolita*, *Bactrocera (Hemizeugodacus) neoaglaiae*, *B. (H.) wilhelmiae*, *Bactrocera (Neozeugodacus) leblanci*, *Bactrocera (Semicallantra) cerberae*, *B. (S.) malasaitiae*, *Bactrocera (Tetradacus) arbuscula*, *B. (T.) novotnyi*, *B. (T.) procera*, *Bactrocera (Zeugodacus) aiyurae*, *B. (Z.) anglimpiae*, *B. (Z.) bainingsiae*, *B. (Z.) madangiae*, *B. (Z.) magiae*, *B. (Z.) mitparingii*, *B. (Z.) oiyaripensis*, *B. (Z.) parasepikae*, *B. (Z.) rufoscutella*, *B. (Z.) xanthovelata*, *Dacus (Callantra) nigrolobus*, *D. (Mellesis) alatifuscatus*, *Dacus (Neodacus) asteriscus*, *D. (N.) bimaculosus*, *D. (N.) curvabilis*, *D. (N.) kreeriae*, *D. (N.) lalokiae* and *D. (N.) neosignatifrons.* Females of *B. (Bactrocera) daruensis* Drew, *B. (Bactrocera) nigella* (Drew) and *B. (Bactrocera) thistletoni* Drew are described and a revised description of *B. (Bactrocera) torresiae* Huxham & Hancock is presented. *Bactrocera (Bactrocera) denigrata* (Drew) is withdrawn from synonymy with *B. longicornis* Macquart, and a full description of *B. longicornis* is presented from a study of the holotype and 27 newly collected specimens. New geographical distribution, host plant and male lure records are presented for some species.

The major pest species that occur in the geographical region covered by this publication are reviewed and their biosecurity risks to other regional countries discussed. The land mass of Papua New Guinea and Indonesian Papua contains a richer fauna than any other from South-east Asia to the eastern Pacific, presumably resulting from speciation in the rich rainforest ecosystem.

Differences of opinion on the status of some species in the *Bactrocera dorsalis* complex and on the supraspecific classification within the genus *Bactrocera* are evident in the literature. We have acknowledged and discussed these differences and, as authors, have presented conclusions based on our own research data.

Key words: fruit flies, taxonomy, pest species, biosecurity

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Introduction

Within the published work of Drew (1989), the dacine fauna of Papua New Guinea was comprehensively studied. Furthermore, in that publication, the history of the taxonomic research on Pacific region Dacini was discussed. Since that time, additional species have been described and/or recorded from Indonesian Papua and Papua New Guinea by White and Evenhuis (1999), from Papua New Guinea by K.A. Huxham and D.L. Hancock in Huxham *et al*. (2006), and by R.A.I. Drew in Drew *et al*. (2011) and Drew and Hancock (2016), and from Bougainville by Drew and Romig (2001).

Biogeography and speciation in the Dacini were discussed by Drew (2004), indicating a close ecological relationship between these fruit fly species and their tropical rainforest host plants. Based on this knowledge, Drew (2004) postulated that dacine species cospeciated with rainforest plant species. Given the rich rainforest flora of Papua New Guinea, which includes some 8000 known plant species (Drew, 2004), it is understandable why this land mass contains such a rich dacine fauna, with the largest number of species of any land mass across the entire Asian/Pacific region.

Over the past two decades, major collections of Dacini have been obtained by male lure trapping and host fruit sampling across large areas of Papua New Guinea. These surveys have provided the specimens for the descriptions of the new species in this book. In particular, the use of vanillylacetone has resulted in the collection of a number of previously unknown species.

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Materials and Methods

Large numbers of dacine specimens were collected throughout Papua New Guinea by trapping and host fruit sampling. Steiner-type fruit fly traps, baited with cue lure, methyl eugenol or vanillylacetone (zingerone), were set in many localities over a wide range of ecosystems. In most cases, the traps were serviced on 2-week cycles for at least 1 year. Samples of rainforest and cultivated fruits were collected in some provinces and set in rearing cages until flies emerged, in laboratories under the supervision of local staff. The label data on some type specimens contains inconsistencies in spelling. However, under the International Code of Zoological Nomenclature, label data cannot be changed, resulting in the appearance of apparent spelling errors. In order to maintain consistency, the morphological terminology used in the species descriptions is the same as that used by Drew and Romig (2013, 2016).

All specimens collected were preserved in a dry state and sent to R.A.I. Drew at Griffith University, Brisbane, Australia, for microscopic identification and curation. Curated specimens were returned to Papua New Guinea laboratories. Type specimens of new species have been deposited in the Australian National Insect Collection (ANIC), Queensland Department of Agriculture and Fisheries (QDPC) and the Queensland Museum Insect Collection (QMIC). Data and photographs of *Bactrocera longicornis* Macquart were received from the Museum Nationale d'Histoire Naturelle (MNHN), Paris, France. The subgeneric classification used herein follows Drew and Hancock (2016) and Hancock and Drew (2006, 2015, 2016, 2017a,b,c,d,e, 2018a,b,c, 2019).

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Species and Speciation

There are a number of species models, two of which are diametrically opposed. The first, often called the 'biological species concept' was initiated by Wallace (1889) and expanded in detail by Dobzhansky (1935). These authors and more recent proponents of this model define species in terms of 'reproductive isolation', convinced that species arise when subsets of a population are split off and remain geographically isolated over evolutionary time. If and when such new species are reunited with their founder population, interbreeding does not occur, or if it does, infertile progeny result. Hence, from the biological species concept, natural selection is a primary agent of change and directly selects for new species. In this sense, species are the direct products of natural selection and they are therefore 'adaptive devices'.

Over many decades, in practice, following this concept has led workers to conduct laboratory-based breeding experiments using different but presumed closely related species. Based on the levels of infertility obtained as the result of cross-breeding, decisions are made on the determination of species. Also, within the bounds of this species concept, enzyme electrophoresis and, more recently, molecular analyses are undertaken to measure genetic distance between presumed species.

Over the past few decades, biologists have come to realize that this biological species concept has serious limitations, particularly due to major advances in knowledge gained from ecological and behavioural research. When applying this species concept, it has been impossible to separate some sibling species of fruit flies in the genus *Bactrocera* where distinct morphological species can be similar in molecular analyses of certain DNA sequences, while similar species morphologically are distinct in the same molecular characters. Furthermore, *Bactrocera* species, even in separate subgenera, have been hybridized in laboratory experiments to produce fertile progeny.

A radically different model, the 'recognition concept of species', was first proposed by Paterson (1973) and researched and developed by himself and co-workers over subsequent decades. This concept relies heavily on a knowledge of species ecology and behaviour, particularly in their natural habitat. The principal points in this concept are as follows:

- Each species possesses a 'specific mate recognition system' (SMRS), which includes courtship and mating behaviour. The mate recognition system brings the sexes of a species together to reproduce. Significant advances in our knowledge of the ecology and behaviour of *Bactrocera* species support this concept of speciation (Drew, 2004). Over four decades, we have undertaken host fruit surveys of rainforest and edible fruits across South-east Asia and the South Pacific (including Australia). Approximately 135,000 fruit samples were collected and incubated, resulting in the definition of species-specific host plants (Allwood *et al*., 1999; Hancock *et al*., 2000a; Leblanc *et al*., 2012). Furthermore, host plant courtship and mating are major aspects of *Bactrocera* behaviour (Drew and Lloyd, 1987; Drew *et al*., 2008). Consequently, the SMRS for *Bactrocera* species includes chemical and visual cues that attract individuals to the host plant (the emission of pheromones and wing beat calling signals by males within the host) that attract females to the specific mating site, usually on lower surfaces of leaves.
- Habitat preference is a basic species-specific character.
- Ecological knowledge is fundamental to understanding speciation and defining species.
- Within a species, mating partners are coadapted to finding their hosts, courtship and mating sites.

In reviewing the recognition concept of species, several significant points are made by various workers in support of this approach to determine species, particularly sibling species within species complexes:

1. 'At the level of closely related species there is no consistent correlation between morphological resemblance and genetic distance, because no set amount of genetic divergence can be found to accompany speciation events' (Lambert and Paterson, 1982, p. 296). This statement reveals the difficulty in identifying cryptic species based on either morphology or molecular data

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alone and in attempting to obtain congruence between both. Experienced taxonomists undertaking revisions of large taxa have usually experienced the deficiencies of using morphological characters alone to define species and require the application of supporting evidence. However, until the genes are identified that are directly involved in the process of speciation, molecular data are going to be limited. Such data as are currently available appear to be more useful in determining relationships between species than in defining species.

2. 'It has long been known that sterility *s. lat.* is an unsatisfactory criterion for delineating species' (Paterson, 1988). Under the biological species concept, the recognized isolating mechanisms have been defined as premating and postmating mechanisms. Because sterility results from cross-breeding of two populations (or parents), it is a postmating mechanism.Because postmating mechanisms cannot develop under the pressure of natural selection, they cannot be regarded as isolating mechanisms in the sense that they evolved specifically for the purpose of producing species. For this reason, we regard as erroneous the use of laboratory-based cross-breeding experiments to assess levels of sterility and thus define species. Under the recognition concept of species, sterility takes on a different meaning. Under this concept, a species comprises a group of individuals that share a common fertilization system. Clearly, sterility cannot be a selected adaptation that brings about successful fertilization and thus is not a relevant factor in delineating species boundaries. Under this concept, sterility is regarded as an intra-specific phenomenon. Our understanding of the occurrence and definition of sterility is vital to understanding the most comprehensive species concept and thus accurately defining species.

3. 'The Recognition Concept is also important in understanding the assembly of ecosystems and communities and in interpreting biogeographical data' (Paterson, 1989).'The preferred habitat of a species approximates to the habitat in which the species arose. Habitat preference is, thus, a fundamental, species-specific character….' (Paterson, 1982).'One comes to suspect the existence of a species complex from the occurrence of biological discontinuities….' and 'host relationships can provide evidence for the existence of unsuspected cryptic species' (Paterson, 1991).Whereas an understanding of the recognition concept of species provides us with new insights into the behaviour and ecology of individual species, the reverse is also true, mainly that such field data provide evidence for the diagnosis of sibling species. In contrast to the now-outdated biological species concept that leads one to depend on laboratory-based research to define species, the recognition concept requires workers to undertake extensive field research in the habitat of the taxon under investigation. In translating this approach to our research in the insect family Tephritidae, particularly the Dacinae, we have undertaken some 35 years of field surveys throughout the Indian subcontinent, South-east Asia and the South Pacific region. These surveys included trapping using male lure traps and host fruit collections of commercial/edible fruits. The results of this work have included the provision of specimens of almost all known species for morphological descriptions (*c.*800 species), material for male pheromone chemistry, and data on host fruit relationships and biogeographical studies (Allwood *et al*., 1999; Hancock *et al*., 2000a; Leblanc *et al*., 2012; Drew, 1989; Drew and Romig, 2013, 2016). In association with this work, we have undertaken research into the biology of species within their host plants and in particular their courtship and mating behaviour. We have demonstrated that the host plant is the 'centre of activity' for a species (Drew and Lloyd, 1987) and that this close association has facilitated the diagnosis of sibling species, particularly in the genus *Bactrocera*. Some examples of successful diagnoses based on host associations are *Bactrocera arecae* (Hardy & Adachi) (primary host *Areca catechu*), *Bactrocera carambolae* Drew & Hancock (primary host *Averrhoa carambola*), *Bactrocera melastomatos* Drew & Hancock (primary host *Melastoma malabathrica* flowers), *Bactrocera osbeckiae* Drew & Hancock (primary host flowers of species of Melastomataceae) and *Bactrocera papayae* Drew & Hancock (major host *Musa paradisiaca*). The strong association between *Bactrocera* species and their host plants, and the association between the wider dacine fauna and their endemic rainforest ecosystem was discussed by Drew (2004). The ecological connections between the fly species and its host plant have provided fertile ground for our understanding of the process of cospeciation within the Indo-Malayan rainforests. We believe that the recognition concept of species will continue to drive ecological research on this group of insects, which, in turn, will throw further light on our understanding of species.

Status of the Name *Bactrocera papayae* Drew & Hancock

In recent years, the name *Bactrocera dorsalis* (Hendel) has been applied widely to populations otherwise treated as the separate species *B. papayae* Drew & Hancock or *B. invadens* Drew, Tsuruta & White, following a study by Schutze *et al*. (2015a) that synonymized the three names on the basis of their inability to find significant morphological, molecular or other differences between them. However, significant differences in morphology do exist. Apart from differences in the relative lengths of the aedeagus and aculeus, wrongly dismissed by Schutze *et al*. (2015a,b) as clinal, the latter two species differ from *B. dorsalis* in the shape of the phallus in males (R.A.I. Drew and D.L. Hancock, unpublished data), a structure that locks the sexes together during mating. *Bactrocera invadens* has narrower lateral postsutural vittae and a different pattern of scutal variation than in the other two species (Drew and Romig, 2013), evident even in the illustrations and pie charts in Fig. 1 of Schutze *et al*. (2015b), while *B. papayae* has a distinct black stripe along the underside of the fore tibia, best seen in fresh specimens (H. Fay and D.L. Hancock, personal communication), that probably plays a role in species' recognition during courtship. Interspecific pairing in artificially confined laboratory or field cage situations, a strategy designed under the now-outdated biological species concept, and which applies to many often unrelated *Bactrocera* species, does not reflect the natural situation, where the species are not known to interact. In Thailand, *B. papayae* is known throughout the Kra Isthmus and at least as far north as Bangkok (so the inability of Schutze *et al*. (2015a) to separate populations therein is not surprising), while *B. dorsalis* occurs in northern Thailand at least as far south as Chiang Mai. A contact zone, if such exists, has yet to be determined, and the species are likely to be either parapatric or allopatric. Hybridization under natural conditions is thus unlikely to occur.

The lack of molecular differentiation within the limited genes studied is also not unusual in closely related and recently evolved species of *Bactrocera*. Leblanc *et al*. (2015) noted the lack of differentiation in the genes examined in the closely related *B. dorsalis*, *B. papayae*, *B. invadens* and *B. carambolae* Drew & Hancock quartet (*B. carambolae* is separable on other genes) and in the sympatric Australian pair *B. tryoni* (Froggatt) and *B. neohumeralis* (Hardy), which mate at different times of the day according to light intensity and hybridize freely in the laboratory but, judging by the scarcity of naturally occurring hybrids, rarely under natural conditions. Leblanc *et al*. (2015) also noted the inability to separate genetically the Asian species *B. osbeckiae* Drew & Hancock, *B. melastomatos* Drew & Hancock and *B. rubigina* (Wang & Zhao), despite *B. rubigina* differing significantly in morphology and in host plant selection (Drew and Romig, 2013).

The value of using artificially controlled mating experiments, cytogenetics, chemoecology and incomplete molecular data in assessing the status of closely related species in the *dorsalis* complex was discussed by Drew and Romig (2016), with all found to be inappropriate as indicators of synonymy and not as significant as suggested by Schutze *et al*. (2015a).

Accordingly, we consider the synonymy proposed by Schutze *et al*. (2015a) to be incorrect and unjustified, and continue to regard *B. papayae* as the valid name for populations occurring from southern Thailand to Papua New Guinea. Failure to correctly identify pest species can have serious implications for their management and control.

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Supraspecific Classification

The definitions of genera and subgenera used in the classification of the Dacini have been in a continual state of change for over a century. The early definitions were based on often homoplasious morphological characters, some examples for the Oriental and Australian regions being Tryon (1927), Perkins (1937), Hardy (1951), May (1951) and Drew (1972). More recently revised subgeneric definitions for most species groups were published by Drew and Hancock (2016) and Hancock and Drew (2006, 2015, 2016, 2017a,b,c,d,e, 2018a,b,c, 2019), based on detailed analyses of dacine biogeography, host plant biology and morphology.

The *Zeugodacus* group of subgenera was elevated to generic level by Virgilio *et al*. (2015) and a list of included species was provided by Doorenweerd *et al*. (2018). Virgilio *et al*. (2015) based their molecular evidence on only two genes from seven species out of a known fauna of over 200 species. They noted that their molecular evidence was not supported by the nuclear gene fragment studied and that the situation required further research, which was done and published by Hancock and Drew (2018c) after studying the entire fauna of 200 species. Furthermore, neither Virgilio *et al*. (2015) nor Doorenweerd *et al*. (2018) attempted to define the large number of subgenera and their morphological and biological relationships within the genus. Consequently, establishing *Zeugodacus* as a genus was based on a false premise (shared Cucurbitaceae host plants with *Dacus*) and molecular evidence. Hancock and Drew (2018b,c) noted that plesiomorphic groups of neither *Zeugodacus* nor *Dacus* utilize Cucurbitaceae as host plants and that the molecular evidence was limited, contradictory and not supported by morphology or molecular dating. Accordingly, we do not recognize *Zeugodacus*, which has no defining synapomorphy, as a genus separate from *Bactrocera*. Division of formerly included *Zeugodacus* species into revised subgenera *Zeugodacus* or *Javadacus* was proposed by Hancock and Drew (2018c) and is consistent with available molecular data. The *Bactrocera* group of subgenera, which contains the bulk of the Papuan species, appears to be the most recently evolved group and of Papuan origin (Hancock and Drew, 2018a,b). Rapid recent speciation, particularly in subgenus *Bactrocera* (Gilchrist *et al*., 2014), has resulted in low and unreliable genetic differentiation between many of the component species, as noted in examples above.

EVOLUTIONARY ORIGINS OF THE DACINI

The Dacini are Gondwanan in origin with the parental stock having originated on the Indian plate of Gondwana as it drifted northward (Drew and Hancock, 1999). Consequently, the centre of evolution of this group has been regarded as the Indian plate and, after unification with Laurasia, speciating and dispersing in two major waves, one to Africa and the other across Asia/South-east Asia and the South Pacific (see Drew and Hancock, 1999, for a detailed explanation).

During the late Cretaceous when active dacine speciation was occurring on the Indian plate, the flora of that region contained tropical and subtropical rainforests, which today are recognized as the endemic habitat for most species in South-east Asia to the South Pacific (Drew and Hancock, 1999).

THE HOST PLANT AND ITS INFLUENCE ON SPECIATION IN THE DACINI

Ecological studies such as those published by Drew (1987), Drew and Lloyd (1987) and Drew *et al*. (2008) have demonstrated that dacine species have a close association with their host plant(s) and that their reproductive behaviour is dependent on biological factors in the host plant. This relationship has provided a basis for Drew (2004) proposing a process of coevolution between

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dacine species and their endemic host plants. Indeed, evolving host plant species and associated changes within the host environment would have a direct influence on the development of fruit fly species.

In the South-east Asian and Pacific regions, extensive host plant surveys, particularly in the tropical and subtropical rainforests, have provided substantial information on the endemic fruit fly species and their host plant relationships (Allwood *et al*., 1999; Hancock *et al*., 2000a; Leblanc *et al*., 2012). While such evidence has supported the fact that there has been extensive speciation in this rainforest habitat, it has also provided data to enable the assembly of species into subgenera, particularly within the genus *Bactrocera* Macquart (Drew and Hancock, 2016; Hancock and Drew, 2006, 2015, 2016, 2017a,b,c,d,e, 2018a,b,c, 2019). The prolific speciation in plants within the Indo-Malayan rainforests has undoubtedly led to the large number of dacine species in that ecosystem. The land mass of Papua New Guinea and Indonesian Papua contains the largest number of rainforest plant genera and species in the region from India to the South Pacific and consequently the largest number of dacine species, particularly within the genus *Bactrocera* (Drew, 2004).

While the tropical/subtropical rainforest ecosystem was established on the Indian plate prior to its unification with Laurasia, together with the early Dacini stock, research by Schaefer *et al*. (2008) indicates an Asian origin of the family Cucurbitaceae with a spread into the epicentre of the Dacini when the remainder of Asia joined with India, well after the development of the genera *Dacus* and *Bactrocera*. Consequently, *Dacus* and *Bactrocera* evolved in the rainforest ecosystem, with some species utilizing cucurbit hosts at a later date.

Further research by Suhara and Kuriachan (1996) points to the possibility that some genera of Cucurbitaceae in India and Africa have different evolutionary pasts. This concept fits with the known speciation in *Dacus* and *Bactrocera* where in Africa there is limited usage by *Dacus* species in cucurbit hosts while, in comparison, *Zeugodacus* group species in the Asian-Pacific region have a high usage of Cucurbitaceae. The known native cucurbit host plants throughout South-east Asia and the South Pacific are vines that grow in the rainforests, indicating that, as the genus *Bactrocera* evolved in the rainforest ecosystem, some subgroups (now classified as subgenera) speciated in a range of cucurbit species. This current knowledge demonstrates a strong evolutionary link of the subgenera in the *Zeugodacus* group to the genus *Bactrocera* and a weak link to *Dacus.*

Systematic Analysis of the Fauna of Papua New Guinea and Associated Biogeographical Territories

We currently classify the dacine fauna of Papua New Guinea and associated biogeographical territories into two genera, *Bactrocera* Macquart (with 21 subgenera) and *Dacus* Fabricius (with three subgenera). These, plus subgenus *Diplodacus* May, which occurs in north-eastern Australia and the Torres Strait Islands, are as follows:

Genus *Bactrocera*
Subgenus *Apodacus* Perkins
Subgenus *Austrodacus* Perkins
Subgenus *Bactrocera* Macquart
Subgenus *Bulladacus* Drew & Hancock
Subgenus *Calodacus* Hancock
Subgenus *Diplodacus* May
Subgenus *Heminotodacus* Drew
Subgenus *Hemizeugodacus* Hardy
Subgenus *Javadacus* Hardy
Subgenus *Neozeugodacus* May
Subgenus *Paradacus* Perkins
Subgenus *Parasinodacus* Drew & Romig
Subgenus *Paratridacus* Shiraki
Subgenus *Parazeugodacus* Shiraki
Subgenus *Perkinsidacus* Hancock & Drew
Subgenus *Queenslandacus* Drew
Subgenus *Semicallantra* Drew
Subgenus *Sinodacus* Zia
Subgenus *Tetradacus* Miyake
Subgenus *Trypetidacus* Drew
Subgenus *Zeugodacus* Hendel

Genus *Dacus*
Subgenus *Callantra* Walker
Subgenus *Mellesis* Bezzi
Subgenus *Neodacus* Perkins

The known fauna consists of 270 species in the genus *Bactrocera* and 26 species in the genus *Dacus.*

Because of the economic importance of the Dacini, with Drew and Romig (2013) having recorded 48 major pest species over the South-east Asian to Pacific region, it is essential to have morphological definitions of genera, subgenera and species that are supported by sound scientific criteria, especially their evolutionary biogeography and ecology. The division of the Tribe Dacini into two genera based on morphology, the genus *Dacus* with fused abdominal terga and the genus *Bactrocera* with free terga (terga III–V separated by a soft membrane), links with the original concept of dispersal of two major groups from the Indian plate, one into Africa (*Dacus*) and the other into Asia (*Bactrocera*). Furthermore, the major endemic host plants of *Dacus* are in the family Asclepiadaceae, primarily in the drier savannah ecosystem, while those of *Bactrocera* belong to numerous plant families in the Indo-Malayan rainforests. With regard to host plant ecology in the rainforests, species of Cucurbitaceae are

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common and have supported the high level of speciation within the *Zeugodacus* group of subgenera. Approximately 50% of species in this taxonomic group utilize cucurbit species (flowers or fruit), while the remainder (including the most plesiomorphic subgenera) infest rainforest tree fruits. In combining this information on biogeographic history, morphology and ecology, the available data support the use of *Zeugodacus* and related species groups as subgenera within *Bactrocera*.

With regard to current biogeographic knowledge of the fauna of Papua New Guinea and Indonesian Papua, there are strong links through both shared species and morphologically related species to Wallacea, north-eastern Australia, the Bismarck Archipelago, Solomon Islands and Vanuatu. Further surveys will undoubtedly enhance these linkages. In general, there is a slight separation in species with altitude, whereas in the lowland areas most species are ubiquitous (Drew, 1989; Clarke *et al*., 2004). In addition to the shared relationships, Wallacea, north-eastern Australia, the Bismarck Archipelago, Solomon Islands and Vanuatu also possess their own unique fauna.

KEY TO GENERA AND SUBGENERA RECORDED IN THE AUSTRALIAN-PACIFIC REGION

1. Abdominal terga fused along intersegmental lines; abdomen shape elongate oval to elongate oval and petiolate……Genus *Dacus* Fabricius……2

Abdominal terga not fused, joined by membrane along intersegmental lines between terga III, IV and V; abdomen shape generally oval……Genus *Bactrocera* Macquart……4

2. Abdomen shape elongate oval to pyriform and petiolate with abdominal tergum I longer than wide……3

Abdomen shape elongate oval, not strongly petiolate and with abdominal tergum I quadrate or wider than long ……subgenus *Neodacus* Perkins

3. Abdominal tergum II with a black medial vitta and anal stripe absent, if not then scutum with a narrow and elongate yellow medial postsutural vitta or abdominal tergum III enlarged medially and strongly convex posteriorly ……subgenus *Mellesis* Bezzi

Abdominal tergum II without a black medial vitta, anal stripe present and scutum without a yellow postsutural medial vitta; abdominal tergum III not enlarged medially and evenly convex posteriorly.....……subgenus *Callantra* Walker

4. Postpronotal seta present and positioned posterolaterally; scutellum large and bilobed; body fulvous to red-brown with a glossy transparent appearance……subgenus *Notodacus* Perkins

Postpronotal seta absent (if present then not posterolateral on postpronotum); scutellum and body not as above.....……5

5. Posterior lobe of male surstylus short to medium in length and sometimes broad, if relatively long and narrow then not finger-like and abdominal sternite V of male with a deep concavity in posterior margin……6

Posterior lobe of male surstylus elongate, finger-like and narrow; abdominal sternite V of male with a slight concavity in posterior margin……*Zeugodacus* group of subgenera.....18

6. Abdominal sternite V of male with a slight concavity in posterior margin……*Tetradacus* and *Melanodacus* groups of subgenera.....7

Abdominal sternite V of male with a deep concavity in posterior margin……*Bactrocera* group of subgenera……12

7. Abdomen shape elongate oval to elongate oval and petiolate……....……...….subgenus *Tetradacus* Miyake

Abdomen shape oval…….……*Melanodacus* group of subgenera.……8

8. Scutum with medial postsutural yellow vitta present…..……..……....subgenus *Hemizeugodacus* Hardy

Scutum with medial postsutural yellow vitta absent……..……9

9. Abdominal tergum III of male with pecten present…….……10

Abdominal tergum III of male with pecten absent…….……..……11

10. Wing with anal streak distinct…….……subgenus *Neozeugodacus* May

Wing with anal streak absent or extremely narrow……..……subgenus *Parazeugodacus* Shiraki (some species)

11. Scutellum with two apical setae……..…….....…...……subgenus *Parazeugodacus* Shiraki (some species)

Scutellum with two apical and two basal setae……...……...……subgenus *Paratridacus* Shiraki

12. Wing of male with a bulla or patch of cilia in or adjacent to the cell bcu extension; ceromata on abdominal tergum V absent.....……...……subgenus *Bulladacus* Drew & Hancock

Wing of male without a bulla or patch of cilia in or adjacent to the cell bcu extension; ceromata on abdominal tergum V present……..……..……13

13. Scutum with medial postsutural yellow vitta present; ceromata on abdominal tergum V narrow and transverse…….....…….……subgenus *Apodacus* Perkins

Scutum with medial postsutural yellow vitta absent; ceromata on abdominal tergum V rounded.....……14

14. Antennae elongate (*Mellesis*-like), with combined lengths greater than vertical length of head …….....……..…….....…subgenus *Semicallantra* Drew

Antennae short with combined lengths smaller than vertical length of head……...……15

15. Wing with cell bcu extension elongate, extending more than half the length of vein CuA+A1; abdominal tergum III of male usually with pecten present…...……...…subgenus *Bactrocera* Macquart

Wing with cell bcu extension short, not extending more than half the length of vein CuA+A1; abdominal tergum III of male with pecten absent……....……....……16

16. Anatergite black; wing with cell bcu extension vestigial, much shorter than the remainder of cell bcu and extending less than one-quarter of the length of vein CuA+A1; anepisternal stripe not reaching postpronotal lobe anteriorly and supra-alar and prescutellar acrostichal setae both absent…..……..……..……..……..……..……..……..……subgenus *Trypetidacus* Drew

Anatergite yellow; wing with cell bcu extension distinct, approximately as long as the remainder of cell bcu and extending approximately half the length of vein CuA+A1; if anepisternal stripe not reaching postpronotal lobe anteriorly then supra-alar and prescutellar acrostichal setae not both absent……17

17. Anepisternal stripe reaching postpronotal lobe anteriorly; postsutural lateral yellow vittae absent; supra-alar and prescutellar acrostichal setae both absent……subgenus *Queenslandacus* Drew

Anepisternal stripe not reaching postpronotal lobe anteriorly; postsutural lateral yellow vittae present; supra-alar and prescutellar acrostichal setae not both absent (note: some extralimital species have *either* the anepisternal lobe reaching postpronotal lobe anteriorly *or* postsutural lateral yellow vittae absent)…….subgenus *Calodacus* Hancock

18. Scutum with medial postsutural yellow vitta absent……19

Scutum with medial postsutural yellow vitta present……22

19. Postpronotal lobe with a single distinct seta present…..subgenus *Heminotodacus* Drew

Postpronotal lobe without a distinct seta……20

20. Abdominal tergum III of male with pecten absent…..subgenus *Perkinsidacus* Hancock & Drew

Abdominal tergum III of male with pecten present……21

21. Scutum with two apical setae; if two basal setae are also present then the prescutellar acrostichal setae are present……subgenus *Parasinodacus* Drew & Romig

Scutum with two apical and two basal setae present…….subgenus *Paradacus* Perkins

22. Abdominal tergum III of male with pecten absent; scutum with lateral postsutural yellow vittae present…….subgenus *Austrodacus* Perkins

Abdominal tergum III of male with pecten present; if pecten absent then scutum without lateral postsutural yellow vittae……23

23. Supra-alar and prescutellar acrostichal setae absent……subgenus *Diplodacus* May

Prescutellar acrostichal setae present; supra-alar setae present or absent……*Zeugodacus* subgroup……..24

24. Primary hosts are flowers of species of Cucurbitaceae……subgenus *Zeugodacus* Hendel

Primary hosts are fruits of species of Cucubitaceae, Celestraceae, Euphorbiaceae, Loganiaceae……subgenus *Javadacus* Hardy

Species of Dacini Recorded from Papua New Guinea, Indonesian Papua (West Papua, Central Papua, Papua), Associated Islands and Bougainville

Species marked* have only been recorded from the former Irian Jaya (now Indonesian Papua = West Papua, Central Papua, Papua). We recognize that most species are distributed across mainland Papua New Guinea and Indonesian Papua, with some species endemic to islands in the Bismarck Archipelago. Records for Torres Strait Islands are only included for those located within the border of Papua New Guinea.

abdoangusta (Drew), *Bactrocera (Javadacus)*
abdoaurantiaca Drew, *Bactrocera (Austrodacus)*
abdofuscata (Drew), *Bactrocera (Bactrocera)*
abdolonginqua (Drew), *Bactrocera (Bactrocera)*
abdomininigra Drew, *Bactrocera (Neozeugodacus)*
abdonigella (Drew), *Bactrocera (Bactrocera)*
abdopallescens (Drew), *Bactrocera (Parasinodacus)*
abnormis (Hardy), *Bactrocera (Zeugodacus)*
abscondita (Drew & Hancock), *Bactrocera (Bactrocera)*
absidata Drew, *Bactrocera (Bactrocera)*
abundans Drew, *Bactrocera (Bactrocera)*
aceraglans White & Evenhuis, *Bactrocera (Bulladacus)*
aceromata White & Evenhuis, *Bactrocera (Bulladacus)*
aemula Drew, *Bactrocera (Bactrocera)*
aeroginosa (Drew & Hancock), *Bactrocera (Bactrocera)*
aglaiae (Hardy), *Bactrocera (Hemizeugodacus)*
aiyurae new species, *Bactrocera (Zeugodacus)*
alampeta Drew, *Bactrocera (Austrodacus)*
alarifumidus Drew, *Dacus (Neodacus)*
alatifuscatus new species, *Dacus (Mellesis)*
alulapictus Drew, *Dacus (Neodacus)*
alyxiae (May), *Bactrocera (Bactrocera)*
amoena (Drew), *Bactrocera (Zeugodacus)*
ampla (Drew), *Bactrocera (Bactrocera)*
anchitrichota Drew, *Bactrocera (Javadacus)*
anfracta Drew, *Bactrocera (Bactrocera)*
anglimpiae new species, *Bactrocera (Zeugodacus)*
angusticostata Drew, *Bactrocera (Zeugodacus)*
angustifasciata Drew, *Bactrocera (Bactrocera)*
anthracina (Drew), *Bactrocera (Bactrocera)*
antigone (Drew & Hancock), *Bactrocera (Bactrocera)*
aquila (Drew), *Bactrocera (Semicallantra)*
arbuscula new species, *Bactrocera (Tetradacus)*
assita Drew, *Bactrocera (Bactrocera)*
asteriscus new species, *Dacus (Neodacus)*
aterrima (Drew), *Bactrocera (Bactrocera)*
atramentata (Hering), *Bactrocera (Bactrocera)*
atriliniellata Drew, *Bactrocera (Bactrocera)*
atriscuta new species, *Bactrocera (Bactrocera)*
atrisetosa (Perkins), *Bactrocera (Austrodacus)*
**atypica* White & Evenhuis, *Bactrocera (Parasinodacus)*
aurantiaca (Drew & Hancock), *Bactrocera (Bactrocera)*
aurantiventer Drew, *Bactrocera (Zeugodacus)*
axanthinus White & Evenhuis, *Dacus (Callantra)*
axanus (Hering), *Dacus (Callantra)*
badius Drew, *Dacus (Neodacus)*
bainingsiae new species, *Bactrocera (Zeugodacus)*
balagawii Drew, *Bactrocera (Bactrocera)*
bancroftii (Tryon), *Bactrocera (Bactrocera)*
barringtoniae (Tryon), *Bactrocera (Bactrocera)*
bellulus Drew & Hancock, *Dacus (Neodacus)*
biarcuata (Walker), *Bactrocera (Bactrocera)*
bimaculosus new species, *Dacus (Neodacus)*
bisianumu new species, *Bactrocera (Bactrocera)*
bogiae new species, *Bactrocera (Bactrocera)*
brachus (Drew), *Bactrocera (Zeugodacus)*
breviaculeus (Hardy), *Bactrocera (Bactrocera)*
brevistriata (Drew), *Bactrocera (Bactrocera)*
bryoniae (Tryon), *Bactrocera (Bactrocera)*
bubiae new species, *Bactrocera (Bactrocera)*
buinensis Drew, *Bactrocera (Neozeugodacus)*
bukaensis new species, *Bactrocera (Bactrocera)*
bullata Drew, *Bactrocera (Bulladacus)*
buloloensis Drew, *Bactrocera (Bactrocera)*
buvittata Drew, *Bactrocera (Zeugodacus)*
caccabata new species, *Bactrocera (Bactrocera)*
caliginosa (Hardy), *Bactrocera (Bactrocera)*
calophylli (Perkins & May), *Bactrocera (Calodacus)*

 The Fruit Fly Fauna (Diptera: Tephritidae: Dacinae) of Papua New Guinea, Indonesian Papua, Associated Islands and Bougainville (R.A.I. Drew and M.C. Romig)
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capillaris (Drew), *Dacus (Callantra)*
carbonaria (Hendel), *Bactrocera (Bactrocera)*
centraliae new species, *Bactrocera (Bactrocera)*
cerberae new species, *Bactrocera (Semicallantra)*
cheesmanae (Perkins), *Bactrocera (Apodacus)*
chorista (May), *Bactrocera (Javadacus)*
cinnamea Drew, *Bactrocera (Bactrocera)*
circamusae Drew, *Bactrocera (Bactrocera)*
citroides Drew, *Bactrocera (Zeugodacus)*
commina Drew, *Bactrocera (Bactrocera)*
concolor Drew, *Dacus (Neodacus)*
confluens (Drew), *Bactrocera (Bactrocera)*
congener Drew, *Bactrocera (Bactrocera)*
consectorata Drew, *Bactrocera (Bactrocera)*
contermina Drew, *Bactrocera (Bactrocera)*
contigua Drew, *Bactrocera (Bactrocera)*
coracinus (Drew), *Bactrocera (Perkinsidacus)*
cucurbitae (Coquillett), *Bactrocera (Javadacus)*
curiosa new species, *Bactrocera (Bulladacus)*
curreyi Drew, *Bactrocera (Bactrocera)*
curta (Drew), *Bactrocera (Javadacus)*
curvabilis new species, *Dacus (Neodacus)*
dapsiles Drew, *Bactrocera (Bactrocera)*
daruensis Drew, *Bactrocera (Bactrocera)*
daula Drew, *Bactrocera (Zeugodacus)*
decipiens (Drew), *Bactrocera (Javadacus)*
decumana (Drew), *Bactrocera (Bactrocera)*
decurtans (May), *Bactrocera (Bactrocera)*
denigrata (Drew), *Bactrocera (Bactrocera)*
diallagma Drew, *Bactrocera (Bactrocera)*
diaphana (Hering), *Bactrocera (Bulladacus)*
diospyri Drew, *Bactrocera (Bactrocera)*
discors Drew, *Dacus (Mellesis)*
dissidens Drew, *Bactrocera (Heminotodacus)*
dissimilis Drew, *Dacus (Neodacus)*
dyscrita (Drew), *Bactrocera (Bactrocera)*
dysoxyli new species, *Bactrocera (Bactrocera)*
emarginata (Perkins), *Bactrocera (Zeugodacus)*
endiandrae (Perkins & May), *Bactrocera (Bactrocera)*
enochra (Drew), *Bactrocera (Bactrocera)*
epicharis (Hardy), *Bactrocera (Bactrocera)*
erubescentis (Drew & Hancock), *Bactrocera (Bactrocera)*
exigua (May), *Bactrocera (Queenslandacus)*
eximia Drew, *Bactrocera (Bulladacus)*
expandens (Walker), *Bactrocera (Paratridacus)*
expandosa new species, *Bactrocera (Bactrocera)*
exspoliata (Hering), *Bactrocera (Bactrocera)*
fergussoniensis Drew, *Bactrocera (Bactrocera)*
finitima Drew, *Bactrocera (Bactrocera)*
frauenfeldi (Schiner), *Bactrocera (Bactrocera)*
froggatti (Bezzi), *Bactrocera (Bactrocera)*
fuliginus (Drew & Hancock), *Bactrocera (Bactrocera)*
fulvicauda (Perkins), *Bactrocera (Bactrocera)*
**fulvoabdominalis* White & Evenhuis, *Bactrocera (Zeugodacus)*
fumica new species, *Bactrocera (Bactrocera)*
furfurosa Drew, *Bactrocera (Bactrocera)*
furvescens Drew, *Bactrocera (Bactrocera)*
furvilineata Drew, *Bactrocera (Bactrocera)*
fuscalata Drew, *Bactrocera (Bactrocera)*
**fuscohumeralis* White & Evenhuis, *Bactrocera (Bactrocera)*
gabensiae new species, *Bactrocera (Bactrocera)*
**grandifasciata* White & Evenhuis, *Bactrocera (Bactrocera)*
hamaceki Drew & Romig, *Bactrocera (Javadacus)*
hardyi (Drew), *Dacus (Neodacus)*
hastigerina (Hardy), *Bactrocera (Calodacus)*
hoedi White, *Bactrocera (Parasinodacus)*
hollingsworthi Drew & Romig, *Bactrocera (Bactrocera)*
hypomelaina Drew, *Bactrocera (Bactrocera)*
impar Drew, *Dacus (Mellesis)*
inconstans Drew, *Bactrocera (Bactrocera)*
indecora (Drew), *Bactrocera (Bactrocera)*
insolita new species, *Bactrocera (Calodacus)*
invisitata Drew, *Bactrocera (Trypetidacus)*
ismayi Drew, *Bactrocera (Bactrocera)*
jarvisi (Tryon), *Bactrocera (Bactrocera)*
kaiauiae new species, *Bactrocera (Bactrocera)*
kauiae new species, *Bactrocera (Bactrocera)*
kelaena Drew, *Bactrocera (Bactrocera)*
keravatiae new species, *Bactrocera (Bactrocera)*
kokodiae new species, *Bactrocera (Bactrocera)*
kreeriae new species, *Dacus (Neodacus)*
kunvawaensis new species, *Bactrocera (Bactrocera)*
labubulu new species, *Bactrocera (Bactrocera)*
laensis new species, *Bactrocera (Bactrocera)*
lalokiae new species, *Dacus (Neodacus)*
lampabilis (Drew), *Bactrocera (Bactrocera)*
laticosta Drew, *Bactrocera (Bactrocera)*
latilineata Drew, *Bactrocera (Bactrocera)*
latissima Drew, *Bactrocera (Bactrocera)*
leblanci new species, *Bactrocera (Neozeugodacus)*
lineata (Perkins), *Bactrocera (Bactrocera)*
longicornis Macquart, *Bactrocera (Bactrocera)*
macrovittata Drew, *Bactrocera (Zeugodacus)*
madangiae new species, *Bactrocera (Zeugodacus)*
magiae new species, *Bactrocera (Zeugodacus)*
**magnicauda* White & Evenhuis, *Bactrocera (Paradacus)*
malasaitiae new species, *Bactrocera (Semicallantra)*
manusiae new species, *Bactrocera (Bactrocera)*
maprikensis Drew, *Dacus (Neodacus)*
mayi (Drew), *Dacus (Callantra)*
melanogaster Drew, *Bactrocera (Bactrocera)*
melanohumeralis Drew, *Dacus (Mellesis)*
melanoscutata Drew, *Bactrocera (Paratridacus)*
melanothoracica Drew, *Bactrocera (Bactrocera)*
memnonia (Drew), *Bactrocera (Semicallantra)*
meraiensis new species, *Bactrocera (Bactrocera)*
mesonotaitha Drew, Bactrocera (*Zeugodacus*)
mesonotochra Drew, *Bactrocera (Tetradacus)*
mimulus Drew, *Bactrocera (Bactrocera)*
mitparingii new species, *Bactrocera (Zeugodacus)*
moluccensis (Perkins), *Bactrocera (Bactrocera)*
monostriata new species, *Bactrocera (Bactrocera)*
morobiensis Drew, *Bactrocera (Bactrocera)*

morula Drew, *Bactrocera (Bactrocera)*
murrayi (Perkins), *Bactrocera (Bactrocera)*
musae (Tryon), *Bactrocera (Bactrocera)*
neoabdonigella new species, *Bactrocera (Bactrocera)*
neoaeroginosa new species, *Bactrocera (Bactrocera)*
neoaglaiae new species, *Bactrocera (Hemizeugodacus)*
neocheesmanae Drew, *Bactrocera (Apodacus)*
neohumeralis (Hardy), *Bactrocera (Bactrocera)*
neonigrita Drew, *Bactrocera (Bactrocera)*
neopallescentis Drew, *Bactrocera (Zeugodacus)*
neosignatifrons new species, *Dacus (Neodacus)*
nigella (Drew), *Bactrocera (Bactrocera)*
nigrescens (Drew), *Bactrocera (Bactrocera)*
nigrescentis (Drew), *Bactrocera (Bactrocera)*
nigricula (Drew), *Bactrocera (Semicallantra)*
nigrolobus new species, *Dacus (Callantra)*
**nigroscutata* White & Evenhuis, *Bactrocera (Bactrocera)*
nigrovittata Drew, *Bactrocera (Bactrocera)*
novotnyi new species, *Bactrocera (Tetradacus)*
obfuscata Drew, *Bactrocera (Bactrocera)*
oblineata Drew, *Bactrocera (Bactrocera)*
obliqua (Malloch), *Bactrocera (Bactrocera)*
ochracea Drew, *Bactrocera (Bactrocera)*
ochromarginis (Drew), *Bactrocera (Bactrocera)*
ohuiae new species, *Bactrocera (Bactrocera)*
oiyaripensis new species, *Bactrocera (Zeugodacus)*
pacificae Drew & Romig, *Bactrocera (Bulladacus)*
papayae Drew & Hancock, *Bactrocera (Bactrocera)*
papuaensis (Malloch), *Bactrocera (Austrodacus)*
parabancroftii Drew, *Bactrocera (Bactrocera)*
paraendiandrae new species, *Bactrocera (Bactrocera)*
parafroggatti Drew & Romig, *Bactrocera (Bactrocera)*
paramusae Drew, *Bactrocera (Bactrocera)*
paraochracea new species, *Bactrocera (Bactrocera)*
parasepikae new species, *Bactrocera (Zeugodacus)*
paulula Drew, *Bactrocera (Zeugodacus)*
penefurva Drew, *Bactrocera (Bulladacus)*
peninsularis (Drew & Hancock), *Bactrocera (Bactrocera)*
pepisalae (Froggatt), *Bactrocera (Bactrocera)*
petila Drew, *Bactrocera (Bactrocera)*
phaea (Drew), *Bactrocera (Bactrocera)*
picea (Drew), *Bactrocera (Bactrocera)*
pisinna Drew, *Bactrocera (Bactrocera)*
pometiae new species, *Bactrocera (Bactrocera)*
popondettiensis Drew, *Bactrocera (Bactrocera)*
procera new species, *Bactrocera (Tetradacus)*
prolixa Drew, *Bactrocera (Bactrocera)*
propedistincta Drew, *Bactrocera (Bactrocera)*
pseudodistincta (Drew), *Bactrocera (Bactrocera)*
**pura* White, *Bactrocera (Parasinodacus)*
quadrata (May), *Bactrocera (Bactrocera)*
quasisilvicola Drew, *Bactrocera (Bactrocera)*
ramuensis Drew, *Bactrocera (Bactrocera)*
raunsepnaensis new species, *Bactrocera (Bactrocera)*
reclinata Drew, *Bactrocera (Bactrocera)*
recurrens (Hering), *Bactrocera (Bactrocera)*
reduncа (Drew), *Bactrocera (Bactrocera)*
reflexa (Drew), *Bactrocera (Zeugodacus)*
repanda Drew, *Bactrocera (Bactrocera)*
resima Drew, *Bactrocera (Bactrocera)*
retrorsa (Drew), *Bactrocera (Bactrocera)*
rhabdota Drew, *Bactrocera (Bactrocera)*
robertsi Drew, *Bactrocera (Bactrocera)*
romigae (Drew & Hancock), *Bactrocera (Bactrocera)*
rounaensis new species, *Bactrocera (Bactrocera)*
rufivitta Drew, *Bactrocera (Bactrocera)*
rufofuscula (Drew & Hancock), *Bactrocera (Bactrocera)*
rufoscutella new species, *Bactrocera (Zeugodacus)*
rutila (Hering), *Bactrocera (Bactrocera)*
rutilana new species, *Bactrocera (Bactrocera)*
sandaracina Drew, *Bactrocera (Javadacus)*
saramandiae new species, *Bactrocera (Bactrocera)*
sari new species, *Bactrocera (Bactrocera)*
satanellus (Hering), *Bactrocera (Parazeugodacus)*
seguyi (Hering), *Bactrocera (Bactrocera)*
sepikae Drew, *Bactrocera (Zeugodacus)*
simulata (Malloch), *Bactrocera (Bactrocera)*
singularis Drew, *Bactrocera (Zeugodacus)*
solomonensis Malloch, *Dacus (Callantra)*
speculifera (Walker), *Bactrocera (Bactrocera)*
strigifinis (Walker), *Bactrocera (Zeugodacus)*
surrufula Drew, *Bactrocera (Zeugodacus)*
sylvania new species, *Bactrocera (Bactrocera)*
terminaliae Drew, *Bactrocera (Bactrocera)*
thistletoni Drew, *Bactrocera (Bactrocera)*
tikelingiae new species, *Bactrocera (Bactrocera)*
tinomiscii Drew, *Bactrocera (Bactrocera)*
torresiae Huzham & Hancock, *Bactrocera (Bactrocera)*
**tortuosa* White & Evenhuis, *Bactrocera (Bactrocera)*
toxopeusi (Hering), *Bactrocera (Semicallantra)*
triangularis (Drew), *Bactrocera (Zeugodacus)*
trichota (May), *Bactrocera (Javadacus)*
trifaria (Drew), *Bactrocera (Bactrocera)*
trilobata Drew & Hancock, *Bactrocera (Bulladacus)*
trivialis (Drew), *Bactrocera (Bactrocera)*
trivirgulata new species, *Bactrocera (Bactrocera)*
turneri Drew, *Bactrocera (Bactrocera)*
umbrosa (Fabricius), *Bactrocera (Bactrocera)*
unicolor Hendel, *Dacus (Mellesis)*
unilateralis Drew, *Bactrocera (Zeugodacus)*
unilineata Drew, *Bactrocera (Bactrocera)*
unistriata (Drew), *Bactrocera (Bactrocera)*
univittata (Drew), *Bactrocera (Zeugodacus)*
ustulata Drew, *Bactrocera (Bactrocera)*
uvariae Drew, *Bactrocera (Bactrocera)*
vespiformis Hendel, *Dacus (Mellesis)*
visenda (Hardy), *Bactrocera (Apodacus)*
vulgaris (Drew), *Bactrocera (Bactrocera)*
waidoriae new species, *Bactrocera (Bactrocera)*
wanangiae Drew & Hancock, *Bactrocera (Bulladacus)*
**warisensis* White & Evenhuis, *Bactrocera (Bulladacus)*
wilhelmiae new species, *Bactrocera (Hemizeugodacus)*
xanthovelata new species, *Bactrocera (Zeugodacus)*
yayamiae new species, *Bactrocera (Bactrocera)*

Major Pest Species in Papua New Guinea

Within the genus *Bactrocera*, a large number of sibling species complexes have been identified, some containing major pest species (Drew, 1989; Drew and Romig, 2013). While diagnosis of species within these complexes is difficult, extensive field research across the Indo-Malayan and Pacific regions, supported by studies combining morphology (including wing shapes, and female and male genitalia), cytology, DNA and pheromone chemistry have provided valuable data upon which to define species. The *dorsalis*, *frauenfeldi* and *tau* complexes are examples where Drew and Romig (2013, 2016) were able to provide definitions of species based on comprehensive analyses of research data.

The extensive speciation within the Dacini in Papua New Guinea has resulted in the occurrence of a large number of endemic pest species. In addition, two major pest species have been introduced from South-east Asia, *Bactrocera (Bactrocera) papayae* Drew & Hancock and *Bactrocera (Javadacus) cucurbitae* (Coquillett).

Extensive host fruit sampling between 1997 and 2000, carried out under the auspices of externally funded aid projects, has provided a valuable understanding of the economic status and distribution of the pest species (Leblanc *et al*., 2012).

BACTROCERA (BACTROCERA) BRYONIAE (TRYON)

Bactrocera bryoniae is common along the east coast of Australia, occurring in large populations as far south as northern New South Wales and across northern Australia and the Torres Strait Islands. In Papua New Guinea, it occurs over the mainland and the Bismarck Archipelago, where it is an occasional pest of bananas and a major pest of birdseye chilli (*Capsicum annuum* L.). Because *B. bryoniae* in Australia is rarely reared from edible host fruits, it is possible that the Papua New Guinea population is a separate sibling species. As noted below, this is a similar situation for the two allopatric populations of *Bactrocera neohumeralis*. *B. bryoniae* in Papua New Guinea is not a serious biosecurity threat to other countries in the region.

BACTROCERA (BACTROCERA) FRAUENFELDI (SCHINER) (MANGO FRUIT FLY)

Bactrocera frauenfeldi belongs to a complex of species distributed between South-east Asia and Vanuatu. Its closest relative morphologically is *Bactrocera (Bactrocera) albistrigata* (de Meijere) in South-east Asia, and these two populations could be conspecific. In Wallacea, a recognized biogeographic transition zone, specimens that exhibit the characters of both species are present. Both species also have a similar host fruit range. In Papua New Guinea, *B. frauenfeldi* has been reared from 31 plant families, demonstrating its wide host range. It is a serious pest of edible fruits such as citrus, guava and mango, all important food sources in lowland village provinces. It was first detected in Cape York, Queensland, in 1972 and over time has spread as far south as Townsville, demonstrating its importance as a biosecurity threat to countries in the South Pacific region.

BACTROCERA (BACTROCERA) MUSAE (TRYON) (BANANA FRUIT FLY)

Bactrocera musae is a well-known pest of bananas, distributed in Queensland north from Townsville, Torres Strait Islands, Papua New Guinea and the Bismarck Archipelago. Its presence in the Solomon Islands has not been confirmed (Drew and Romig, 2001). This species belongs to a complex of morphologically similar species, some of which occur in Papua New

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Guinea. However, it is unique in having bananas as its major host plant and in being able to oviposit in hard green fruit. Ecologically, *B. musae* appears to have adapted to the wet tropics and thus is not a major biosecurity risk to countries beyond its present distribution.

BACTROCERA (BACTROCERA) NEOHUMERALIS (HARDY)

Bactrocera neohumeralis has long been recognized as a 'sister' species to *Bactrocera (Bactrocera) tryoni* (Froggatt), having similar host ranges and being sympatric for most of their geographic distributions. Although both species are distinguishable morphologically, and possess different daily courtship and mating periods, they are readily hybridized under laboratory conditions to produce fertile progeny. In Papua New Guinea, *B. neohumeralis* has been reared only from a single sample of guava. Although recognized as a major pest species in north-eastern Australia, its pest status in Papua New Guinea appears to be minor and in fact could be a separate strain or sibling species within the *tryoni* complex. This Papua New Guinea population is not a biosecurity risk to other countries in the region.

BACTROCERA (BACTROCERA) PAPAYAE DREW & HANCOCK (ASIAN PAPAYA FRUIT FLY)

Bactrocera papayae is a major pest species in the *dorsalis* complex. Originating in South-east Asia, on 17 October 1995 it was detected in Cairns, North Queensland, having invaded from the Torres Strait Islands where it was first detected in March 1993. A grower in East Trinity, near Cairns, brought the infestation to the attention of government entomologists because of serious damage to green (unripened) papaya causing premature ripening and major crop losses (Cantrell *et al*., 2002). Within 2 weeks of this discovery, the authors (R.A.I. Drew and M.C. Romig) collected bananas on the same farm at East Trinity and had them graded for maturity by a banana specialist horticulturalist. The samples produced specimens of *B. papayae*, the data of which were published by Drew and Romig (2016). These data confirmed results from an Australian Centre for International Agricultural Research (ACIAR) aid project in Malaysia conducted over 6 years from 1983. In this project, Drew and co-workers conducted extensive field fruit surveys throughout the country resulting in the host fruits records published by Allwood *et al*. (1999). *B. papayae* was reared from 161 separate samples of banana (*Musa paradisiaca* L.), most of which were in the green to mature green stage.

With regard to Papua New Guinea, *B. papayae* was first detected in Jayapura on the western end of Indonesian Papua in 1989 when specimens were sent to R.A.I. Drew in Brisbane for identification. These specimens were collected and forwarded by Dr Santianawati at Gadjah Mada University, Yogyakarta, Indonesia. Movement of this invading species from west to east was slow, eventually being detected at Merauke at the eastern end of Indonesian Papua in April 1992 (Bellas, 1996), in the Western Province of Papua New Guinea in May 1992, the Torres Strait Islands in March 1993 and North Queensland in October 1995. During the ACIAR aid project in Papua New Guinea, methyl eugenol male lure trapping was conducted in most provinces resulting in the capture of *B. papayae* in nine provinces and only in small numbers in the Central and Morobe Provinces. Published records (Clarke *et al*., 2004; Leblanc *et al*., 2012) noted that this species was not detected in the eastern banana-growing provinces of Oro, Milne Bay, New Britain, New Ireland, Manus and Bougainville up to 2012. East New Britain is the major commercial banana-growing province. Consequently, *B. papayae* was not reared from bananas during the ACIAR project.

The record of *B. papayae* only infesting yellow ripe bananas (Hancock *et al*., 2000a), based on sampling of yellow ripe fruit only and the acceptance of hard green bananas for interstate trade within Australia (Cantrell *et al*., 2002) during the North Queensland papaya fruit fly eradication programme, did not refer to prior research data obtained from field sampling in a commercial banana plantation in the eradication zone and later published by Drew and Romig (2016).

B. papayae was first recognized as a separate species by Hardy (1973) and later described by Drew and Hancock (1994). Recently, Drew and Romig (2016) presented sound morphological, biogeographic and ecological data confirming the specific status of this species, along with *Bactrocera (Bactrocera) invadens* Drew, Tsuruta & White that has invaded Africa from the Indian subcontinent. The differences in ovipositor measurements and ratios between *Bactrocera (Bactrocera) dorsalis* (Hendel) and *B. papayae*, recorded by Drew and Romig (2016), are based on specimens reared from preferred hosts, demonstrating the differences observed by Hardy (1973) and Drew and Hancock (1994). Hancock (2017) supported the integrity of these species. The unique ecological characteristics of *B. papayae*, and particularly its major host plants, set it apart from other *dorsalis*-complex species. In Papua New Guinea, *B. papayae* has become widespread and is a major pest of cooking bananas. Its ability to infest hard green bananas is unique and results in the loss of significant food sources in villages in provinces as far as East New Britain (D. Tenakanai, personal communication). Host records play an important role in the identification of *Bactrocera* species and also impact trade and biosecurity decisions. These records of *B. papayae* in Papua New Guinea are consistent with those published for South-east Asia by Allwood *et al*. (1999). In that publication, presenting results of extensive field sampling, the following data are significant:

- *Musa paradisiaca* L.: 161 fruit samples produced *B. papayae*; seven fruit samples produced *B. dorsalis*; three fruit samples produced *Bactrocera (Bactrocera) correcta* (Bezzi); zero fruit samples produced *B. carambolae*.
- *Carica papaya* L.: 129 fruit samples produced *B. papayae*; 15 fruit samples produced *B. dorsalis*; one fruit sample produced *B. correcta*; zero fruit samples produced *B. carambolae*.

The preference of *B. papayae* for hard green bananas and mature green papaya was recorded in the South-east Asian sampling as well as in the host records in North Queensland during the *B. papayae* eradication programme, 1995–1999 (Drew and Romig, 2016). This species is not only a major pest but also a serious biosecurity risk to countries in the South Pacific region. It was eradicated from North Queensland by methyl eugenol male annihilation and protein baiting over a 3-year period from late 1995 (Hancock *et al*., 2000b).

BACTROCERA (BACTROCERA) TRIVIALIS (DREW)

Bactrocera trivialis has been recorded throughout Papua New Guinea, West Papua and the Torres Strait Islands. It is a serious pest species, having been recorded from a wide range of edible crops over ten plant families. Major hosts include citrus, guava, mango and capsicum chili. This species does not appear to be a major biosecurity threat as it has not expanded its distribution to associated islands to the east of the Papua New Guinea mainland.

BACTROCERA (BACTROCERA) UMBROSA (FABRICIUS)

Bactrocera umbrosa is widespread from South-east Asia to New Caledonia and Vanuatu in the South Pacific. It is a major pest of *Artocarpus* species, particularly jackfruit and breadfruit. While it causes significant crop losses in breadfruit in Papua New Guinea, it is not a biosecurity threat to other countries in the region as it is already widespread.

BACTROCERA (JAVADACUS) CUCURBITAE (COQUILLETT) (MELON FLY)

Bactrocera cucurbitae is one of the major dacine pest species worldwide. It has been recognized as originally endemic to South-east Asia and is now widespread across northern Africa, the northern Pacific and into the South Pacific as far as the Solomon Islands (see Drew and Romig, 2013, for a detailed distribution). In Papua New Guinea, it is a serious pest of cucurbit crops. Similar to the cucumber fly *Bactrocera (Austrodacus) cucumis* (French) in Australia, it also has the potential to attack tree fruit crops. This species is a serious biosecurity threat to countries in the South Pacific region.

BACTROCERA (JAVADACUS) DECIPIENS (DREW) (PUMPKIN FRUIT FLY)

Bactrocera decipiens has been recorded only from the East New Britain Province of Papua New Guinea. It is a major pest of pumpkins, the only host from which it has been reared. While we are familiar with the polyphagous pest species, within the Dacini there are examples of major pest species that are monophagous. This species is an example of the latter. However, it is not a serious biosecurity threat to countries in the South Pacific region, particularly as pumpkins are not transferred from New Britain to other countries, either in trade or by travellers. It is not attracted to any known male lure.

GENERAL NOTES ON PEST SPECIES

There are at least nine other dacine species in mainland Papua New Guinea, the Bismarck Archipelago and Bougainville that are occasionally recorded from non-economic edible fruits or nuts in villages. These are recorded in Leblanc *et al*. (2001, 2012, 2013) and are regarded as minor pest species. The major Australian pest species *Bactrocera cucumis* and *Bactrocera tryoni* have not been detected in breeding populations in Papua New Guinea, while *Bactrocera (Bactrocera) jarvisi* (Tryon) has been reared only from a wild forest host, *Planchonia papuana* R. Knuth, from Papua New Guinea.

Taxonomy

DESCRIPTIONS OF NEW SPECIES

Genus *Bactrocera* Macquart

Bactrocera (Bactrocera) atriscuta, new species
(Fig. 1)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, Bainings Mts, 3 km SW Malasait, 14.ix.1998, L. Leblanc *et al*., attracted to methyl eugenol.
Paratypes: PAPUA NEW GUINEA: 2 ♂, same data as holotype; 1 ♂, East New Britain Province, Bainings Mts, Malasait 250M, 29.ix.1998, L. Leblanc *et al*., attracted to methyl eugenol.
Location of types: Holotype (T245530) in QMIC; 2 paratypes in QDPC; 1 paratype (T245531) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of medium-sized circular black spots; postpronotal lobe and notopleuron yellow; scutum entirely black with red-brown below lateral postsutural vittae; two lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous to fuscous costal band almost confluent with R_{4+5}, a broad fuscous anal streak, cells bc and c pale fuscous to fuscous, microtrichia in outer corner of cell c only; abdominal terga III–V pale red-brown with a distinct black 'T'-shaped pattern and narrow fuscous lateral margins on terga IV and V.
Description: Male.
Head: Vertical length 1.6 mm. Frons length 1.4 times breadth; fuscous with red-brown around lower lateral margins; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of medium-sized circular black spots; length 0.44 mm. Occiput fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum black with red-brown below lateral postsutural yellow vittae. Pleural areas black with dark red-brown below postpronotal lobes. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a small transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two broad subparallel lateral postsutural vittae ending at *ia*. seta. Postnotum black. Scutellum yellow except for a moderately broad black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous except fore tibiae pale fuscous and hind tibiae fuscous.
Wings: Length 5.4 mm; cells bc and c pale fuscous to fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except for a dark fuscous cell sc, a broad dark fuscous costal band almost confluent with R_{4+5} and paler between R_{2+3} and R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I black with a narrow red-brown transverse band across posterior margin; tergum II red-brown anteriorly with black anterolateral corners, a narrow transverse black band across centre and fulvous posteriorly; terga III–V pale red-brown with a distinct black 'T'-shaped pattern and narrow fuscous lateral margins over terga IV and V. A pair of oval fuscous shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites pale coloured, red-brown.
Attractant: Methyl eugenol.
Female: No known record.
Distribution: East New Britain Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *atriscuta* refers to the black scutum.
Comments: *B. atriscuta* new species is similar to *B. bryoniae* (Drew, 1989: Fig. 63) in possessing similar colour patterns on the scutum and abdomen but differs from this species in having darker cells bc and c, the costal band not confluent

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with R_{4+5} and being attracted to methyl eugenol. It is also similar to *B. buloloensis* (Drew, 1989: Fig. 213) and *B. congener* (Drew, 1989: Fig. 216) in the colour patterns on the scutum and abdomen but differs in having a broader costal band overlapping R_{2+3}, broad parallel-sided lateral postsutural yellow vittae reaching the *ia*. seta and being attracted to methyl eugenol.

Bactrocera (Bactrocera) bisianumu, new species
(Fig. 2)

Type data: Holotype ♂, PAPUA NEW GUINEA: Central Province, Bisianumu Rubber Estate, 1.xii.1998, D. Tenakanai, attracted to cue lure. **Paratypes:** PAPUA NEW GUINEA: 1 ♂, same data as holotype, except 15.x.1998; 1 ♂, Lobulogo, Hiri Tano Highway, 25.v.1999, D. Tenakanai, attracted to cue lure.
Location of types: Holotype (T245532) in QMIC; 1 paratype in QDPC; 1 paratype (T245533) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of medium-sized oval black spots; postpronotal lobe and notopleuron yellow; scutum red-brown with dark red-brown on posterior and lateral margins; two lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe equal in width to notopleuron dorsally; scutellum yellow; wings with a narrow fuscous costal band overlapping R_{2+3}, a broad fuscous anal streak, cells bc and c fulvous, microtrichia in outer corner of cell c only; abdominal terga III–V red-brown with broad dark fuscous to black lateral margins and a narrow medial longitudinal dark fuscous band joined along anterior margin of tergum III.
Description: Male.
Head: Vertical length 1.6 mm. Frons length 1.25 times breadth; red-brown with fuscous around orbital setae; orbital setae black: 1 *s.or.*; 2 *i.or.*; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of medium-sized oval black spots; length 0.49 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum red-brown with dark red-brown on posterior and lateral margins separated by a fuscous 'U'-shaped pattern. Pleural areas red-brown to dark red-brown with fuscous along anterior and posterior margins of mesopleural stripe. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe equal in width to notopleuron dorsally, extending to katepisternum as a small spot, anterior margin straight; anatergite (posterior apex red-brown); anterior two-thirds katatergite (remainder dark red-brown); two lateral postsutural vittae narrowing slightly posteriorly to end at *ia*. seta. Postnotum dark red-brown tending to fuscous laterally. Scutellum yellow with a narrow red-brown basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments fulvous except hind tibiae pale fuscous.
Wings: Length 5.8 mm; cells bc and c fulvous; microtrichia in outer corner of cell c only; remainder of wings colourless except fuscous cell sc, narrow fuscous costal band tending to paler fuscous as it overlaps R_{2+3}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I dark fuscous; tergum II fulvous with a narrow transverse dark fuscous band and narrow dark fuscous lateral margins; terga III–V red-brown with broad lateral dark margins tending to black on tergum III and dark fuscous to black on terga IV and V, a narrow medial longitudinal dark fuscous band over all three terga, the lateral and medial bands tend to join on the anterior margin of tergum III. A pair of oval dark fuscous shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark red-brown.
Attractant: Cue lure.
Female: No known record.
Distribution: Central Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *bisianumu* refers to the type locality.
Comments: *B. bisianumu* new species is similar to *B. abundans* (Drew, 1989: Fig. 174) in possessing similar colour patterns on the scutum and abdomen, a narrow costal band and fulvous cells bc and c. It differs from *B. abundans* in having a narrow mesopleural stripe equal in width to the notopleuron dorsally, broader lateral postsutural yellow vittae, a narrow red-brown basal band on the scutellum and clear wing membranes.

Bactrocera (Bactrocera) bogiae, new species
(Fig. 3)

Type data: Holotype ♂, PAPUA NEW GUINEA: Madang Province, Bogia Station, 26.xi.1998, attracted to Cue lure.
Location of type: Holotype (T245534) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of small teardrop-shaped dark spots; postpronotal lobe with posterior half yellow and anterior half fuscous; notopleuron yellow; scutum fuscous with a pair of medial longitudinal red-brown bands either side of mid-line; two moderately broad lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad costal band that is dark fuscous to R_{2+3} and fuscous as it becomes confluent with R_{4+5}, a broad fuscous anal streak, cells bc and c pale fulvous, microtrichia in outer corner of cell c only; abdominal terga III–V dark red-brown with fuscous along anterior margin of tergum III widening across lateral margins of this tergum and narrow fuscous anterolateral corners on terga IV and V.
Description: Male.
Head: Vertical length 1.8 mm. Frons length 1.2 times breadth; red-brown with dark fuscous around orbital setae; orbital setae black: 1 *s.or.*; 2 *i.or.*; lunule dark fuscous. Ocellar triangle dark fuscous. Face fulvous with a pair of small teardrop-shaped dark spots; length 0.54 mm. Occiput dark fuscous, fulvous along eye margins; antennae short, with

segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum fuscous except for a pair of red-brown longitudinal bands either side of the mid-line. Pleural areas entirely fuscous. Yellow markings as follows: posterior half postpronotal lobe (anterior half fuscous); notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, not continuing to katepisternum, anterior margin straight; anatergite (posterior apex fuscous); anterior half katatergite (remainder fuscous); two moderately broad parallel-sided lateral postsutural vittae ending at *ia*. seta. Postnotum fuscous. Scutellum yellow except for narrow fuscous basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous.
Wings: Length 6.1 mm; cells bc and c pale fulvous; microtrichia in outer corner of cell c only; remainder of wings colourless except for dark fuscous cell sc, a broad costal band confluent with R_{4+5}, dark fuscous to R_{2+3} and fuscous between R_{2+3} and R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I dark fuscous; tergum II fuscous with a narrow fulvous line along posterior margin; terga III–V dark red-brown with fuscous along anterior margin of tergum III widening across lateral margin of this tergum and narrow fuscous anterolateral corners on terga IV and V. A pair of oval dark fuscous shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous to black.
Attractant: Cue lure.
Female: No known record.
Distribution: Madang Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *bogiae* refers to the type locality.
Comments: *B. bogiae* new species is similar to *B. furfurosa* (Drew, 1989: Fig. 131) and *B. obfuscata* (Drew, 1989: Fig. 135) in possessing a pale-coloured scutum, a broad costal band confluent with R_{4+5} and pale femora. It differs from *B. furfurosa* in having fuscous on the anterior half of the postpronotal lobes, the lateral postsutural vittae reaching the *ia*. seta and the abdominal terga III–V mostly red-brown and from *B. obfuscata* in having the mesopleural stripe narrower and equal in width to the notopleuron, cells bc and c pale and abdominal terga III–V mostly red-brown.

Bactrocera (Bactrocera) bubiae, new species
(Fig. 4)

Type data: Holotype ♂, PAPUA NEW GUINEA: Morobe Province, Jim Jacobson's farm, 1 mile from Bubia, 17.vi.1999, S. Balagawi and S. Sar, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1 ♂ (1.vii.1999), 1 ♂ (20.vii.1999), Morobe Province, Bundun, Lae, A. Mararuai *et al*.; 1 ♂, Madang Province, Bogia Station, 19.xi.1999; 1 ♂, Western Highlands Province, Anglimp area, Madan block, 7.7 km East Kagamaga Airport, 28.ix.1999, A. Movis. All attracted to cue lure.
Location of types: Holotype (T245535) in QMIC; 1 paratype in ANIC; 2 paratypes in QDPC; 1 paratype (T245536) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of small- to medium-sized pale fuscous to black spots; postpronotal lobe and notopleuron yellow; scutum black; two lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching almost to anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow fuscous costal band overlapping R_{2+3}, a broad fuscous anal streak, cell c with a pale fulvous tint and cell bc fulvous, microtrichia in outer corner of cell c only; abdominal terga III–V red-brown with a broad medial longitudinal black band and narrow dark fuscous to black longitudinal bands over all three terga.
Description: Male.
Head: Vertical length 1.6 mm. Frons length 1.4 times breadth; red-brown without dark markings; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of small pale fuscous to black spots; length 0.49 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum black with red-brown below lateral postsutural vittae. Pleural areas dark fuscous to black with red-brown below postpronotal lobe. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching almost to anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two moderately broad lateral postsutural vittae narrowing slightly posteriorly to end at *ia*. seta. Postnotum dark red-brown centrally, black laterally. Scutellum yellow with a narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments fulvous except pale fuscous on basal area of hind tibiae.
Wings: Length 5.2 mm; cell c with a pale fulvous tint, cell bc fulvous; microtrichia in outer corner of cell c only; remainder of wings colourless except fuscous cell sc, narrow fuscous costal band overlapping R_{2+3} where it becomes paler and confluent with R_{4+5} apically; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I red-brown with black on lateral margins; tergum II red-brown anteriorly, fulvous posteriorly and with a dark fuscous to black transverse band and dark fuscous to black lateral margins; terga III–V red-brown with a broad medial longitudinal black band and narrow dark fuscous to black lateral bands over all three terga. A pair of oval red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a reduced concavity on posterior margin. Abdominal sternites I and II dark fuscous, remainder red-brown.
Attractant: Cue lure.

Female: No known record.
Distribution: Morobe, Madang and Western Highlands Provinces, Papua New Guinea.
Hosts: No known record.
Etymology: The name *bubiae* refers to the type locality.
Comments: *B. bubiae* new species is similar to *B. vulgaris* (Drew, 1989: Fig. 25) in possessing a black scutum, mesopleural stripe reaching anterior *npl*. seta dorsally, wing with a narrow costal band overlapping R_{2+3} and cells bc and c pale fulvous. It differs from this species in having a broader costal band and the medial longitudinal black band absent on abdominal terga I and II.

Bactrocera (Bactrocera) bukaensis, new species
(Fig. 5)

Type data: Holotype ♂, PAPUA NEW GUINEA: N. Solomons, Buka, DPI, Cue, P210, 4–11.xi.1998, Cletus Banak, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1 ♂ (14–21.x.1998), same data as holotype; 1 ♂, N. Solomons, Buka, cue lure trap No. 10, 24–31.xii.1997, B. Hulo.
Location of types: Holotype (T245537) in QMIC; 2 paratypes in QDPC.
Diagnosis: A medium-sized species; face fulvous with a pair of small oval black spots; postpronotal lobe and notopleuron yellow; scutum red-brown centrally with a large fuscous to dark fuscous lanceolate pattern; two lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad fuscous costal band almost confluent with R_{4+5}, a broad fuscous anal streak, cells bc and c fuscous, microtrichia in outer corner of cell c only; abdominal terga III–V fulvous with a black 'T'-shaped pattern and broad lateral longitudinal dark fuscous bands over all three terga.
Description: Male.
Head: Vertical length 1.6 mm. Frons length 1.4 times breadth; red-brown with fulvous along lower lateral margins; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule red-brown. Ocellar triangle black. Face fulvous with a pair of small oval black spots; length 0.44 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum red-brown centrally with a fuscous to dark fuscous lanceolate pattern. Pleural areas dark fuscous with red-brown below postpronotal lobes. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a small transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two moderately broad parallel-sided lateral postsutural vittae ending at *ia*. seta. Postnotum red-brown centrally, black laterally. Scutellum yellow with a narrow fuscous basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous.
Wings: Length 5.5 mm; cells bc and c fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except for a fuscous cell sc, a broad fuscous costal band almost confluent with R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I dark fuscous; tergum II red-brown with fulvous across posterior margin, narrow fuscous lateral margins and a small dark fuscous transverse marking centrally; terga III–V fulvous with a black 'T'-shaped pattern and broad lateral longitudinal dark fuscous bands over all three terga. A pair of fulvous shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites pale coloured.
Attractant: Cue lure.
Female: No known record.
Distribution: Buka, North Solomons Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *bukaensis* refers to the type locality.
Comments: *B. bukaensis* new species is similar to *B. moluccensis* (Drew, 1989: Fig. 257) in possessing a pale-coloured scutum, abdominal terga III–V with a black 'T'-shaped pattern, leg segments entirely fulvous and cells bc and c coloured. It differs from this species in having the scutum dark fuscous with red-brown centrally, broad dark fuscous lateral longitudinal bands over terga III–V, cells bc and c fuscous and the costal band broader, almost confluent with R_{4+5}.

Bactrocera (Bactrocera) caccabata, new species
(Fig. 6)

Type data: Holotype ♂, PAPUA NEW GUINEA: Madang Province, Mt Wilhelm (1200 m), Oct–Nov 2012, V. Novotny, attracted to vanillylacetone. **Paratypes**: PAPUA NEW GUINEA: 6 ♂, same data as holotype; 22 ♂, same data as holotype, attracted to cue lure.
Location of types: Holotype (T245538) in QMIC; 8 paratypes in ANIC; 12 paratypes in QDPC; 8 paratypes (T245539–T245546) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of small pear-shaped black spots; postpronotal lobe yellow (anteromedial corners fuscous) and notopleuron yellow; scutum entirely black; two lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow dark fuscous costal band slightly overlapping R_{2+3}, a broad dark fuscous anal streak, cells bc and c with a pale tint, microtrichia in outer corner of cell c only; abdominal tergum III black, terga IV and V dark fuscous to black with a narrow medial longitudinal black band and narrow areas of dark red-brown either side of this black band.
Description: Male.
Head: Vertical length 1.4 mm. Frons length 1.1 times breadth; red-brown with dark fuscous around orbital setae and on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.;

lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of small pear-shaped black spots; length 0.39 mm. Occiput dark fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.

Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: postpronotal lobe (anteromedial corners fuscous); notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a small transverse spot, anterior margin straight; anatergite (posterior apex black); anterior half katatergite (remainder black); two narrow lateral postsutural vittae narrowing slightly posteriorly to end before *ia*. seta. Postnotum black. Scutellum yellow except for a broad black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.

Legs: All femora fulvous with dark fuscous around apical one-third; fore and hind tibiae dark fuscous, mid tibiae fuscous; all tarsi with basal segment fulvous and apical four segments fuscous.

Wings: Length 5.4 mm; cells bc and c with a pale tint; microtrichia in outer corner of cell c only; remainder of wings with a pale tint across membrane, a dark fuscous cell sc, a narrow dark fuscous costal band overlapping R_{2+3} where it becomes pale fuscous; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.

Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Terga I and II black except a transverse fulvous band across posterior margin of tergum II; tergum III black; terga IV and V dark fuscous to black with a narrow medial longitudinal black band over both terga and narrow areas of dark red-brown either side of this medial longitudinal black band. A pair of fuscous shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites black.

Attractant: Vanillylacetone and cue lure.

Female: No known record.

Distribution: Madang Province, Papua New Guinea.

Hosts: No known record.

Etymology: The name *caccabata* refers to the overall black coloration.

Comments: *B. caccabata* new species is similar to *B. aterrima* (Drew, 1989: Fig. 33) in possessing a black scutum and abdomen, lateral postsutural yellow vittae ending before the *ia*. seta and scutellum with a broad black basal band. It differs from this species in having a narrower mesopleural stripe, dark fuscous patterns on apices of all femora, the costal band overlapping R_{2+3} and small pear-shaped facial spots.

Bactrocera (Bactrocera) centraliae, new species

(Fig. 7)

Type data: Holotype ♂, PAPUA NEW GUINEA: Central Province, Rouna 4, 15.vi.1999, D. Tenakanai, attracted to methyl eugenol. **Paratypes**: PAPUA NEW GUINEA: 2 ♂ (23.xii.1998), 1 ♂ (16.ii.1999), 1 ♂ (23.iii.1999), 1 ♂ (12.v.1999), same data as holotype; 1 ♂ (6.viii.1998), 1 ♂ (17.ix.1998), Central Province, Rouna, D. Tenakanai, attracted to methyl eugenol; 1 ♂, Central Province, Lobulogo (Hiri Tano Highway), 6.i.2000, D. Tenakanai, attracted to methyl eugenol; 1 ♂, Central Province, Pacific Adventist University, 16.ii.1999, D. Tenakanai, attracted to methyl eugenol; 1 ♂ (22.ix.1998), 1 ♂ (27.i.1999), Central Province, Rabuka Village (Magi Highway), D. Tenakanai, attracted to methyl eugenol; 1 ♂ (6.vii.1999), 2 ♂ (5.x.1999), Central Province, Nara Gabadi (Hiri Tano Highway), D. Tenakanai, attracted to methyl eugenol; 1 ♂, Central Province, Furumuti Farm (Laloki River), 20.viii.1998, D. Tenakanai, attracted to methyl eugenol; 1 ♂, Central Province, Galley Reach Ranch (Hiri Tano Highway), 7.i.1999, D. Tenakanai, attracted to methyl eugenol; 1 ♂, Central Province, Laloki Research Station, 16.ii.1999, D. Tenakanai, attracted to methyl eugenol; 1 ♂, Morobe Province, Borzie Village, 5.iv.1999, S. Sar and S. Balagawi, attracted to methyl eugenol; 1 ♂ (21.iv.1999), 1 ♂ (4.v.1999), Morobe Province, Jim Jacobson's Farm, 1 mile from Bubia, S. Balagawi and S. Sar, attracted to methyl eugenol; 1 ♂ (24.ii.1999), 1 ♂ (3.iii.1999), Morobe Province, Markham Farming, S. Sar and S. Balagawi, attracted to methyl eugenol.

Location of types: Holotype (T245547) in QMIC; 6 paratypes in ANIC; 10 paratypes in QDPC; 6 paratypes (T245548–T245553) in QMIC.

Diagnosis: A medium-sized species; face fulvous with a pair of small circular black spots; postpronotal lobe and notopleuron yellow; scutum red-brown with pale red-brown medial longitudinal bands either side of mid-line; two broad lateral postsutural yellow vittae narrowing posteriorly to end before *ia*. seta; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a moderately broad fuscous costal band that becomes paler as it overlaps R_{2+3} but is not confluent with R_{4+5}, a broad fuscous anal streak, cell c pale fulvous, cell bc fulvous, microtrichia in outer half of cell c only; abdominal terga entirely red-brown.

Description: Male.

Head: Vertical length 1.7 mm. Frons length 1.4 times breadth; red-brown with pale fuscous around *s.or*. setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule red-brown. Ocellar triangle black. Vertex red-brown. Face fulvous with a pair of small circular black spots; length 0.44 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.

Thorax: Scutum red-brown with pale red-brown medial longitudinal bands either side of mid-line. Pleural areas entirely red-brown. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a small spot, anterior margin convex; anatergite (posterior apex red-brown); anterior two-thirds katatergite (remainder red-brown); two moderately broad lateral postsutural vittae narrowing sharply posteriorly to end just before *ia*. seta. Postnotum red-brown. Scutellum yellow except for narrow red-brown basal band.

Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments fulvous except fore tibiae pale fuscous and hind tibiae fuscous.
Wings: Length 6.3 mm; cell c pale fulvous and cell bc fulvous; microtrichia in outer half of cell c only; remainder of wings colourless except for fuscous cell sc, a narrow fuscous costal band that becomes pale fuscous as it overlaps R_{2+3} but not confluent with R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Elongate oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Terga I and II red-brown with a narrow fulvous band along posterior margin of tergum II; terga III–V entirely red-brown. A pair of oval red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites pale, entirely red-brown.
Attractant: Methyl eugenol.
Female: No known record.
Distribution: Central and Morobe Provinces, Papua New Guinea.
Hosts: No known record.
Etymology: The name *centraliae* refers to the province in Papua New Guinea wherein the type locality exists.
Comments: *B. centraliae* new species is similar to *B. dyscrita* (Drew, 1989: Fig. 226) in possessing a basic red-brown scutum and abdomen, cells bc and c with a pale tint and a broad costal band almost confluent with R_{4+5}. It differs from this species in having a narrow lateral postsutural yellow vittae ending before the *ia*. seta and being attracted to methyl eugenol, not cue lure.

Bactrocera (Bactrocera) dysoxyli, new species
(Fig. 8)

Type data: Holotype ♂, PAPUA NEW GUINEA: Madang Province, Ohu, 3.viii.2000, bred from *Dysoxylum alatum* (family Meliaceae). **Paratypes**: PAPUA NEW GUINEA: 6♀ and 5♂, same data as holotype; 3♀ and 1♂, Central Province, Rouna Forest, 17.xii.1998, Drew *et al*., bred from *Gomphandra montana* (family Icacinaceae); 8♀ and 9♂, Madang Province, Ohu, 13.x.2000, bred from *Elattostachys tetrappondra* (family Sapindaceae).
Location of types: Holotype (T245554) in QMIC; 5 paratypes in ANIC; 20 paratypes in QDPC; 7 paratypes (T245555–T 245561) in QMIC.
Diagnosis: A small species; face fulvous with a pair of elongate oval narrow black spots; postpronotal lobe dark fuscous; notopleuron yellow; scutum entirely black; lateral and medial postsutural yellow vittae absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous costal band confluent with R_{4+5}, a broad fuscous anal streak, cells bc and c pale fuscous, microtrichia in outer corner of cell c only; abdominal tergum III black, tergum IV mostly black, tergum V red-brown with a medial longitudinal black band and narrow dark fuscous anterolateral corners.
Description: Male.
Head: Vertical length 1.3 mm. Frons length 1.6 times breadth; fuscous with dark fuscous around orbital setae and on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of narrow elongate oval black spots; length 0.39 mm. Occiput dark fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, not continuing to katepisternum, anterior margin straight; anatergite (posterior apex black); anterior half katatergite (remainder black). Lateral and medial postsutural yellow vittae absent. Postpronotal lobe dark fuscous. Postnotum black. Scutellum yellow with a narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: Fore and mid femora entirely dark fuscous, hind femora fulvous with apical one-third dark fuscous; fore and hind tibiae dark fuscous, mid tibiae dark fuscous basally to fuscous apically; fore and hind tarsi with basal segment fulvous and apical four segments fuscous, mid tarsi with all segments entirely fulvous.
Wings: Length 4.6 mm; cells bc and c pale fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except for a dark fuscous cell sc, a broad dark fuscous costal band confluent with R_{4+5} where it becomes paler; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I black; tergum II fulvous with dark fuscous across anterior half; tergum III entirely black; tergum IV black with a narrow medial longitudinal black line across anterior half surrounded by narrow red-brown margins; tergum V red-brown with dark fuscous anterolateral corners and a narrow medial longitudinal black band. A pair of oval dark fuscous shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous to black.
Attractant: No known record.
Female: As for male except no dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak; no pecten on abdominal tergum III. Ovipositor basal segment dark fuscous; ratio of length of oviscape to length of tergum V, 0.52:1; apex of piercer needle-shaped.
Distribution: Madang and Central Provinces, Papua New Guinea.
Hosts: *Dysoxylum alatum* (family Meliaceae), *Gomphandra montana* (family Icacinaceae) and *Elattostachys tetrappondra* (family Sapindaceae).
Etymology: The name *dysoxyli* refers to the generic name of the host plant from which the holotype was reared.
Comments: *B. dysoxyli* new species is similar to *B. thistletoni* (Drew, 1989: Fig. 296) in possessing a black scutum without lateral and medial postsutural yellow vittae, abdominal terga

with extensive dark coloration, postpronotal lobes dark fuscous to black and femora with similar dark coloration. It differs from this species in having coloured costal cells bc and c, the costal band wider and confluent with R_{4+5}, smaller facial spots and pale coloration on abdominal terga IV and V.

Bactrocera (Bactrocera) expandosa, new species
(Fig. 9)

Type data: Holotype ♂, PAPUA NEW GUINEA: Morobe Province, Gabensis Village, 25.ii.1999, S. Sar and S. Balagawi, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 4 ♂ (25.ii.1999), 3 ♂ (25.iii.1999), 1 ♂ (9.vi.1999), 5 ♂ (24.vi.1999), 3 ♂ (9.iii.2000), same data as holotype; 4 ♂ (10.iii.1999), 2 ♂ (17.iii.1999), Morobe Province, Jim Jacobson's farm, 1 mile from Bubia, S. Balagawi and S. Sar, attracted to cue lure; 1 ♂ (20.i.1999), 1 ♂ (10.ii.1999), 1 ♂ (17.ii.1999), 1 ♂ (3.iii.1999), Morobe Province, Markham Farming, S. Sar and S. Balagawi, attracted to cue lure; 4 ♂, Morobe Province, Tikeling Village Forest, 3.iii.1999, S. Sar and S. Balagawi, attracted to cue lure; 3 ♂ (9.xii.1998), 1 ♂ (23.xii.1998), Madang Province, Ramu Sugar Residential Area, attracted to cue lure; 2 ♂ (10.xii.1998), 1 ♂ (18.ii.1999), Madang Province, Bogia Station, attracted to cue lure; 1 ♂, Madang Province, DPI 2nd Station, 27.i.1999, attracted to cue lure; 1 ♂, Madang Province, Brahman High School, 4.xii.1998, attracted to cue lure; 11 ♂, East Sepik Province, Wewak Town, Kreer Heights, 4.iii.1999, S. Sar and S. Balagawi, attracted to cue lure.
Location of types: Holotype (T245562) in QMIC; 10 paratypes in ANIC; 30 paratypes in QDPC; 10 paratypes (T245563–T245572) in QMIC.
Diagnosis: A small species; face fulvous with a pair of medium-sized pear-shaped black spots; postpronotal lobe and notopleuron yellow; scutum entirely black with dark red-brown lateral margins below lateral postsutural yellow vittae; two lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad fuscous to pale fuscous costal band confluent with R_{4+5}, a broad fuscous anal streak, cells bc and c pale fuscous, microtrichia in outer corner of cell c only; abdominal terga III–V fulvous with very broad fuscous to dark fuscous lateral longitudinal bands joined along anterior margin of tergum III.
Description: Male.
Head: Vertical length 1.3 mm. Frons length 1.2 times breadth; red-brown with fuscous around orbital setae and on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of medium-sized pear-shaped black spots; length 0.39 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 fuscous, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum entirely black except dark red-brown below and behind lateral postsutural yellow vittae. Pleural areas dark fuscous to black except dark red-brown below postpronotal lobes. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two broad parallel-sided lateral postsutural vittae ending behind *ia*. seta. Postnotum black. Scutellum yellow except for narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous except pale fuscous on basal half of hind tibiae.
Wings: Length 4.5 mm; cells bc and c pale fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except fuscous cell sc, broad fuscous costal band becoming paler as it overlaps R_{2+3} and confluent with R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I dark fuscous with a narrow transverse fulvous line along posterior margin; tergum II fuscous anteriorly, red-brown laterally and fulvous along posterior margin; terga III–V fulvous with very broad lateral longitudinal fuscous to dark fuscous bands joined along anterior margin of tergum III where they become pale fuscous. A pair of red-brown shining spots on tergum V that are generally fuscous laterally and can become entirely fuscous in some specimens. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark red-brown to fuscous.
Attractant: Cue lure.
Female: No known record.
Distribution: Morobe, Madang and East Sepik Provinces, Papua New Guinea.
Hosts: No known record.
Etymology: The name *expandosa* refers to the broad (expanded) costal band on the wing.
Comments: *B. expandosa* new species fits in the *bryoniae* complex defined by Drew (1989) and is similar to *B. bryoniae* (Drew, 1989: Fig. 63) and *B. latissima* (Drew, 1989: Fig. 66) in possessing a black scutum, costal band confluent with R_{4+5} and femora entirely fulvous. It differs from both species in having abdominal terga entirely pale centrally and the lateral postsutural vittae ending behind the *ia*. seta.

Bactrocera (Bactrocera) fumica, new species
(Fig. 10)

Type data: Holotype ♂, PAPUA NEW GUINEA: Madang Province, Mt Wilhelm (1200 m), Oct–Nov 2012, V. Novotny, attracted to methyl eugenol.
Location of type: Holotype (T245573) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of small pear-shaped black spots; postpronotal lobe yellow (anteromedial corners fuscous), notopleuron yellow; scutum entirely black; two narrow lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe slightly wider than notopleuron dorsally; scutellum yellow; wings with a narrow dark fuscous costal band slightly overlapping R_{2+3}, a broad dark fuscous anal streak,

cells bc and c fuscous, microtrichia in outer corner of cell c only; abdominal terga mostly black.
Description: Male.
Head: Vertical length 1.4 mm. Frons length 1.3 times breadth; fuscous with fulvous lateral margins and dark fuscous around orbital setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of small pear-shaped black spots; length 0.44 mm. Occiput dark fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: postpronotal lobe (anteromedial corners fuscous); notopleuron; mesopleural stripe slightly wider than notopleuron dorsally, continuing to katepisternum as a very small spot, anterior margin slightly convex; anatergite (posterior apex black); anterior half katatergite (remainder black); two narrow lateral postsutural vittae narrowing slightly posteriorly to end before *ia*. seta. Postnotum black. Scutellum yellow with a broad black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: Femora fulvous with dark fuscous around apical one-third to half of fore and mid femora and apical one-quarter of hind femora; fore and mid tibiae fuscous, hind tibiae dark fuscous; all tarsal segments fulvous.
Wings: Length 5.8 mm; cells bc and c fuscous; microtrichia in outer corner of cell c only; remainder of wings with fuscous across the entire wing membrane, a dark fuscous cell sc, a narrow dark fuscous costal band slightly overlapping R_{2+3}; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Elongate oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Terga I and II black with fulvous across posterior margin of tergum II; terga III–V black with dark red-brown across posterior margin of tergum V. A pair of oval black shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites black.
Attractant: Methyl eugenol.
Female: No known record.
Distribution: Madang Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *fumica* refers to the dark smoky coloration of the entire wing membrane.
Comments: *B. fumica* new species is similar to *B. abdolonginqua* (Drew, 1989: Fig. 90) in possessing a black scutum and an elongate oval-shaped abdomen. It differs in having anteromedial corners of the postpronotal lobes fuscous, lateral postsutural yellow vittae not reaching *ia*. seta, a broad black basal band on the scutellum, apices of all femora dark fuscous and the entire wing membrane with fuscous coloration and a predominantly dark-coloured abdomen.

Bactrocera (Bactrocera) gabensiae, new species
(Fig. 11)

Type data: Holotype ♂, PAPUA NEW GUINEA: Morobe Province, Gabensis Village, 25.iii.1999, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1 ♂, same data as holotype; 1 ♂, Morobe Province, Forest Research Institute, Lae Botanical Garden, 16.iii.1999, L. Leblanc *et al*., attracted to cue lure.
Location of types: Holotype (T245574) in QMIC; 1 paratype in QDPC; 1 paratype (T245575) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of large oval black spots; postpronotal lobe and notopleuron yellow; scutum dark red-brown with a distinctive lanceolate dark pattern; two narrow lateral postsutural yellow vittae present ending before *ia*. seta; medial postsutural yellow vitta absent; mesopleural stripe equal in width to notopleuron dorsally; scutellum yellow; wings with a broad dark fuscous costal band confluent with R_{4+5}, a broad fuscous anal streak, cells bc and c dark fuscous and covered with dense microtrichia; abdominal terga III–V red-brown with a narrow medial longitudinal fuscous to dark fuscous band and broad lateral longitudinal dark fuscous to black bands over all three terga and joined along anterior margin of tergum III.
Description: Male.
Head: Vertical length 1.5 mm. Frons length 1.4 times breadth; red-brown with fuscous around orbital setae and on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of large oval black spots; length 0.44 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum dark red-brown with a distinctive lanceolate pattern changing from fuscous posteriorly to dark fuscous to black anteriorly. Pleural areas entirely dark fuscous to black. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe equal in width to notopleuron dorsally, continuing to katepisternum as small transverse spot, anterior margin straight; anatergite (posterior apex black); anterior half katatergite (remainder black); two narrow lateral postsutural vittae narrowing posteriorly to end well before *ia*. seta. Postnotum black. Scutellum yellow with a narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: Fore and mid femora fulvous with dark fuscous spots on outer apical surfaces, hind femora fulvous with dark fuscous around apical one-third; fore and hind tibiae dark fuscous, mid tibiae fulvous; all tarsal segments fulvous.
Wings: Length 5.1 mm; cells bc and c dark fuscous and covered with dense microtrichia; remainder of wings colourless except dark fuscous cell sc, broad dark fuscous costal band confluent with R_{4+5}; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely dark fuscous; tergum II dark fuscous across anterior and lateral margins, fulvous across posterior area; terga III–V red-brown with a narrow medial longitudinal fuscous to dark fuscous band and broad lateral longitudinal dark fuscous to black bands across all three terga and joining along anterior margin of tergum III. A pair of oval red-brown shining spots on tergum V. Posterior lobe of surstylus short,

sternum V with a deep concavity on posterior margin. Abdominal sternites fuscous.
Attractant: Cue lure.
Female: No known record.
Distribution: Morobe Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *gabensiae* refers to the type locality.
Comments: *B. gabensiae* new species is similar to *B. furfurosa* (Drew, 1989: Fig. 131) in possessing a red-brown scutum, a broad costal band confluent with R_{4+5} and abdominal terga III–V red-brown with dark colour patterns. It differs from this species in having a lanceolate fuscous pattern on the scutum, cells bc and c fuscous and covered with dense microtrichia and all femora fulvous with apical dark fuscous patterns.

Bactrocera (Bactrocera) kaiauiae, new species
(Fig. 12)

Type data: Holotype ♂, PAPUA NEW GUINEA: Central Province, Kaiau Settlement (Hiri Tano Highway), 22. xii.1998, D. Tenakanai, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 3 ♂, same data as holotype; 3 ♂(26.i.1999), same data as holotype; 25 ♂ (3.xii.1998), same data as holotype; 14 ♂, Morobe Province, Bulolo Forestry Uni, 11.ii.1999, S. Sar and S. Balagawi, attracted to cue lure; 3 ♂, Morobe Province, Jim Jacobson's Farm, 1 mile from Bubia, 1.ii.2000, S. Balagawi and S. Sar, attracted to cue lure; 4 ♂, Morobe Province, Gabensis Village, 11.v.1999, S. Sar and S. Balagawi, attracted to cue lure; 1 ♂, West Sepik Province, Bewani Govt Station, 27.x.1999, DPI, attracted to cue lure.
Location of types: Holotype (T245576) in QMIC; 10 paratypes in ANIC; 33 paratypes in QDPC; 10 paratypes (T245577–T245586) in QMIC.
Diagnosis: A medium-sized species; face fuscous with a pair of large oval black spots; postpronotal lobe and notopleuron yellow; scutum entirely black; two broad subparallel lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous costal band confluent with R_{4+5}, a broad dark fuscous anal streak, cells bc and c with a pale fuscous tint, microtrichia in outer corner of cell c only; abdominal terga III–V mostly dark fuscous to black, tending to black laterally and dark fuscous centrally, with a broad medial longitudinal black band over all three terga.
Description: Male.
Head: Vertical length 1.7 mm. Frons length 1.3 times breadth; fuscous, fulvous along lateral and ventral margins, dark fuscous around orbital setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Vertex dark fuscous. Ocellar triangle black. Face fuscous with a pair of large oval black spots; length 0.59 mm. Occiput dark fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 fuscous, segment 3 almost entirely dark fuscous.
Thorax: Scutum entirely black. Pleural areas black except dark fuscous below postpronotal lobe. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a small transverse spot, anterior margin slightly convex; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two broad subparallel-sided lateral postsutural vittae ending at *ia*. seta. Postnotum black, dark red-brown centrally. Scutellum yellow with a narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: Fore and mid femora dark fuscous with small fulvous areas basally, hind femora fulvous with dark fuscous around apical one-third; fore tibiae fuscous, mid tibiae pale fuscous, hind tibiae dark fuscous; all tarsal segments entirely fulvous.
Wings: Length 5.8 mm; cells bc and c with a pale fuscous tint; microtrichia in outer corner of cell c only; remainder of wings colourless except for dark fuscous cell sc, a broad dark fuscous costal band confluent with R_{4+5}; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely black; tergum II dark red-brown with fulvous along posterior margin, black lateral margins and a narrow transverse black band centrally but not reaching lateral margins; terga III–V mostly dark fuscous to black with a black band across anterior margin of tergum III expanding over lateral margins of terga III and IV and a very broad medial longitudinal black band over all three terga. A pair of oval red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous to black.
Attractant: Cue lure.
Female: No known record.
Distribution: Central, Morobe and West Sepik Provinces, Papua New Guinea.
Hosts: No known record.
Etymology: The name *kaiauiae* refers to the Kaiau Settlement, the type locality.
Comments: *B. kaiauiae* new species is similar to *B. bryoniae* (Drew, 1989: Fig. 63) and *B. latissima* (Drew, 1989: Fig. 66) in possessing a black scutum, yellow postpronotal lobes and notopleura and a broad costal band confluent with R_{4+5}. It differs from both species in having extensive areas of dark fuscous on all femora and cells bc and c with a pale tint only. Furthermore, it differs from *B. latissima* in having broad parallel-sided lateral postsutural yellow vittae extending to the *ia*. seta.

Bactrocera (Bactrocera) kauiae, new species
(Fig. 13)

Type data: Holotype ♂, PAPUA NEW GUINEA: Madang Province, Kau Wildlife Conserv. Area, 24.v.2000, M. Damag and C. Pato, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 2 ♂, same data as holotype; 1 ♂ (3.v.2000), 1 ♂ (20.vi.2000), 1 ♂ (25.vii.2000), Madang Province, Kau Wildlife Conserv. Area, M. Damag and C. Pato, attracted to

cue lure; 1 ♂, Western Highlands Province, Mt Hagen, 20. vi.2000, attracted to cue lure.
Location of types: Holotype (T245587) in QMIC; 2 paratypes in ANIC; 3 paratypes in QDPC; 1 paratype (T245588) in QMIC.
Diagnosis: A large species; face fulvous with a pair of small circular black spots; postpronotal lobe and notopleuron yellow; scutum entirely dark red-brown; two very broad lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow dark fuscous costal band overlapping R_{2+3} and almost confluent with R_{4+5}, a broad fuscous anal streak, cells bc and c fuscous, microtrichia in outer corner of cell c only; abdominal terga III–V fulvous with narrow transverse dark fuscous markings anterolaterally on tergum III and a narrow dark fuscous medial line on tergum V.
Description: Male.
Head: Vertical length 1.8 mm. Frons length 1.6 times breadth; entirely red-brown without dark markings; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark red-brown. Ocellar triangle black.
Face fulvous with a pair of small circular black spots; length 0.58 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum entirely dark red-brown without dark markings. Pleural areas entirely red-brown without dark markings. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, not continuing to katepisternum, anterior margin straight; anatergite (posterior apex red-brown); anterior two-thirds katatergite (remainder red-brown); two very broad subparallel lateral postsutural vittae ending before *ia*. seta. Postnotum red-brown. Scutellum yellow except for a narrow red-brown basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous.
Wings: Length 6.5 mm; cells bc and c fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except dark fuscous cell sc, dark fuscous costal band becoming paler as it overlaps R_{2+3} and almost confluent with R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely fuscous; tergum II dark red-brown with a narrow transverse fuscous band anteriorly and fulvous along posterior margin; terga III–V entirely fulvous with narrow transverse dark fuscous markings anterolaterally on tergum III and a narrow dark fuscous line medially on tergum V. A pair of oval red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites red-brown.
Attractant: Cue lure.
Female: No known record.
Distribution: Madang and Western Highlands Provinces, Papua New Guinea.
Hosts: No known record.
Etymology: The name *kauiae* refers to the type locality.
Comments: *B. kauiae* new species is similar to *Bactrocera (Bactrocera) pallida* (Perkins & May) (Drew, 1989: Fig. 141), *B. peninsularis* (Drew, 1989: Fig. 162) and *Bactrocera (Bactrocera) tenuifascia* (May) (Drew, 1989: Fig. 144) in possessing a red-brown scutum and abdomen, narrow costal band and entirely fulvous femora. It differs from all three species in having fuscous cells bc and c, from *B. pallida* and *B. tenuifascia* in being attracted to cue lure and from *B. peninsularis* in having broad lateral postsutural yellow vittae ending before the *ia*. seta and abdominal terga III–V entirely pale fulvous.

Bactrocera (Bactrocera) keravatiae, new species
(Fig. 14)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, LAES Keravat, Fidelis Hela house, 19. iii.1999, A. Mararuai, attracted to methyl eugenol. **Paratypes**: PAPUA NEW GUINEA: 2 ♂ (28.v.1998), 1 ♂ (5. iii.1999), 2 ♂ (19.iii.1999), 1 ♂ (26.iii.2000), same data as holotype.
Location of types: Holotype (T245589) in QMIC; 2 paratypes in ANIC; 3 paratypes in QDPC; 1 paratype (T245590) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of medium-sized circular black spots; postpronotal lobe and notopleuron yellow; scutum red-brown with a distinct dark red-brown lanceolate pattern; two broad lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta; scutellum yellow; wings with a narrow fuscous costal band almost confluent with R_{4+5}, a broad fuscous anal streak, cells bc and c with a pale fulvous tint, microtrichia in outer corner of cell c only; abdominal terga III–V red-brown with broad dark red-brown lateral margins that join along anterior margin of tergum III and a narrow medial longitudinal dark red-brown band over terga III and IV.
Description: Male.
Head: Vertical length 1.6 mm. Frons length 1.4 times breadth; red-brown with fulvous margins and pale fuscous on anteromedial hump and around bases of orbital setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of medium-sized circular black spots; length 0.54 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum red-brown with a distinct dark red-brown lanceolate pattern. Pleural areas red-brown with dark fuscous along anterior and posterior margins. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight;

anatergite (posterior apex red-brown); anterior two-thirds katatergite (remainder red-brown); two broad parallel-sided lateral postsutural vittae ending at *ia*. seta. Postnotum red-brown, dark fuscous laterally. Scutellum yellow except for a narrow red-brown basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All leg segments entirely fulvous.
Wings: Length 6.2 mm; cells bc and c with a pale fulvous tint; microtrichia in outer corner of cell c only; remainder of wings colourless except for a fuscous costal band overlapping R_{2+3} where it becomes pale fuscous and almost confluent with with R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I dark fuscous with a narrow transverse fulvous line across posterior margin; tergum II red-brown with dark fuscous anterolateral corners, a transverse fuscous band anteromedially and fulvous across posterior margin; terga III–V red-brown with broad dark red-brown lateral margins that join along anterior margin of tergum III and a narrow medial longitudinal dark red-brown band on terga III and IV. A pair of oval dark red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark red-brown to fuscous.
Attractant: Methyl eugenol.
Female: No known record.
Distribution: East New Britain Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *keravatiae* refers to the type locality.
Comments: *B. keravatiae* new species is sympatric with and similar to *B. dyscrita* (Drew, 1989: Fig. 226) in possessing a red-brown scutum with dark colour patterns, broad parallel-sided lateral postsutural vittae, cells bc and c with a pale fulvous tint, costal band almost confluent with R_{4+5} and legs entirely fulvous. It differs from this species in having a distinct dark red-brown lanceolate pattern on the scutum, abdominal terga III–V red-brown with broad dark red-brown lateral margins and being attracted to methyl eugenol.

Bactrocera (Bactrocera) kokodiae, new species
(Fig. 15)

Type data: Holotype ♂, PAPUA NEW GUINEA: Central Province, Start of Kokoda Track, 30.xii.1998, D. Tenakanai, attracted to cue lure.
Location of type: Holotype (T245591) in QMIC.
Diagnosis: A small species; face fulvous with a pair of small oval black spots; postpronotal lobe dark fuscous; notopleuron yellow; scutum entirely black; two lateral postsutural yellow vittae present ending at *ia*. seta; medial postsutural yellow vitta absent; mesopleural stripe equal in width to notopleuron dorsally; scutellum yellow; wings with a broad fuscous to pale fuscous costal band confluent with R_{4+5}, a broad fuscous anal streak, cells bc and c with a pale fulvous tint, microtrichia in outer half of cell c only; abdominal tergum III black, terga IV and V red-brown to dark red-brown with broad lateral black bands joined along anterior margin of tergum IV and a very narrow medial longitudinal black band over both terga.
Description: Male.
Head: Vertical length 1.3 mm. Frons length 1.3 times breadth; fulvous with fuscous to dark fuscous on anteromedial hump and around bases of orbital setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of small oval black spots; length 0.44 mm. Occiput dark fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum entirely black. Pleural areas black, tending to dark fuscous below postpronotal lobes. Yellow markings as follows: notopleuron; mesopleural stripe equal in width to notopleuron dorsally, continuing to katepisternum as a very small transverse spot, anterior margin straight; anatergite (posterior apex black); anterior half katatergite (remainder black); two narrow parallel-sided lateral postsutural vittae ending at *ia*. seta. Postpronotal lobe dark fuscous. Postnotum black. Scutellum yellow except for a narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: Fore femora fulvous, mid and hind femora fulvous with pale fuscous around apical one-third; fore tibiae fuscous, mid tibiae fulvous, hind tibiae dark fuscous; all tarsal segments fulvous.
Wings: Length 4.9 mm; cells bc and c with a pale fulvous tint; microtrichia in outer half of cell c only; remainder of wings colourless except for a broad fuscous costal band tending to pale fuscous as it becomes confluent with R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I black with a narrow fulvous line along posterior margin; tergum II dark fuscous with fulvous along posterior margin; tergum III black; terga IV and V red-brown to dark red-brown with broad lateral black margins joined along anterior margin of tergum IV, a very narrow medial longitudinal black band over both terga. A pair of oval black shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous to black.
Attractant: Cue lure.
Female: No known record.
Distribution: Central Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *kokodiae* refers to the type locality.
Comments: *B. kokodiae* new species is similar to *B. bryoniae* (Drew, 1989: Fig. 63), *B. epicharis* (Drew and Romig 2001: Fig. 2) and *B. latissima* (Drew, 1989: Fig. 66) in possessing a broad costal band confluent with R_{4+5}, a black scutum and abdominal terga III–V with large areas of dark coloration. It differs from these species in having dark fuscous postpronotal lobes, dark coloration on apices of mid

and hind femora and a narrow mesopleural stripe equal in width to notopleuron dorsally.

Bactrocera (Bactrocera) kunvawaensis, new species
(Fig. 16)

Type data: Holotype ♂, PAPUA NEW GUINEA: New Ireland, Lihir, Kunvawa village, 30.vii–12.viii.1998, L. Leblanc & and S. Balagawi, cue snapshot trap, LIH-E, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 2 ♂, New Ireland, Lihir, Akebut River bridge, 30.vii–12.viii.1998, L. Leblanc & S. Balagawi, cue snapshot trap, LIH-H; 4 ♂, Lihir Golf Course, 30.vii–12.viii.1998, L. Leblanc & S. Balagawi, cue snapshot trap, LIH-F; 2 ♂, New Ireland, Lihir, Kapit village, 29.vii–12.viii.1998, L. Leblanc & S. Balagawi, cue snapshot trap, LIH-C; 1 ♂, New Ireland, Lihir, Papindo store, 29.vii–12.viii.1998, L. Leblanc & S. Balagawi, cue trap No. P-216; 1 ♂, New Ireland, Road between Putput and Tome, Joe Kadilaqowa house, 8–22.ix.1998, L. Leblanc & A. Mararuai, cue snapshot, KAV-A; 1 ♂, New Ireland, Kaviena, C.I.S. Prison, 9–22.ix.1998, L. Leblanc & A. Mararuai, cue snapshot, KAV-D.
Location of types: Holotype (T245592) in QMIC; 3 paratypes in ANIC; 5 paratypes in QDPC; 3 paratypes (T245593–T245595) in QMIC.
Diagnosis: A large species; face fulvous with a pair of small oval black spots; postpronotal lobe and notopleuron yellow; scutum black with red-brown below lateral postsutural yellow vittae; two lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe slightly wider than notopleuron dorsally; scutellum yellow; wings with a pale tint across membrane, a broad dark fuscous costal band overlapping R_{4+5} and extending along r-m crossvein, a broad dark fuscous anal streak, cells bc and c dark fuscous, microtrichia over outer half of cell c only; abdominal terga III–V red-brown with a black 'T'-shaped pattern and lateral longitudinal dark fuscous markings over all three terga.
Description: Male.
Head: Vertical length 1.9 mm. Frons length 1.4 times breadth; red-brown with fuscous around orbital setae and on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule red-brown. Ocellar triangle black. Face red-brown with a pair of small oval black spots; length 0.49 mm. Occiput red-brown with dark fuscous laterally, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum black with red-brown below lateral postsutural vittae and around mesonotal suture. Pleural areas black. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe just wider than notopleuron dorsally, continuing to katepisternum as a small transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two broad subparallel lateral postsutural vittae ending at *ia*. seta. Postnotum black. Scutellum yellow with a narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All femora entirely fulvous; fore and mid tibiae pale fuscous, hind tibiae fuscous; fore and hind tarsi with basal segment fulvous and apical four segments red-brown, mid tarsi with all segments entirely fulvous.
Wings: Length 6.5 mm; cells bc and c dark fuscous; microtrichia in outer half of cell c only; remainder of wings with a pale tint across membrane, a dark fuscous cell sc, a dark fuscous costal band becoming paler as it overlaps R_{4+5} and extends along r-m crossvein; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I black; tergum II red-brown with fulvous across posterior margin, dark fuscous on anterolateral corners and a broad transverse black band centrally; terga III–V red-brown with a black 'T'-shaped pattern and moderately broad lateral longitudinal dark fuscous markings over all three terga. A pair of oval black shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a medium-sized concavity on posterior margin. Abdominal sternites black.
Attractant: Cue lure.
Female: No known record.
Distribution: New Ireland, Papua New Guinea Territory.
Hosts: No known record.
Etymology: The name *kunvawaensis* refers to the type locality.
Comments: *B. kunvawaensis* new species is similar to *B. bryoniae* (Drew, 1989: Fig. 63), *Bactrocera (Bactrocera) neoritsemai* Drew & Romig (Drew and Romig, 2013: Fig. 123) and *Bactrocera (Bactrocera) penecostalis* Drew & Romig (Drew and Romig, 2013: Fig. 153) in possessing a broad fuscous costal band, a black scutum and abdominal terga III–V with a dark 'T'-shaped pattern. It differs from these species in having the costal band overlapping R_{4+5} and extending along the r-m crossvein and a fuscous tint over the remainder of the wing membrane.

Bactrocera (Bactrocera) labubulu, new species
(Fig. 17)

Type data: Holotype ♂, PAPUA NEW GUINEA: Morobe Province, Labu-bulu area, Markham River, 28.vii.1999, S. Balagawi and S. Sar, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1 ♂ (13.iv.1999), 2 ♂ (9.vi.1999), same data as holotype; 1 ♂, Central Province, Start of Kokoda Track, 2.ii.1999, D. Tenakanai, attracted to cue lure; 1 ♂, Central Province, Rouna Forest, 1.iii.1999, D. Tenakanai, attracted to cue lure; 1 ♂, Central Province, Bisianumu Rubber Estate, 12.v.1999, D. Tenakanai, attracted to cue lure; 2 ♂, Milne Bay Province, Alotau, 31.iii.2000, Howard Maso, attracted to cue lure; 3 ♂, Milne Bay Province, Guerny Airport, 29.iv.2000, Howard Maso, attracted to cue lure; 1 ♂ (24.xi.1999), 2 ♂ (1.xii.1999), West Sepik Province, Bewani Govt Station, DPI, attracted to cue lure.
Location of types: Holotype (T245596) in QMIC; 2 paratypes in ANIC; 8 paratypes in QDPC; 4 paratypes (T245597–T245600) in QMIC.
Diagnosis: A small species; face fulvous with a pair of medium-sized oval black spots; postpronotal lobe dark fuscous to black; notopleuron yellow; scutum entirely black; two

narrow lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe equal in width to notopleuron dorsally; scutellum yellow; wings with a dark fuscous to fuscous costal band almost confluent with R_{4+5}, a broad dark fuscous anal streak, cells bc and c pale fuscous, microtrichia covering most of cell c; abdominal terga III and IV dark fuscous to black, tergum V fulvous with broad fuscous anterolateral corners.

Description: Male.

Head: Vertical length 1.3 mm. Frons length 1.25 times breadth; fuscous with fulvous margins and dark fuscous around orbital setae and on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of medium-sized oval black spots; length 0.39 mm. Occiput fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 fuscous, segment 3 fuscous with dark fuscous on apex and outer surface.

Thorax: Scutum entirely black. Pleural areas entirely dark fuscous to black. Yellow markings as follows: notopleuron; mesopleural stripe equal in width to notopleuron dorsally, continuing to katepisternum as a small transverse spot, anterior margin straight; anatergite (posterior apex black); anterior half katatergite (remainder including ventral margin black); two narrow parallel-sided lateral postsutural vittae ending at *ia*. seta. Postpronotal lobe dark fuscous to black. Postnotum black. Scutellum yellow except for narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.

Legs: All femora fulvous with fuscous around apical one-third to one-quarter of each; fore tibiae fuscous, mid tibiae fulvous, hind tibiae dark fuscous; fore tarsi fulvous with apical four segments pale fuscous, mid and hind tarsi entirely fulvous.

Wings: Length 4.4 mm; cells bc and c pale fuscous with microtrichia over most of cell c; remainder of wings colourless except dark fuscous cell sc, narrow dark fuscous costal band becoming paler as it overlaps R_{2+3} and almost confluent with R_{4+5}; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.

Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I dark fuscous to black; tergum II dark fuscous to black with fulvous along posterior margin; terga III and IV dark fuscous to black, tergum V fulvous with broad fuscous anterolateral corners. A pair of oval fuscous shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous.

Attractant: Cue lure.

Female: No known record.

Distribution: Morobe, Central, Milne Bay and West Sepik Provinces, Papua New Guinea.

Hosts: No known record.

Etymology: The name *labubulu* refers to the type locality.

Comments: *B. labubulu* new species is similar to *B. bulolo-ensis* (Drew, 1989: Fig. 213) and *B. saramandiae* new species (Fig. 31) in possessing a black scutum, mostly dark-coloured abdominal terga and dark-coloured cells bc and c. It differs from *B. buloloensis* in having dark fuscous to black postpronotal lobes, lateral postsutural vittae extending posteriorly to the *ia*. seta and the costal band overlapping R_{2+3}, and from *B. saramandiae* in having narrow tapering lateral postsutural vittae, apices of all femora fuscous and the costal band not confluent with R_{4+5}.

Bactrocera (Bactrocera) laensis, new species

(Fig. 18)

Type data: Holotype ♀, PAPUA NEW GUINEA: Morobe Province, Lae, FRI forest botanical gardens, 30.iv.1999, bred from *Pometia pinnata* (family Sapindaceae).

Location of type: Holotype (T245601) in QMIC.

Diagnosis: A medium-sized species; face fulvous with a pair of large oval black spots; postpronotal lobe fuscous; notopleuron yellow; scutum entirely black; lateral and medial postsutural yellow vittae absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous costal band confluent with R_{4+5}, a broad fuscous anal streak, cells bc and c dark fuscous and covered with dense microtrichia; abdominal terga entirely black except for a narrow red-brown margin around shining spot on tergum V.

Description: Female.

Head: Vertical length 1.6 mm. Frons length 1.6 times breadth; fuscous with dark fuscous on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of large oval black spots; length 0.44 mm. Occiput fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.

Thorax: Scutum entirely black. Pleural areas black except dark fuscous below postpronotal lobe. Yellow markings as follows: notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a small spot, anterior margin straight; anatergite (posterior apex black); katatergite (anterior, lower and posterior margins broadly black); postpronotal lobe fuscous. Lateral and medial postsutural yellow vittae absent. Postnotum dark red-brown centrally, black laterally. Scutellum yellow with a narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.

Legs: All femora entirely dark fuscous; fore and hind tibiae dark fuscous, mid tibiae fuscous; all tarsi with basal segment fulvous and apical four segments fuscous.

Wings: Length 6.3 mm; cells bc and c dark fuscous and covered with dense microtrichia; remainder of wings colourless except for a dark fuscous cell sc, a dark fuscous costal band confluent with R_{4+5}; a broad dark fuscous anal streak; no dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of weak development.

Abdomen: Oval; terga free; pecten absent on tergum III. Tergum I and sterna I and II wider than long. All segments entirely black except for narrow red-brown margins around

a pair of red-brown oval shining spot on tergum V. Ovipositor basal segment black, dorsoventrally flattened and tapering posteriorly in dorsal view. Ratio of length of oviscape to length of tergum V, 0.67:1. Apex of piercer needle-shaped. Abdominal sternites dark fuscous to black.
Attractant: No known record.
Male: No known record.
Distribution: Morobe Province, Papua New Guinea.
Host: *Pometia pinnata* (family Sapindaceae).
Etymology: The name *laensis* refers to Lae, the type locality.
Comments: *B. laensis* new species is similar to *B. thistletoni* (Drew, 1989: Fig. 296) in possessing a black scutum without postsutural yellow vittae, abdominal terga mostly black and legs with extensive dark coloration. It differs from this species in having a narrow mesopleural stripe, a costal band on wing confluent with R_{4+5}, cells bc and c dark fuscous and covered with dense microtrichia, small facial spots, scutellum with a narrow black basal band and abdominal terga entirely black. *B. laensis* is also similar to *B. pometiae* new species (Fig. 27) in the general colour patterns of the body, legs and wings but differs from this species in having dark fuscous postpronotal lobes and in lacking lateral postsutural yellow vittae.

Bactrocera (Bactrocera) manusiae, new species
(Fig. 19)

Type data: Holotype ♂, PAPUA NEW GUINEA: Manus Province, Dungon Village, near Lorengau, 29.iv.1999, H. Enock, attracted to methyl eugenol. **Paratypes**: PAPUA NEW GUINEA: 6 ♂, same data as holotype; 4 ♂ (29.ii.1999), 6 ♂ (15.iii.1999), same data as holotype; 4 ♂ (12.iv.1999), 3 ♂ (19.iv.1999), Manus Province, Lorengau, S Pondrilei House, H. Enock, attracted to methyl eugenol; 3 ♂ (9.iii.1999), 6 ♂ (7.v.1999), Manus Province, Lorengau, Enock House, H. Enock, attracted to methyl eugenol; 5 ♂, West New Britain Province, Kimbe, B Nambut House, 2.xii.1998, B. Nambut, attracted to methyl eugenol.
Location of types: Holotype (T245602) in QMIC; 7 paratypes in ANIC; 20 paratypes in QDPC; 10 paratypes (T245603–T245612) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of large oval black spots; postpronotal lobe and notopleuron yellow; scutum entirely black; two narrow lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe equal in width to notopleuron dorsally; scutellum yellow; wings with a broad fuscous costal band almost confluent with R_{4+5}, a transverse fuscous to pale fuscous band enclosing both crossveins, a broad fuscous anal streak, cells bc and c with a pale fuscous tint, microtrichia in outer corner of cell c only; abdominal terga I–V almost entirely black.
Description: Male.
Head: Vertical length 1.7 mm. Frons length 1.5 times breadth; fulvous with dark fuscous on anteromedial hump and around bases of orbital setae; orbital setae black: 1 *s.or.*; 2 *i.or.*; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of large oval black spots; length 0.49 mm. Occiput fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe equal in width to notopleuron dorsally, continuing to katepisternum as a small transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two narrow lateral postsutural vittae narrowing slightly posteriorly to end before *ia*. seta. Postnotum black. Scutellum yellow with a moderately broad black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: Fore femora fulvous with a dark fuscous spot on outer apical surface, mid femora entirely fulvous, hind femora fulvous with pale fuscous around apex; fore tibiae fuscous, mid tibiae fulvous with pale fuscous basally, hind tibiae dark fuscous; all tarsi with basal segment fulvous and apical four segments fuscous.
Wings: Length 5.9 mm; cells bc and c with a pale fuscous tint; microtrichia in outer corner of cell c only; remainder of wings colourless except for fuscous cell sc, a broad fuscous costal band almost confluent with R_{4+5}, a transverse band across wing from costal band to hind margin that is narrow and fuscous along r-m crossvein and broader and pale fuscous as it extends to hind margin of wing; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. All abdominal terga black except for a narrow dark red-brown line along posterior margin of tergum II and dark red-brown medially on terga IV and V. A pair of oval black shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites black.
Attractant: Methyl eugenol.
Female: No known record.
Distribution: Manus and West New Britain Provinces, Papua New Guinea.
Hosts: No known record.
Etymology: The name *manusiae* refers to the type locality.
Comments: *B. manusiae* new species is similar to *Bactrocera (Bactrocera) pulchra* Tryon (Drew, 1989: Fig. 129) and *B. unistriata* (Drew, 1989: Fig. 130) in possessing a black scutum and wing with a single dark transverse band enclosing both crossveins. It differs from *B. pulchra* in having pale cells bc and c, the costal band not confluent with R_{4+5}, the transverse band across the wing narrow along r-m crossvein and dark patterns on the apices of fore and hind femora, and from *B. unistriata* Tryon in having pale cells bc and c, the costal band not confluent with R_{4+5}, the lateral postsutural yellow vittae ending before the *ia*. seta and abdominal terga III–V almost entirely black.

Bactrocera (Bactrocera) meraiensis, new species
(Fig. 20)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, Merai Village, 22.iii.2000, A. Mararuai, attracted to methyl eugenol. **Paratypes**: PAPUA NEW

GUINEA: 3 ♂, same data as holotype; 5 ♂, Urai village, 22.iii.2000, A. Mararuai, attracted to methyl eugenol.
Location of types: Holotype (T245613) in QMIC; 2 paratypes in ANIC; 4 paratypes in QDPC; 2 paratypes (T245614 and T245615) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of large oval black spots; postpronotal lobe and notopleuron yellow; scutum black; two lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a dark fuscous costal band overlapping R_{2+3} but not confluent with R_{4+5}, broad fuscous anal streak, cells bc and c pale fuscous, microtrichia in outer corner of cell c only; abdominal terga III–V red-brown with a broad medial longitudinal black band and narrow fuscous to pale fuscous margins over all three terga.
Description: Male.
Head: Vertical length 1.96 mm. Frons length 1.4 times breadth; red-brown with dark fuscous around bases of orbital setae and on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of large oval black spots; length 0.49 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum entirely black with dark red-brown below lateral postsutural vittae. Pleural areas black except dark red-brown below postpronotal lobe. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two broad parallel-sided lateral postsutural vittae ending at *ia*. seta. Postnotum black. Scutellum yellow with a narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments fulvous except hind tibiae pale fuscous.
Wings: Length 6.4 mm; cells bc and c pale fuscous with microtrichia in outer corner of cell c only; remainder of wings colourless except dark fuscous cell sc, broad dark fuscous costal band tending to fuscous between R_{2+3} and R_{4+5} but not confluent with R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I dark fuscous with a narrow transverse red-brown band along posterior margin; tergum II red-brown anteriorly, fulvous posteriorly with a narrow transverse dark fuscous band across centre and anterolateral corners dark fuscous; terga III–V red-brown with a broad medial longitudinal black band over all three terga and narrow fuscous to pale fuscous lateral margins over all three terga. A pair of oval dark red-brown shining spots on tergum V. Posterior lobe of surstylus slightly elongate, sternum V with a deep concavity on posterior margin. Abdominal sternites pale, generally red-brown.
Attractant: Methyl eugenol.
Female: No known record.
Distribution: East New Britain Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *meraiensis* refers to the type locality.
Comments: *B. meraiensis* new species is similar to *B. nigrescens* (Drew, 1989: Fig. 102) in possessing a black scutum, mesopleural stripe of medium width and abdominal terga III–V red-brown with dark fuscous to black medial and lateral longitudinal bands. It differs from this species in having fuscous cells bc and c, a broader costal band almost confluent with R_{4+5} and broad parallel-sided yellow lateral postsutural vittae.

Bactrocera (Bactrocera) monostriata, new species
(Fig. 21)

Type data: Holotype ♂, PAPUA NEW GUINEA: Morobe Province, Bubia Ag Exp Centre, 11.viii.1998, S. Sar & S. Balagawi, attracted to cue lure.
Location of type: Holotype (T245616) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of small pear-shaped black spots; postpronotal lobe yellow with anterodorsal margins fuscous; notopleuron yellow; scutum entirely black; two narrow lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous costal band confluent with R_{4+5}, a transverse dark fuscous band across wing enclosing both crossveins, a broad dark fuscous anal streak, cells bc and c colourless, microtrichia in outer corner of cell c only; abdominal terga III–V dark fuscous to black with dark red-brown centrally on posterior margin of tergum IV and medially on tergum V.
Description: Male.
Head: Vertical length 1.6 mm. Frons length 1.5 times breadth; dark fuscous with narrow fulvous lateral margins; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of small pear-shaped black spots; length 0.44 mm. Occiput dark fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: postpronotal lobe (anterodorsal margins fuscous); notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a small transverse spot, anterior margin slightly convex; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two narrow subparallel lateral postsutural vittae ending at *ia*. seta. Postnotum black. Scutellum yellow with a broad black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: Fore and mid femora fulvous with fuscous over apical half to one-third, hind femora fulvous with dark fuscous over apical one-third; fore and mid tibiae fuscous, hind tibiae dark fuscous; all tarsal segments fulvous.

Wings: Length 5.5 mm; cells bc and c colourless; microtrichia in outer corner of cell c only; remainder of wings colourless except for a dark fuscous cell sc, a broad dark fuscous costal band confluent with R_{4+5}, a dark fuscous transverse band from costal band to hind margin and enclosing r-m and dm-cu crossveins; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I black; tergum II dark fuscous to black with dark red-brown across posterior margin; terga III–V dark fuscous to black with dark red-brown centrally on posterior margin of tergum IV and over tergum V. A pair of oval dark fuscous to black shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous.
Attractant: Cue lure.
Female: No known record.
Distribution: Morobe Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *monostriata* refers to the single transverse fuscous band across the wing.
Comments: *B. monostriata* new species is similar to *B. unistriata* (Drew, 1989: Fig. 130) in possessing a black scutum, apices of all femora fuscous and wings with a broad costal band confluent with R_{4+5} and a transverse fuscous band enclosing both r-m and dm-cu crossveins. It differs from this species in having the anteromedial corners of the postpronotal lobes fuscous, a broad basal black band on the scutellum, cells bc and c colourless and abdominal terga III–V mostly dark fuscous to black.

Bactrocera (Bactrocera) neoabdonigella, new species
(Fig. 22)

Type data: Holotype ♂, PAPUA NEW GUINEA: Central Province, Mt Diamond High School, 9.xii.1998, D. Tenakanai, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1 ♂, Central Province, Start of Kokoda Track, 1.iii.1999, D. Tenakanai, attracted to cue lure; 1 ♂, Morobe Province, Jim Jacobson's farm, 1 mile from Bubia, 29.v.2000, S. Balagawi and S. Sar, attracted to cue lure.
Location of types: Holotype (T245617) in QMIC; 1 paratype in QDPC; 1 paratype (T245618) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of small- to medium-sized circular black spots; postpronotal lobe and notopleuron yellow; scutum red-brown to dark red-brown; two lateral postsutural vittae present; medial postsutural vitta absent; mesopleural stripe reaching almost to anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous costal band confluent with R_{4+5}, broad fuscous anal streak, cells bc and c fuscous, microtrichia in outer corner of cell c only; abdominal tergum III black, tergum IV dark fuscous to black with red-brown lateral to a medial longitudinal black band, tergum V red-brown with a medial longitudinal black band.
Description: Male.
Head: Vertical length 1.95 mm. Frons length 1.4 times breadth; fuscous with fulvous margins and a dark fuscous anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of small- to medium-sized circular black spots; length 0.55 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum red-brown to dark red-brown without darking markings. Pleural area red-brown to dark red-brown with black adjacent to anterior margin of mesopleural stripe. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching almost to anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex dark red-brown); anterior two-thirds katatergite (remainder dark red-brown); two broad parallel-sided lateral postsutural vittae ending just posterior to *ia*. seta. Postnotum dark red-brown. Scutellum yellow except for broad red-brown basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All leg segments entirely fulvous.
Wings: Length 7.2 mm; cells bc and c fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except dark fuscous cell sc, broad dark fuscous costal band tending to fuscous as it becomes confluent with R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I black; tergum II dark fuscous except for a broad red-brown transverse band posteriorly; tergum III black, tergum IV dark fuscous with red-brown each side of a narrow medial longitudinal black band, tergum V red-brown with a narrow medial longitudinal black band. A pair of oval dark fuscous shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous.
Attractant: Cue lure.
Female: No known record.
Distribution: Central and Morobe Provinces, Papua New Guinea.
Hosts: No known record.
Etymology: The name *neoabdonigella* refers to a close morphological relationship to *Bactrocera abdonigella* (Drew).
Comments: *B. neoabdonigella* new species is similar to *B. abdonigella* (Drew, 1989: Fig. 198) in possessing a red-brown scutum, yellow postpronotal lobes and notopleura, broad parallel-sided lateral postsutural vittae, leg segments mostly fulvous and abdominal terga III–V mostly dark coloured. It differs from *B. abdonigella* in possessing a broad fuscous to dark fuscous costal band confluent with R_{4+5} and areas of red-brown on abdominal terga IV and V.

Bactrocera (Bactrocera) neoaeroginosa, new species
(Fig. 23)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, LAES Keravat, Fidelis Hela House, 19.xi.1999, A. Mararuai, attracted to methyl eugenol. **Paratypes**:

PAPUA NEW GUINEA: 7♂, West New Britain Province, Kimbe, B Nambut House, 17–28.viii.1998, Trap No. P221, A. Mararuai, L. Leblanc, S. Balagawi, attracted to methyl eugenol; 3♂, West New Britain Province, DAMI Oil Palm Res. Sta., 17–28.viii.1998, Trap No. WNB-A, A. Mararuai, L. Leblanc, S. Balagawi, attracted to methyl eugenol; 2♂, West New Britain Province, DAMI Forestry Station, 17–28.viii.1998, Trap No. P220, A. Mararuai, L. Leblanc, S. Balagawi, attracted to methyl eugenol; 4♂, West New Britain Province, Ponini Agriculture School, 17–28.viii.1998, Trap No. WNB-B, A. Mararuai, L. Leblanc, S. Balagawi, attracted to methyl eugenol; 1♂, West New Britain Province, Pohanta Est poultry farm, 17–28.viii.1998, Trap No. WNB-D, A. Mararuai, L. Leblanc, S. Balagawi, attracted to methyl eugenol; 1♂, West New Britain Province, Hoskins, DPI office, 17–28.viii.1998, Trap No. P219, A. Mararuai, L. Leblanc, S. Balagawi, attracted to methyl eugenol.

Location of types: Holotype (T245619) in QMIC; 4 paratypes in ANIC; 10 paratypes in QDPC; 4 paratypes (T245620–T245623) in QMIC.

Diagnosis: A medium-sized species; face fulvous with a pair of large circular black spots; postpronotal lobe and notopleuron yellow; scutum red-brown with narrow longitudinal pale fuscous lines inside lateral postsutural vittae; two broad lateral postsutural yellow vittae present reaching *ia*. seta; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow fuscous costal band overlapping R_{2+3} where it becomes pale fuscous, a broad pale fuscous anal streak, cells bc and c with a fulvous tint, microtrichia in outer corner of cell c only; abdominal terga III–V entirely red-brown with a narrow medial longitudinal pale fuscous line over all three terga.

Description: Male.

Head: Vertical length 1.5 mm. Frons length 1.4 times breadth; entirely red-brown; orbital setae dark red-brown: 1 *s.or*.; 2 *i.or*.; lunule dark red-brown. Ocellar triangle black. Face fulvous with a pair of large circular black spots; length 0.49 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.

Thorax: Scutum red-brown with lateral longitudinal pale fuscous markings inside lateral postsutural yellow vittae. Pleural areas entirely red-brown. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex red-brown); anterior half katatergite (remainder red-brown); two broad parallel-sided lateral postsutural vittae ending at *ia*. seta. Postnotum red-brown. Scutellum yellow with a narrow red-brown basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.

Legs: All segments entirely fulvous except hind tibiae red-brown.

Wings: Length 5.5 mm; cells bc and c with a pale fulvous tint; microtrichia in outer corner of cell c only; remainder of wings colourless except fuscous cell sc, a narrow fuscous costal band becoming paler as it overlaps R_{2+3}; a broad pale fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.

Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I pale fuscous with lateral red-brown margins; tergum II red-brown with a narrow pale fuscous line anteriorly and fulvous across posterior margin; terga III–V entirely red-brown with a narrow medial longitudinal pale fuscous band across all three terga. A pair of oval red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites pale coloured.

Attractant: Methyl eugenol.

Female: No known record.

Distribution: East New Britain and West New Britain Provinces, Papua New Guinea.

Hosts: No known record.

Etymology: The name *neoaeroginosa* refers to the close morphological relationship to *Bactrocera aeroginosa* (Drew & Hancock).

Comments: *B. neoaeroginosa* new species is similar to *B. aeroginosa* (Drew & Hancock) (Drew, 1989: Fig. 59) and *B. dyscrita* (Drew, 1989: Fig. 226) in possessing a red-brown scutum and abdomen, a narrow costal band and entirely fulvous femora. It differs from *B. aeroginosa* in having a narrower mesopleural stripe not extending to the anterior *npl*. seta dorsally, fuscous patterns on the scutum and a broader costal band overlapping R_{2+3} and from *B. dyscrita* in having a narrow medial longitudinal pale fuscous band over abdominal terga III–V. Furthermore, it differs from both species in being attracted to methyl eugenol.

Bactrocera (Bactrocera) ohuiae, new species

(Fig. 24)

Type data: Holotype ♂, PAPUA NEW GUINEA: Madang Province, Ohu Conservation Area, 26.v.2000, Hais Wasil, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1 ♂, Madang Province, Bogia Station, 21.vi.2000, attracted to cue lure; 1 ♂ (16.iii.1999), 1 ♂ (22.iii.1999), East Sepik Province, Angorom District, Saramandi Ag Res Stn, Gavien, attracted to cue lure.

Location of types: Holotype (T245624) in QMIC; 2 paratypes in QDPC; 1 paratype (T245625) in QMIC.

Diagnosis: A medium-sized species; face fulvous with a pair of small pear-shaped black spots; postpronotal lobe yellow with fuscous on anterior half; notopleuron yellow; scutum mostly dark fuscous with red-brown centrally; two broad lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad fuscous costal band confluent with R_{4+5}, broad fuscous anal streak, cells bc and c with a pale tint, microtrichia in outer corner of cell c only; abdominal terga III and IV mostly fuscous with dark fuscous along anterior and lateral margins of

tergum III and a narrow red-brown band along posterior margin of tergum IV, tergum V red-brown with fuscous on anterolateral corners.
Description: Male.
Head: Vertical length 1.7 mm. Frons length 1.2 times breadth; pale fuscous with fulvous along lateral margins; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of small pear-shaped black spots; length 0.49 mm. Occiput fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 fuscous, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum red-brown centrally with dark fuscous around lateral and posterior margins and extending forward as a narrow medial longitudinal band to anterior margin of scutum. Pleural areas entirely dark fuscous. Yellow markings as follows: postpronotal lobe (anterior half fuscous); notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, not continuing to katepisternum, anterior margin convex; anatergite (posterior apex dark fuscous); anterior half katatergite (remainder including ventral margin dark fuscous); two broad parallel-sided to subparallel lateral postsutural vittae ending at *ia*. seta. Postnotum dark fuscous. Scutellum yellow except for narrow dark fuscous basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All leg segments entirely fulvous.
Wings: Length 5.8 mm; cells bc and c with a pale tint; microtrichia in outer corner of cell c only; remainder of wings colourless except for fuscous cell sc, broad fuscous costal band confluent with R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely dark fuscous; tergum II dark fuscous with fulvous along posterior margin; tergum III fuscous with dark fuscous along anterior and lateral margins, tergum IV fuscous with a narrow red-brown band along posterior margin, tergum V red-brown with fuscous on anterolateral corners. A pair of oval dark fuscous to black shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites red-brown.
Attractant: Cue lure.
Female: No known record.
Distribution: East Sepik and Morobe Provinces, Papua New Guinea.
Hosts: No known record.
Etymology: The name *ohuiae* refers to the type locality.
Comments: *B. ohuiae* new species is similar to *B. furfurosa* (Drew, 1989: Fig. 131) in possessing a pale-coloured scutum, abdominal terga III–V mostly dark coloured, femora entirely fulvous and costal band confluent with R_{4+5}. It differs from this species in having the anterior half of postpronotal lobes fuscous, a lanceolate fuscous pattern on the scutum and broad parallel-sided lateral postsutural vittae reaching to the *ia*. setae.

Bactrocera (Bactrocera) paraendiandrae, new species
(Fig. 25)

Type data: Holotype ♂, PAPUA NEW GUINEA: Morobe Province, Jim Jacobson's farm, 1 mile from Bubia, 8. iii.2000, S. Balagawi and S. Sar, attracted to methyl eugenol.
Paratype: 1 ♂, same data as holotype.
Location of types: Holotype (T245626) in QMIC; 1 paratype in QDPC.
Diagnosis: A small species; face fulvous with a pair of medium-sized oval black spots; postpronotal lobe and notopleuron yellow; scutum black; two broad lateral postsutural yellow vittae present narrowing posteriorly to reach *ia*. seta; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous costal band almost confluent with R_{4+5}, a broad fuscous anal streak, cells bc and c with a pale fulvous tint, microtrichia in outer corner of cell c only; abdominal terga III–V red-brown with a black 'T'-shaped pattern and moderately broad dark fuscous lateral margins over all three terga.
Description: Male.
Head: Vertical length 1.2 mm. Frons length 1.4 times breadth; red-brown with fulvous lateral margins, fuscous around bases of orbital setae and on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of medium-sized oval black spots; length 0.39 mm. Occiput dark fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum black with dark red-brown below lateral postsutural vittae. Pleural areas entirely dark fuscous to black. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a small transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two broad lateral postsutural vittae narrowing posteriorly to end at *ia*. seta. Postnotum black. Scutellum yellow with a narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: Femora fulvous with fuscous around apical one-third of fore and hind femora and around apical half of mid femora; fore tibiae dark fuscous basally to fuscous apically, mid tibiae pale fuscous basally to fulvous apically, hind tibiae entirely dark fuscous; all tarsal segments fulvous.
Wings: Length 4.2 mm; cells bc and c with a pale fulvous tint; microtrichia in outer corner of cell c only; remainder of wings colourless except dark fuscous cell sc, a broad dark fuscous costal band almost confluent with R_{4+5}; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely black; tergum II dark fuscous with fulvous along

posterior margin; terga III–V red-brown with a black 'T'-shaped pattern consisting of a black medial longitudinal band over all three terga and a transverse black band across anterior margin of tergum III and moderately broad dark fuscous lateral margins over terga III–V. A pair of oval dark fuscous shining spots on tergum V. Posterior lobe of surstylus slightly elongate, sternum V with a deep concavity on posterior margin. Abdominal sternites dark red-brown.
Attractant: Methyl eugenol.
Female: No known record.
Distribution: Morobe Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *paraendiandrae* refers to a close morphological relationship to *Bactrocera endiandrae* (Perkins & May).
Comments: *B. paraendiandrae* new species is similar to *B. endiandrae* (Drew, 1989: Fig. 98), *B. latissima* (Drew, 1989: Fig. 66) and *B. mimulus* (Drew, 1989: Fig. 101) in possessing a black scutum, costal band overlapping R_{2+3} and abdominal terga III–V with medial and lateral longitudinal dark fuscous to black bands. It differs from these species in having broad subparallel lateral postsutural yellow vittae reaching the *ia*. seta and fuscous coloration around apices of all femora.

Bactrocera (Bactrocera) paraochracea, new species
(Fig. 26)

Type data: Holotype ♂, PAPUA NEW GUINEA: Central Province, Rouna 4, 20.iv.1999, D. Tenakanai, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1 ♂ (16.ii.1999), same data as holotype; 1 ♂ (15.ix.1999), 1 ♂ (29.ix.1999), Central Province, Rouna 2, D. Tenakanai, attracted to cue lure.
Location of types: Holotype (T245627) in QMIC; 2 paratypes in QDPC; 1 paratype (T245628) in QMIC.
Diagnosis: A small species; face fulvous with a pair of medium-sized circular black spots; postpronotal lobe and notopleuron yellow; scutum dark red-brown with medial and lateral longitudinal dull black markings; two lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe almost reaching anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow dark fuscous costal band overlapping R_{2+3} where it becomes paler, a broad dark fuscous anal streak, cells bc and c fuscous, dense microtrichia covering both cells; abdominal terga III–V orange-brown with a distinct black 'T'-shaped pattern and moderately broad dark fuscous lateral markings on terga III and IV.
Description: Male.
Head: Vertical length 1.4 mm. Frons length 1.4 times breadth; fuscous with fulvous lower lateral margins; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of medium-sized circular black spots; length 0.39 mm. Occiput fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum dark red-brown with medial and lateral longitudinal dull black markings. Pleural areas dark fuscous to black with red-brown below postpronotal lobe. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe almost reaching anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two moderately broad parallel- to subparallel-sided lateral postsutural vittae ending at *ia*. seta. Postnotum red-brown centrally, black laterally. Scutellum yellow except for a narrow red-brown basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. absent; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous except hind tibiae fuscous.
Wings: Length 4.8 mm; cells bc and c fuscous; dense microtrichia covering both cells; remainder of wings colourless except for a dark fuscous cell sc, a dark fuscous costal band overlapping R_{2+3} where it becomes paler; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I black; tergum II dark fuscous with a broad fulvous marking across posterior margin; terga III–V red-brown with a distinct black 'T'-shaped pattern and moderately broad dark fuscous lateral markings on terga III and IV. A pair of oval red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites pale coloured.
Attractant: Cue lure.
Female: No known record.
Distribution: Central Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *paraochracea* refers to the morphological similarity to *Bactrocera ochracea* Drew.
Comments: *B. paraochracea* new species is similar to *B. ochracea* (Drew, 1989: Fig. 11) in possessing a red-brown scutum, broad parallel-sided lateral postsutural vittae, a broad mesopleural stripe almost reaching the anterior *npl*. seta dorsally, yellow postpronotal lobes and notopleura and in lacking *a.sa*. seta. It differs from this species in having abdominal terga III–V with a distinct black 'T'-shaped pattern and moderately broad dark fuscous lateral margins on terga III and IV.

Bactrocera (Bactrocera) pometiae, new species
(Fig. 27)

Type data: Holotype ♂, PAPUA NEW GUINEA: Morobe Province, Lae, FRI Forest, Botanical gardens, 30.iv.1999, bred from *Pometia pinnata* (fam. Sapindaceae). **Paratypes**: PAPUA NEW GUINEA: 7♂ and 7♀, same data as holotype; 1 ♂ and 1♀ (28.vi.1999), same data as holotype; 2 ♂, Madang Province, Baitabag, 23.xi.2000, bred from *Pometia pinnata* (fam. Sapindaceae); 6♂ and 8♀, Morobe Province, Lae, FRI Forest, Botanical Gardens, 30.iv.1999, bred from *Tabemaemontana novoguineensis* (fam. Apocynaceae).

Location of types: Holotype (T245629) in QMIC; 6 paratypes in ANIC; 20 paratypes in QDPC; 6 paratypes (T245630–T245635) in QMIC.
Diagnosis: A large species; face fulvous with a pair of medium-sized circular black spots; postpronotal lobe and notopleuron yellow; scutum entirely black; two lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous costal band confluent with R_{4+5}, a broad dark fuscous anal streak, cells bc and c dark fuscous, dense microtrichia covering all of both cells; abdominal terga III–V black with a narrow medial longitudinal black band from centre of tergum III to posterior margin of tergum V and narrow red-brown areas either side of this medial band.
Description: Male.
Head: Vertical length 1.9 mm. Frons length 1.4 times breadth; red-brown with dark fuscous anteroventrally; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of medium-sized circular black spots; length 0.59 mm. Occiput dark fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 entirely dark fuscous.
Thorax: Scutum entirely black. Pleural areas entirely black except red-brown below postpronotal lobes. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two moderately broad subparallel lateral postsutural vittae ending before *ia*. seta. Postnotum black. Scutellum yellow except for a narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: Fore and mid femora dark fuscous with fulvous basally, hind femora fulvous with dark fuscous on apical one-third; all tibiae dark fuscous; all tarsal segments with basal segment fulvous and apical four segments fuscous.
Wings: Length 6.6 mm; cells bc and c dark fuscous; dense microtrichia covering both cells; remainder of wings colourless except for a dark fuscous cell sc, a broad dark fuscous costal band confluent with R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I and II black with fulvous across posterior margin of tergum II; terga III–V black with a narrow medial longitudinal black band from centre of tergum III to posterior margin of tergum V, narrow red-brown areas either side of medial longitudinal black band and red-brown across posterior margin of tergum V. A pair of oval black shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark.
Attractant: No known record.
Female: As for male except no dense aggregation of microtrichia around A_1+CuA_2, supernumerary lobe weak, no pecten on abdominal tergum III, basal segment of ovipositor dark red-brown to fuscous, ratio of length of oviscape to length of tergum V, 0.92:1; apex of aculeus needle-shaped.
Distribution: Morobe and Madang Provinces, Papua New Guinea.
Hosts: *Pometia pinnata* (family Sapindaceae) and *Tabernaemontana novoguineensis* (family Apocynaceae).
Etymology: The name *pometiae* refers to the generic name of the host plant of the holotype.
Comments: *B. pometiae* new species is similar to *B. latissima* (Drew, 1989: Fig. 66) in possessing a black scutum and abdomen, lateral postsutural yellow vittae ending before the *ia*. seta, coloured cells bc and c and costal band confluent with R_{4+5}. It differs from this species in having medium-sized circular facial spots, extensive dark fuscous coloration over all femora and cells bc and c dark fuscous and covered with dense microtrichia.

Bactrocera (Bactrocera) raunsepnaensis, new species
(Fig. 28)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, Bainings Mts, Raunsepna, forest, 28.iv to 15.v.1998, Cue No. 7, S. Balagawi, L. Leblanc, A. Mararuai, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1 ♂, same data as holotype; 1 ♂, East New Britain Province, Bainings Mts, Raunsepna, forest, 23.ii to 13.iii.1998, trap No. 7, L. Leblanc, J. Bokosou, attracted to cue lure; 1 ♂, East New Britain Province, Bainings Mts, Yayam Village, 15.iv.1999, L. Leblanc *et al*., attracted to cue lure; 3 ♂, East New Britain Province, Jacquinot Bay Airstrip, 17 to 28.viii.1998, L. Leblanc, S. Balagawi, A. Mararuai, attracted to cue lure; 1 ♂, East New Britain Province, Gonalie Airstrip, Pomio, 17 to 28.viii.1998, L. Leblanc, S. Balagawi, A. Mararuai, attracted to cue lure; 3 ♂, West New Britain Province, Kandrian Airstrip, 18 to 29.viii.1998, L. Leblanc, S. Balagawi, A. Mararuai, attracted to cue lure; 1 ♂, West New Britain Province, Meselia Airstrip, 18 to 29.viii.1998, L. Leblanc, S. Balagawi, A. Mararuai, attracted to cue lure.
Location of types: Holotype (T245636) in QMIC; 2 paratypes in ANIC; 6 paratypes in QDPC; 3 paratypes (T245637–T245639) in QMIC.
Diagnosis: A small species; face white with very large black markings filling entire antennal furrows; postpronotal lobe with posterior half yellow and anterior half dark fuscous; notopleuron black; scutum entirely black; two moderately broad lateral postsutural yellow vittae ending well before *ia*. seta; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow with a large broad black marking across dorsal surface enclosing apical scutellar setae; wings with a narrow dark fuscous costal band, a narrow transverse band that is dark fuscous along r-m crossvein and fuscous along dm-cu crossvein, a broad dark fuscous anal streak, cells bc and c colourless, microtrichia in outer corner of cell c only, r-m crossvein strongly oblique; abdominal terga II–V fulvous with a large black 'T'-shaped pattern over all four terga and

broad lateral longitudinal black bands over terga III–V, all bands joining across posterior margin of tergum V.
Description: Male.
Head: Vertical length 1.5 mm. Frons length 1.9 times breadth; fulvous with fuscous along lower lateral margins; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face white with a pair of very large elongate black spots filling entire antennal furrows; length 0.44 mm. Occiput black and extending over the vertex on to the upper frons, fulvous along eye margins; antennae short, with segments 1 and 2 fuscous, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: posterior half postpronotal lobe (anterior half dark fuscous); mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a small pale transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two moderately broad lateral postsutural vittae ending well before *ia*. seta. Notopleuron black. Postnotum black. Scutellum yellow with a broad black dorsal marking extending over the entire surface and enclosing apical scutellar setae. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: Fore and mid femora entirely fulvous, hind femora fulvous with black around apical one-quarter; fore tibiae pale fuscous, mid tibiae fuscous, hind tibiae black; all tarsi with all segments entirely fulvous.
Wings: Length 4.5 mm; cells bc and c colourless; microtrichia in outer corner of cell c only; r-m crossvein extremely oblique; remainder of wings colourless except dark fuscous cell sc, a narrow dark fuscous costal band confluent with R_{2+3} and remaining very narrow to apex of wing, a narrow transverse band across wing that is dark fuscous along r-m crossvein and fuscous across dm-cu crossvein; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely black; terga II–V fulvous with a large 'T'-shaped pattern consisting of a black band across anterior margin of tergum II and expanding over lateral margins and a broad medial longitudinal black band over all terga, broad lateral longitudinal black bands over terga III–V, all bands joining across posterior margin of tergum V. A pair of oval black shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites black.
Attractant: Cue lure.
Female: No known record.
Distribution: East New Britain and West New Britain Provinces, Papua New Guinea.
Hosts: No known record.
Etymology: The name *raunsepnaensis* refers to the type locality.
Comments: *B. raunsepnaensis* new species is similar to species in the *frauenfeldi* complex in possessing a black scutum, a black pattern on the scutellum, black medial and lateral longitudinal black bands on the abdomen and the wing with a narrow transverse fuscous band enclosing both crossveins. It differs in having a white face with large elongate black markings filling the entire antennal furrows, a black notopleuron, wing with a narrow complete costal band and the transverse fuscous band not joining the costal band.

Bactrocera (Bactrocera) rounaensis, new species
(Fig. 29)

Type data: Holotype ♂, PAPUA NEW GUINEA: Central Province, Rouna Forest, 15.vi.1999, D. Tenakanai, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1 ♂, same data as holotype; 1 ♂, Central Province, Start of Kokoda Track, 1.iii.1999, D. Tenakanai, attracted to cue lure.
Location of types: Holotype (T245640) in QMIC; 1 paratype in QDPC; 1 paratype (T245641) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of small- to medium-sized circular black spots; postpronotal lobe yellow with anterodorsal corners fuscous; notopleuron yellow; scutum entirely black; two lateral postsutural yellow vittae present narrowing sharply posteriorly; medial postsutural yellow vitta absent; mesopleural stripe reaching anterior *npl*. seta dorsally; scutellum yellow with a distinct triangular black marking on dorsal surface; wings with a narrow fuscous to pale fuscous costal band overlapping R_{2+3}, a broad fuscous anal streak, a narrow transverse fuscous to pale fuscous band across wing and enclosing both crossveins, cells bc and c pale fulvous; microtrichia covering outer half to two-thirds of cell c only; abdominal terga III–V red-brown with broad lateral and medial longitudinal black bands, which are joined along the intersegmental lines.
Description: Male.
Head: Vertical length 1.4 mm. Frons length 1.44 times breadth; fuscous with dark fuscous around orbital setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with small- to medium-sized circular black spots; length 0.49 mm. Occiput fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum entirely black. Pleural areas black. Yellow markings as follows: postpronotal lobe with fuscous on anterodorsal corners; notopleuron; mesopleural stripe reaching anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two lateral postsutural vittae narrowing sharply posteriorly to end before *ia*. seta. Postnotum black. Scutellum yellow with a distinct triangular black marking on dorsal surface. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All femora fulvous except for a small fuscous area on apex of hind femora; fore tibiae fuscous basally to pale fuscous apically, mid tibiae fuscous, hind tibiae dark fuscous; all tarsi with basal segment fulvous and four apical segments fuscous.

Wings: Length 5.2 mm; cells bc and c pale fulvous; microtrichia covering outer half to two-thirds of cell c only; remainder of wings colourless except fuscous cell sc, narrow fuscous costal band overlapping R_{2+3} where it becomes pale fuscous; a broad fuscous anal streak; a narrow transverse fuscous band across wing enclosing r-m and dm-cu crossveins and becoming pale fuscous along dm-cu crossvein; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely black; tergum II fulvous with broad lateral and medial longitudinal black bands joined along anterior margin; terga III–V red-brown with broad lateral and medial longitudinal black bands that join along the intersegmental lines between all three terga. A pair of oval red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous to black.
Attractant: Cue lure.
Female: No known record.
Distribution: Central Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *rounaensis* refers to the type locality.
Comments: *B. rounaensis* new species is similar to *B. angustifasciata* (Drew, 1989: Fig. 202) in possessing a black scutum, lateral postsutural vittae tapering posteriorly to end before the *ia*. seta, a black triangular marking on the dorsal surface of the scutellum and a transverse fuscous band across the wing enclosing both crossveins. It differs from *B. angustifasciata* in having small pale facial spots, the anterodorsal corner of the postpronotal lobe fuscous, the mesopleural stripe reaching to the anterior *npl*. seta dorsally, cells bc and c pale fuscous and the transverse band across the wing narrower and less well defined.

Bactrocera (Bactrocera) rutilana, new species
(Fig. 30)

Type data: Holotype ♂, PAPUA NEW GUINEA: Central Province, Bisianumu Rubber Estate, 12.i.1999, D. Tenakanai, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: Central Province: 1 ♂, (6.iv.1999), same data as holotype; 1♂ (16.ii.1999), 1 ♂ (18.ii.1999), 1 ♂ (1.iii.1999), 1 ♂ (22.iii.1999), 1 ♂ (6.iv.1999), Start of Kokoda Track, D. Tenakanai, attracted to cue lure; 1 ♂, Kaiau Settlement, Hiri Tano Highway, 3.xii.1998, D. Tenakanai, attracted to cue lure; 1 ♂, Goldie River (up River), 15.ii.1999, D. Tenakanai, attracted to cue lure; 1 ♂ (12.i.1999), 3 ♂ (2.ii.1999), 2 ♂ (1.iii.1999), Rouna Forest, D. Tenakanai, attracted to cue lure; 1 ♂ (16.ii.1999), 1 ♂ (22.iii.1999), Rouna 4, D. Tenakanai, attracted to cue lure; Morobe Province: 1 ♂, Gabensis Village, 16.ii.2000, S. Sar and S. Balagawi, attracted to cue lure; 1 ♂ (7.iv.1999), 1 ♂ (15.iv.1999), 1 ♂ (10.vi.1999), Tikeling Village, S. Balagawi and S. Sar, attracted to cue lure; 1 ♂ (21.x.1999), 1 ♂ (9.ii.2000), 1 ♂ (27.iv.2000), Borzie Village, S. Sar and S. Balagawi, attracted to cue lure; Madang Province: 1 ♂, Brahman High School, 20.viii.1999, attracted to cue lure; 2 ♂ (14.iv.1999), 1 ♂ (5.i.2000), Ramu Sugar Residential Area, attracted to cue lure; Western Highlands Province: 1 ♂ (24.v.2000), 1 ♂ (20.vi.2000), Mt. Hagen, attracted to cue lure; East Sepik Province: 1 ♂ (22.iii.1999), 1 ♂ (4.iv.1999), 2 ♂ (19.iv.1999), Hawain CCRI Station, near Boiken Village, attracted to cue lure; 3 ♂, Maprik District, DPI Staff residences, 7.iv.1999, DPI, attracted to cue lure; East Sepik District: 2 ♂ (30.iii.1999), 1 ♂ (19.iv.1999), 1 ♂ (7.v.1999), 2 ♂ (16.vi.1999), 1 ♂ (5.viii.1999), 1 ♂ (22.ix.1999), Wewak town, Kreer Hghts, NAQIA staff residence, NAQIA, attracted to cue lure; 2 ♂ (16.iii.1999), 1 ♂ (30.iii.1999), 1 ♂ (6.iv.1999), 1 ♂ (20.iv.1999), Angorom District, Saramandi Ag Res Stn, Gavien, attracted to cue lure; West Sepik Province: 1 ♂ (9.iv.1999), 3 ♂ (16.iv.1999), 4 ♂ (23.iv.1999), 3 ♂ (30.iv.1999), Yako Village, attracted to cue lure; 1 ♂ (2.iv.1999), 2 ♂ (9.iv.1999), Wutung Govt Station, (PNG Irian Jaya border), NAQIA, attracted to cue lure; 1 ♂, Pasi DPI Station between Krissa and Osima, 8.iv.1999, DPI, attracted to cue lure.
Location of types: Holotype (T245643) in QMIC; 10 paratypes in ANIC; 44 paratypes in QDPC; 10 paratypes (T245644–T245653) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of very small circular black spots; postpronotal lobe yellow with anterolateral corners red-brown; notopleuron yellow; scutum red-brown with narrow pale fuscous lateral lines inside lateral postsutural yellow vittae; two broad lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad fuscous to pale fuscous costal band confluent with R_{4+5}, a broad fuscous anal streak, cells bc and c pale fuscous, microtrichia in outer half of cell c only; abdominal terga III–V entirely red-brown with a narrow pale fuscous line along anterior margin of tergum III.
Description: Male.
Head: Vertical length 1.5 mm. Frons length 1.2 times breadth; red-brown with dark fuscous on anteromedial hump and around orbital setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of very small circular black spots; length 0.44 mm. Occiput red-brown with fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum red-brown with narrow lateral pale fuscous lines inside lateral postsutural yellow vittae. Pleural area entirely red-brown. Yellow markings as follows: postpronotal lobe (anterolateral corner red-brown); notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin slightly convex; anatergite (posterior apex red-brown); anterior two-thirds katatergite (remainder red-brown); two moderately broad parallel- to subparallel-sided lateral postsutural vittae ending at *ia*. seta. Postnotum red-brown. Scutellum yellow with a narrow red-brown basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All leg segments entirely fulvous.

Wings: Length 5.5 mm; cells bc and c pale fuscous; microtrichia in outer half of cell c only; remainder of wings colourless except fuscous cell sc, a broad fuscous costal band tending to pale fuscous as it becomes confluent with R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely dark red-brown to fuscous; tergum II dark red-brown to fuscous with fulvous along posterior margin; terga III–V entirely red-brown with a pale fuscous line along anterior margin of tergum III. A pair of oval red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a slight concavity on posterior margin. Abdominal sternites red-brown.
Attractant: Cue lure.
Female: No known record.
Distribution: Central, Morobe, Madang, Western Highlands, East Sepik and West Sepik Provinces, Papua New Guinea.
Hosts: No known record.
Etymology: The name *rutilana* refers to the overall pale red-brown coloration.
Comments: *B. rutilana* new species is similar to *B. furfurosa* (Drew, 1989: Fig. 131), *B. obfuscata* (Drew, 1989: Fig. 135) and *B. popondettiensis* (Drew, 1989: Fig. 136) in the *furfurosa* complex of Drew (1989) in possessing a pale-coloured scutum, a broad costal band confluent with R_{4+5} and the femora entirely fulvous. It differs from *B. furfurosa* and *B. obfuscata* in having broad parallel-sided lateral postsutural vittae and from all three species in having the anterolateral corners of the postpronotal lobes fuscous and abdominal terga III–V entirely red-brown.

Bactrocera (Bactrocera) saramandiae, new species
(Fig. 31)

Type data: Holotype ♂, PAPUA NEW GUINEA: East Sepik Province, Angoram District, Saramandi Agricultural Res Station, 22.iii.1999, Gavien, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 4 ♂, same data as holotype; 1 ♂, 16.iii.1999, same data as holotype; 2 ♂ (7.iv.1999), 1 ♂ (27.v.1999), East Sepik Province, Maprik District, DPI Staff residence, DPI, attracted to cue lure.
Location of types: Holotype (T245654) in QMIC; 2 paratypes in ANIC; 4 paratypes in QDPC; 2 paratypes (T245655 and T245656) in QMIC.
Diagnosis: A small species; face fulvous with a pair of medium-sized circular black spots; postpronotal lobe fuscous; notopleuron yellow; scutum entirely black except dark fuscous below and behind lateral postsutural yellow vittae; two lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous costal band becoming paler as it becomes confluent with R_{4+5}, a broad fuscous anal streak, cells bc and c with a pale tint, microtrichia in outer half of cell c only; abdominal tergum III fuscous centrally and dark fuscous anteriorly and laterally, tergum IV fuscous across anterior half with red-brown posterolaterally and fulvous medially, tergum V entirely fulvous.
Description: Male.
Head: Vertical length 1.6 mm. Frons length 1.25 times breadth; fuscous with fulvous lateral margins and dark fuscous around orbital setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of medium-sized circular black spots; length 0.49 mm. Occiput fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum entirely black except dark fuscous below and behind lateral postsutural yellow vittae. Pleural areas varying from dark red-brown through fuscous to black. Yellow markings as follows: notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two broad parallel-sided lateral postsutural vittae ending behind *ia*. seta. Postpronotal lobe fuscous. Postnotum red-brown centrally, black laterally. Scutellum yellow with a narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous except hind tibiae fuscous.
Wings: Length 4.6 mm; cells bc and c with a pale fulvous tint; microtrichia in outer half of cell c only; remainder of wings colourless except dark fuscous cell sc, broad dark fuscous costal band becoming paler as it overlaps R_{2+3} and confluent with R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely fuscous; tergum II fuscous across anterior and lateral margins, fulvous across posterior margin; tergum III fuscous centrally with dark fuscous across the anterior margin and forming broad lateral margins, tergum IV fuscous across the anterior half, red-brown posterolaterally, fulvous centrally, tergum V entirely fulvous. A pair of oval red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous.
Attractant: Cue lure.
Female: No known record.
Distribution: East Sepik Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *saramandiae* refers to the type locality.
Comments: *B. saramandiae* new species is similar to *B. labubulu* new species (Fig. 17) in possessing a black scutum, dark postpronotal lobes, coloured cells bc and c and dark-coloured abdominal terga. It differs from this species in having broad parallel-sided lateral postsutural vittae enclosing the *ia*. seta, the costal band confluent with R_{4+5}, all femora entirely fulvous and abdominal terga III–V without a medial longitudinal dark band.

Bactrocera (Bactrocera) sari, new species
(Fig. 32)

Type data: Holotype ♂, PAPUA NEW GUINEA: Morobe Province, Bubia Ag Exp Centre, 1.ix.1998, S. Sar & S. Balagawi, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1 ♂ (11.viii.1998), 1 ♂ (18.viii.1998), 1 ♂ (9.ix.1998), Bubia Ag Exp Centre, S. Sar & S. Balagawi, attracted to cue lure; 1 ♂, Central Province, Hood Lagoon, Magi Highway, 22.ix.1998, D. Tenakanai, attracted to cue lure.
Location of types: Holotype (T245657) in QMIC; 1 paratype in ANIC; 2 paratypes in QDPC; 1 paratype (T245658) in QMIC.
Diagnosis: A small species; face fulvous with a pair of medium-sized circular black spots; postpronotal lobe and notopleuron yellow; scutum dark red-brown with fuscous to dark fuscous lanceolate patterns; two lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous costal band confluent with R_{4+5}, a broad dark fuscous anal streak, cells bc and c pale fuscous, microtrichia in outer corner of cell c only; abdominal terga III–V red-brown with a broad medial longitudinal dark fuscous to black band and broad lateral longitudinal dark fuscous bands over all three terga and joined along anterior margin of tergum III.
Description: Male.
Head: Vertical length 1.4 mm. Frons length 1.5 times breadth; red-brown with fulvous lower lateral margins; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of medium-sized circular black spots; length 0.39 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum dark red-brown with fuscous to dark fuscous lanceolate patterns. Pleural areas dark fuscous to black. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two broad lateral postsutural vittae narrowing slightly posteriorly to end just before *ia*. seta. Postnotum black. Scutellum yellow with a narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: Fore and mid femora fulvous with fuscous around apical one-third to half, hind femora fulvous with fuscous to dark fuscous around apical one-third; fore and mid tibiae fuscous, hind tibiae fuscous to dark fuscous; all tarsal segments fulvous.
Wings: Length 4.6 mm; cells bc and c pale fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except for a dark fuscous cell sc, a broad dark fuscous costal band confluent with R_{4+5} where it becomes paler; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I dark fuscous; tergum II dark fuscous with red-brown across posterior half; terga III–V red-brown with a broad medial longitudinal dark fuscous to black band and broad lateral longitudinal dark fuscous bands over all three terga and joined along anterior margin of tergum III. A pair of oval dark fuscous shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a slight concavity on posterior margin. Abdominal sternites pale coloured.
Attractant: Cue lure.
Female: No known record.
Distribution: Morobe Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *sari* acknowledges Mr Sim Sar who carried out extensive fruit fly collecting throughout Papua New Guinea.
Comments: *B. sari* new species is similar to *B. popondetiensis* (Drew, 1989: Fig. 136) in possessing a pale-coloured scutum, abdominal terga III–V red-brown with medial and lateral longitudinal dark bands and a broad costal band confluent with R_{4+5}. It differs from this species in having a distinct fuscous to dark fuscous lanceolate pattern over the scutum, fuscous patterns on the apices of all femora and microtrichia confined to the outer corner of cell c only.

Bactrocera (Bactrocera) sylvania, new species
(Fig. 33)

Type data: Holotype ♂, PAPUA NEW GUINEA: Morobe Province, Bulolo Forestry Uni, 1.vi.2000, S. Sar and S. Balagawi, attracted to Methyl methyl eugenol. **Paratype**: PAPUA NEW GUINEA: 1 ♂, 17.xi.1999, same data as holotype.
Location of types: Holotype (T245659) in QMIC; 1 paratype in QDPC.
Diagnosis: A medium-sized species; face fulvous with very large elongate black spots filling the antennal furrows; postpronotal lobe and notopleuron yellow; scutum entirely fuscous; two broad lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous costal band markedly overlapping R_{4+5} where it becomes paler, a broad dark fuscous anal streak, cell bc fuscous, cell c dark fuscous, dense microtrichia covering cells bc and c; abdominal terga III and IV entirely black, tergum V fulvous to fuscous with a narrow black medial longitudinal band and black anterolateral corners.
Description: Male.
Head: Vertical length 1.6 mm. Frons length 1.3 times breadth; fuscous with narrow fulvous lateral margins and dark fuscous around bases of orbital setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face pale fulvous with very large elongate black spots filling the entire antennal furrow; length 0.44 mm. Occiput fuscous, fulvous along eye margins; antennae short, with

segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum entirely fuscous. Pleural areas entirely dark fuscous to black. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two broad subparallel-sided lateral postsutural vittae ending at *ia*. seta. Postnotum black. Scutellum yellow except for narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: Fore and mid femora entirely dark fuscous, hind femora fulvous with fuscous around apical one-third; all tibiae entirely fuscous; all tarsi with basal segment fulvous and apical fore segments red-brown.
Wings: Length 5.1 mm; cell bc fuscous, cell c dark fuscous, both cells covered with dense microtrichia; remainder of wings colourless except dark fuscous cell sc, a broad dark fuscous costal band markedly overlapping R_{4+5} where it becomes fuscous; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Elongate oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I black; tergum II dark fuscous to black with fulvous along posterior margin; terga III and IV entirely black, tergum V fulvous to fuscous with a narrow medial longitudinal black band but not reaching posterior margin and black anterolateral corners. A pair of oval dark fuscous shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites black.
Attractant: Methyl eugenol.
Female: No known record.
Distribution: Morobe Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *sylvania* refers to the forest at the type locality where this species was collected.
Comments: *B. sylvania* new species is a unique species with a narrow, elongate abdomen. It is similar to *B. nigrovittata* (Drew, 1989: Fig. 132) and *B. romigae* (Drew, 1989: Fig. 158) in possessing a pale-coloured scutum, a broad costal band and a predominantly dark-coloured abdomen. It differs from these species in having broad parallel-sided lateral postsutural vittae, a uniformly fuscous scutum and the costal band markedly overlapping R_{4+5}.

Bactrocera (Bactrocera) tikelingiae, new species
(Fig. 34)

Type data: Holotype ♂, PAPUA NEW GUINEA: Morobe Province, Tikeling Village Forest, 1.xi.1999, S. Balagawi and S. Sar, attracted to cue lure.
Location of type: Holotype (T245660) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of small subquadrate black spots; postpronotal lobe and notopleuron yellow; scutum black; two broad lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching almost to postpronotal lobe dorsally; scutellum yellow; wings with a broad dark fuscous costal band confluent with R_{4+5} but expanding across apex of wing, a broad dark fuscous transverse band across centre of wing and enclosing both crossveins, a broad dark fuscous anal streak, cells bc and c dark fuscous and covered with dense microtrichia; abdominal terga III–V red-brown with a broad medial longitudinal black band and moderately broad fuscous to dark fuscous lateral longitudinal bands over all three terga.
Description: Male.
Head: Vertical length 1.5 mm. Frons length 1.8 times breadth; red-brown with fuscous on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of small subquadrate black spots; length 0.44 mm. Occiput dark fuscous to black, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching almost to postpronotal lobe dorsally, continuing to katepisternum as a transverse spot, anterior margin slightly convex; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two broad parallel-sided lateral postsutural vittae ending just before *ia*. seta. Postnotum black. Scutellum yellow with a narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous.
Wings: Length 5.4 mm; cells bc and c dark fuscous and covered with dense microtrichia; remainder of wings colourless except dark fuscous cell sc, a broad dark fuscous costal band confluent with R_{4+5} and expanding across apex; a broad dark fuscous transverse band across centre of wing and enclosing r-m and dm-cu crossveins; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I black; tergum II red-brown with narrow fuscous lateral margins, a transverse fuscous band subanteriorly but not reaching lateral margins and a medial longitudinal narrow dark fuscous to black band; terga III–V red-brown with a broad medial longitudinal black band and moderately broad fuscous to dark fuscous lateral longitudinal bands over all three terga. A pair of oval red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep 'U'-shaped concavity on posterior margin. Abdominal sternites dark fuscous.
Attractant: Cue lure.
Female: No known record.
Distribution: Morobe Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *tikelingiae* refers to the type locality.
Comments: *B. tikelingiae* new species is similar to *B. furvilineata* (Drew, 1989: Fig. 83) and *B. pseudodistincta* (Drew, 1989: Fig. 87) in possessing a black scutum, similar dark

patterns on abdominal terga III–V and a transverse fuscous band across the wing enclosing both crossveins. It differs from *B. furvilineata* in having a broader mesopleural stripe reaching almost to the postpronotal lobe, a broader transverse fuscous band across the wing and femora entirely fulvous, and from *B. pseudodistincta* in having uniformly dark fuscous cells bc and c, a costal band broader across the apex of the wing and a narrower medial longitudinal black band over abdominal terga II-V.

Bactrocera (Bactrocera) trivirgulata, new species
(Fig. 35)

Type data: Holotype ♀, PAPUA NEW GUINEA: Madang Province, Baitabag, 23.v.2001, bred from unidentified host fruit. **Paratypes**: PAPUA NEW GUINEA: 8♀ and 11♂, same data as holotype; 1♂ (6.vi.2001), 3♀ and 11 ♂ (10.x.2001), same data as holotype.
Location of types: Holotype (T245661) in QMIC; 5 paratypes in ANIC; 19 paratypes in QDPC; 10 paratypes (T245662–T245671) in QMIC.
Diagnosis: A small species; face fulvous with a pair of small circular black spots; postpronotal lobe and notopleuron yellow; scutum dark red-brown with three longitudinal black lines joined across the posterior margin with fuscous coloration to form a lanceolate pattern; two moderately broad parallel-sided lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous costal band confluent with R_{4+5}, a broad dark fuscous anal streak, cells bc and c dark fuscous and covered with dense microtrichia; abdominal terga III–V red-brown with a narrow black band across anterior margin of tergum III, a narrow medial longitudinal fuscous line over all three terga, narrow black margins on terga III and IV and a narrow fuscous margin on tergum V.
Description: Male.
Head: Vertical length 1.5 mm. Frons length 1.7 times breadth; fuscous with dark fuscous on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face dark fulvous with a pair of small circular black spots; length 0.44 mm. Occiput fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum dark red-brown with three longitudinal black bands joined along posterior margin with fuscous coloration to form a lanceolate pattern. Pleural areas fuscous to dark fuscous, red-brown below postpronotal lobe. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a large spot, anterior margin straight; anatergite (posterior apex black); katatergite (posterior margin black); two moderately broad parallel-sided lateral postsutural vittae ending at *ia*. seta. Postnotum red-brown centrally, black laterally. Scutellum yellow except for a narrow red-brown basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All femora fulvous with apical one-third to one-quarter dark fuscous, fore and hind tibiae dark fuscous, mid tibiae fuscous basally to fulvous apically; all tarsi with basal segment fulvous and apical four segments fuscous.
Wings: Length 4.8 mm; cells bc and c dark fuscous and covered with dense microtrichia; remainder of wings colourless except for a dark fuscous cell sc, a broad dark fuscous costal band confluent with R_{4+5}; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely dark fuscous; tergum II fulvous with dark fuscous across anterior half; terga III–V red-brown with a 'T'-shaped pattern consisting of a dull black line across anterior margin of tergum III, a narrow medial longitudinal fuscous line over all three terga, narrow dull black margins on terga III and IV and fuscous on tergum V. A pair of oval red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous.
Attractant: No known record.
Female: As for male except no dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak; no pecten on abdominal tergum III; ovipositor basal segment red-brown; ratio of length of oviscape to length of tergum V, 0.48:1; apex of piercer needle-shaped.
Distribution: Madang Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *trivirgulata* refers to the three longitudinal black bands on the scutum.
Comments: *B. trivirgulata* new species is similar to *B. ustulata* (Drew, 1989: Fig. 137) in possessing a basic red-brown scutum with dark patterns, abdominal terga III–V red-brown with medial and lateral longitudinal dark bands and costal band confluent with R_{4+5}. It differs from this species in having the lateral postural yellow vittae on the scutum reaching the *ia*. seta, apices of all femora fuscous and abdominal terga III–V with a distinct 'T'-shaped pattern and narrower lateral longitudinal dark bands.

Bactrocera (Bactrocera) waidoriae, new species
(Fig. 36)

Type data: Holotype ♂, PAPUA NEW GUINEA: Western Province, Waidore Village, 9.xi.1999, David Ipal, attracted to methyl eugenol. **Paratypes**: PAPUA NEW GUINEA: 3 ♂, same data as holotype.
Location of types: Holotype (T245672) in QMIC; 2 paratypes in QDPC; 1 paratype (T245673) in QMIC.
Diagnosis: A small species; face dark red-brown with a pair of large oval black spots; postpronotal lobe and notopleuron yellow; scutum entirely black; two narrow subparallel lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow fuscous

costal band overlapping R_{2+3} but not confluent with R_{4+5}, a broad fuscous anal streak, cells bc and c with a pale fulvous tint, microtrichia in outer corner of cell c only; abdominal terga III–V red-brown with a 'T'-shaped pattern consisting of a narrow transverse black band across anterior margin of tergum III, a narrow medial longitudinal black band over all three terga and broad lateral longitudinal dark fuscous bands over all three terga.

Description: Male.

Head: Vertical length 1.4 mm. Frons length 1.5 times breadth; red-brown with fuscous on anteromedial hump and around bases of orbital setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face dark red-brown with a pair of large oval black spots; length 0.39 mm. Occiput fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.

Thorax: Scutum entirely black. Pleural area black. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex black); anterior half katatergite (remainder black); two narrow subparallel lateral postsutural vittae ending at *ia*. seta. Postnotum dark red-brown centrally, black laterally. Scutellum yellow with a narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.

Legs: All femora fulvous with fuscous to dark fuscous around apical one-third; fore tibiae fuscous, mid and hind tibiae dark fuscous; all tarsi with basal segment fulvous and apical fore segments fuscous.

Wings: Length 4.4 mm; cells bc and c with a pale fulvous tint; microtrichia in outer corner of cell c only; remainder of wings colourless except fuscous cell sc, narrow fuscous costal band overlapping R_{2+3} where it becomes pale fuscous but not confluent with R_{4+5}; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.

Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I black; tergum II dark fuscous across anterior margin and around lateral margins, fulvous posteriorly; terga III–V red-brown with a black 'T'-shaped pattern consisting of a transverse band across anterior margin of tergum III and a narrow medial longitudinal black band over all three terga, broad lateral longitudinal dark fuscous bands over all three terga. A pair of oval black shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous.

Attractant: Methyl eugenol.

Female: No known record.

Distribution: Western Province, Papua New Guinea.

Hosts: No known record.

Etymology: The name *waidoriae* refers to the type locality.

Comments: *B. waidoriae* new species is similar to *B. laticosta* (Drew, 1989: Fig. 21) in possessing a black scutum, a similar colour pattern on abdominal terga III–V, cells bc and c with a pale fulvous tint and femora with dark colour patterns. It differs from this species in having the fore and mid femora not entirely dark fuscous, the scutum and pleural areas entirely black, the costal band paler between R_{2+3} and R_{4+5} and being attracted to methyl eugenol.

Bactrocera (Bactrocera) yayamiae, new species
(Fig. 37)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, Bainings Mts, Yayam Village, 29.xii.1998, L. Leblanc *et al*., attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 3 ♂, same data as holotype; 16 ♂ (13.i.1999), 10 ♂ (27.i.1999), same data as holotype; 6 ♂ (27.i.1999), 3 ♂ (15.iv.1999), East New Britain Province, Bainings Mts, Malasaet Village, L. Leblanc *et al*., attracted to cue lure; 4 ♂ (25.xi.1998), 3 ♂ (18.ii.1999), East New Britain Province, Bainings Mts, Malasaet Village, A. Mararuai, attracted to cue lure; 3 ♂, East New Britain Province, Bainings Mts, Raunsepna 1160 m 11.xii.1998, L. Leblanc *et al*., attracted to cue lure; 1 ♂ (25.xi.1998), 1 ♂ (27.i.1999), 3 ♂ (13.v.1999), East New Britain Province, Bainings Mts, Raunsepna School, L. Leblanc *et al*., attracted to cue lure; 6 ♂ (9.xi.1998), 12 ♂ (25.xi.1998), East New Britain Province, Bainings Mts, 3 km SW Malasaet, L. Leblanc *et al*., attracted to cue lure; 1 ♂, Morobe Province, Forest Res Inst, Lae Botanical Garden, 22.ix.1999, attracted to cue lure.

Location of types: Holotype (T245674) in QMIC; 10 Paratypes in ANIC; 42 paratypes in QDPC; 20 paratypes (T245675–T245694) in QMIC.

Diagnosis: A small species that belongs to the *frauenfeldi* complex; face fulvous with a pair of large oval black spots; postpronotal lobe glossy black; notopleuron yellow; scutum entirely glossy black; two very short and narrow lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow with a broad triangular glossy black marking across dorsal surface enclosing apical scutellar setae; wings with a narrow costal band that is only a pale tint from cell sc to apex of wing, a narrow transverse dark fuscous band across wing and enclosing both crossveins, a broad dark fuscous anal streak, cells bc and c fuscous, dense microtrichia covering all of cell c and outer corner of cell bc; all abdominal terga entirely glossy black.

Description: Male.

Head: Vertical length 1.4 mm. Frons length 1.5 times breadth; fuscous with fulvous along lateral and ventral margins; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of large oval black spots; length 0.39 mm. Occiput black, fulvous along eye margins; antennae short, with segments 1 and 2 fuscous, segment 3 red-brown with dark fuscous on apex and outer surface.

Thorax: Scutum entirely glossy black. Pleural areas entirely glossy black. Yellow markings as follows: notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a small pale marking, anterior margin straight; anatergite (posterior apex glossy black); anterior

half katatergite (remainder glossy black); two very short and narrow lateral postsutural vittae generally ending at level of *a.sa*. seta. Postpronotal lobe glossy black. Postnotum glossy black. Scutellum yellow with a broad triangular glossy black marking across dorsal surface and enclosing apical scutellar setae. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.

Legs: Fore femora fulvous with a large dark fuscous to black marking on outer apical half, mid femora entirely dark fuscous to black, hind femora with basal one-third fulvous and apical two-thirds dark fuscous to black; fore tibiae fuscous, mid tibiae dark fuscous, hind tibiae dark fuscous to black; all tarsi with basal segment fulvous and apical four segments fuscous.

Wings: Length 4.7 mm; cells bc and c fuscous with dense microtrichia over all of cell c and outer corner of cell bc; remainder of wings colourless except dark fuscous cell sc, narrow fuscous costal band in the form of a pale tint from apex of cell sc to apex of wing, a narrow transverse dark fuscous band across wing from costal band to hind margin and enclosing r-m and dm-cu crossveins; a broad dark fuscous anal streak; r-m crossvein strongly oblique; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.

Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. All terga entirely glossy black. A pair of black shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous to black.

Attractant: Cue lure.

Female: No known record.

Distribution: East New Britain and Morobe Provinces, Papua New Guinea.

Hosts: No known record.

Etymology: The name *yayamiae* refers to the type locality.

Comments: *B. yayamiae* new species belongs to the *frauenfeldi* complex of species with a black scutum, a black pattern on the dorsal surface of the scutellum, a transverse fuscous band across the wing enclosing both crossveins and the costal band on the wing extremely pale across the distal half. It differs from other species in having the abdominal terga entirely black, extensive dark patterns on all femora and black postpronotal lobes.

Bactrocera (Bulladacus) curiosa, new species
(Fig. 38)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, Lowlands Agric Exper Station, 16.ix.1997, Luc Leblanc. **Paratype**: PAPUA NEW GUINEA: 1 ♀, same data as holotype.

Location of types: Holotype (T245695) in QMIC; 1 paratype in QDPC.

Diagnosis: A medium-sized species; face entirely pale fulvous without dark markings; postpronotal lobe yellow; notopleuron black; scutum black with a pair of red-brown longitudinal markings either side of mid-line; two broad parallel-sided lateral postsutural yellow vittae beginning as a spot anterior to mesonotal suture; medial postsutural yellow vitta absent; mesopleural stripe reaching postpronotal lobe dorsally; scutellum yellow; wings with a narrow fuscous costal band confluent with R_{2+3} and remaining narrow around apex of wing to end at apex of vein M, a pale fuscous anal streak, cells bc and c fuscous and covered with dense microtrichia, a large fuscous bulla across apex of anal cell extension, a fuscous tint across wing that is darker along the longitudinal veins R_{4+5} and M and crossveins, supernumerary lobe extremely large; abdominal terga entirely black; shining spots on tergum V absent; oviscape extremely large.

Description: Male.

Head: Vertical length 1.5 mm. Frons length 1.6 times breadth; entirely fuscous; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle fuscous. Face entirely pale fulvous without dark spots; length 0.39 mm. Occiput black centrally, fulvous laterally and along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 dark fuscous with red-brown basally.

Thorax: Scutum black except for two small red-brown longitudinal areas either side of mid-line. Pleural areas entirely black. Yellow markings as follows: postpronotal lobe; mesopleural stripe reaching postpronotal lobe dorsally, continuing to katepisternum as a large transverse spot, anterior margin concave; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two broad parallel-sided lateral postsutural vittae beginning as a spot anterior to mesonotal suture and ending behind *ia*. seta. Notopleuron black. Postnotum black. Scutellum yellow except for a narrow black basal band slightly broadening laterally. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.

Legs: All segments entirely fulvous.

Wings: Length 5.2 mm; cells bc and c fuscous and covered with dense microtrichia; remainder of wings with a pale fuscous tint that is darker along the longitudinal veins R_{4+5} and M and along the crossveins r-m and dm-cu, fuscous cell sc, a narrow fuscous costal band confluent with R_{2+3} and remaining extremely narrow around apex of wing to end at apex of vein M; a pale fuscous anal streak; a large fuscous bulla at apex of anal cell extension; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe extremely large.

Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. All abdominal terga entirely black. Oval shining spots on tergum V absent. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous to black.

Attractant: No known record.

Female: As for male except no dense aggregation of microtrichia around A_1+CuA_2, no bulla in wing, no pecten present on abdominal tergum III. Ovipositor basal segment dark fuscous to black, narrow, elongate and conical in transverse cross section, ratio of length of oviscape to length of tergum V, 1.7:1.

Distribution: East New Britain Province, Papua New Guinea.

Hosts: No known record.

Etymology: The name *curiosa* refers to the strange or unusual appearance of this species.
Comments: *B. curiosa* new species is unlike all other species of *Bulladacus*, having the scutum and abdomen mostly black, a broad mesopleural stripe reaching the postpronotal lobe and broad parallel-sided lateral postsutural yellow vittae with a spot anterior to the mesonotal suture. These type specimens were hand collected by L. Leblanc.

Bactrocera (Calodacus) insolita, new species
(Fig. 39)

Type data: Holotype ♀, PAPUA NEW GUINEA: East New Britain Province, Bainings Mts, 3 km SW Malasait, 19. xii.97–5.i.98, Cue trap No. 11 (farm), L. Leblanc and A. Winterer. **Paratypes**: PAPUA NEW GUINEA: 1 ♀, same data as holotype; 1♂, Morobe Province, Manki logging area (LA), Bulolo, 30.v.1983, H. Roberts, collected in Castanopsis – Bamboo forest.
Location of types: Holotype (T245696) in QMIC; 2 paratypes in QDPC.
Diagnosis: A small species; face fulvous with a pair of medium-sized circular black spots; postpronotal lobe and notopleuron yellow; a broad lateral yellow band connecting postpronotal lobe and notopleuron; scutum entirely orange-brown without dark markings; lateral and medial postsutural yellow vittae absent; mesopleural stripe reaching anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow fuscous costal band confluent with R_{2+3}, a broad pale fuscous anal streak, cells bc and c pale fuscous, microtrichia in outer corner of cell c only, a narrow transverse fuscous band across wing from costal band to hind margin and enclosing both crossveins, an indentation in costal margin at apex of cell c, an unusual pattern of r-m and dm-cu crossveins almost in line across wing; all abdominal terga entirely orange-brown.
Description: Female.
Head: Vertical length 1.1 mm. Frons length 1.2 times breadth; fulvous with fuscous on lower margin; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fulvous. Ocellar triangle black. Face fulvous with a pair of medium-sized circular black spots adjacent to oral margin; length 0.29 mm. Occiput entirely orange-brown; antennae short, with all segments entirely fulvous; length of antennal segments: 0.1 mm; 0.2 mm; 0.46 mm.
Thorax: Scutum entirely orange-brown. Pleural areas entirely orange-brown. Yellow markings as follows: postpronotal lobe; notopleuron; a broad lateral yellow band joining postpronotal lobe and notopleuron; mesopleural stripe reaching anterior *npl*. seta dorsally, continuing to katepisternum as a small spot, anterior margin straight; anatergite (posterior apex orange-brown); anterior two-thirds katatergite (remainder orange-brown). Lateral and medial postsutural yellow vittae absent. Postnotum orange-brown. Scutellum yellow with a narrow orange-brown basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. absent; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All femora fulvous; fore tibiae fulvous, mid and hind tibiae very pale fuscous; all tarsi with basal segment fulvous and apical segments very pale fuscous.
Wings: Length 4.3 mm; cells bc and c pale fuscous; microtrichia in outer corner of cell c only; remainder of wings with a pale tint across membrane, fuscous cell sc, a narrow fuscous costal band confluent with R_{2+3} and ending almost at apex of vein M, a broad pale fuscous anal streak, a narrow fuscous band across wing from costal band to hind margin and enclosing r-m and dm-cu crossveins; a broad pale fuscous anal streak; no dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak. Unusual features of this species are an indentation in the costal margin at apex of cell c and the r-m and dm-cu crossveins almost lining up to form a straight line across the wing; cell cup extension short.
Abdomen: Oval; terga free; no pecten present on tergum III. Tergum I and sterna I and II wider than long. All terga entirely orange-brown without dark markings. A pair of oval orange-brown shining spots on tergum V. Ovipositor basal segment orange-brown, conical in transverse cross section. Ratio of length of oviscape to length of tergum V, 1.76:1. Apex of piercer trilobed.
Male: As for female except surstyli short, sternum V with a deep 'U'-shaped concavity. No pecten present on abdominal tergum III.
Attractant: No known record. The two specimens trapped using cue lure were females.
Distribution: East New Britain and Morobe Provinces, Papua New Guinea.
Hosts: No known record.
Etymology: The name *insolita* refers to the unusual morphological characters of this species.
Comments: *B. insolita* new species has no similarity to other known species of Dacini. It is characterized by the wing shape and unusual positioning of the r-m and dm-cu crossveins. This species fits into subgenus *Calodacus* (as defined by Hancock, 2015) in the male having short surstyli, sternum V with a deep posterior concavity, pecten absent on abdominal tergum III and wing cell cup with a short extension (lobe).

Bactrocera (Hemizeugodacus) neoaglaiae, new species
(Fig. 40)

Type data: Holotype ♂, PAPUA NEW GUINEA: Madang Province, Wanang, Oct–Nov 2012, V. Novotny, attracted to vanillyl acetone. **Paratypes**: PAPUA NEW GUINEA: 37♂, same data as holotype; 19♂, Mt Wilhelm (200 m) and 2♂, Mt Wilhelm (700 m), Oct–Nov 2012, V. Novotny, attracted to vanillylacetone.
Location of types: Holotype (T245697) in QMIC; 9 paratypes in ANIC; 40 paratypes in QDPC; 9 paratypes (T245698–T245706) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of small oval black spots; postpronotal lobe and notopleuron yellow; scutum red-brown centrally, fuscous laterally, a pair of lateral longitudinal dark fuscous to black lines; a narrow lateral yellow band connecting postpronotal lobe to notopleuron; two lateral postsutural yellow vittae present; a medial postsutural yellow vitta present; mesopleural stripe slightly wider than notopleuron dorsally; scutellum

yellow with a large red-brown triangular marking on dorsal surface; wings with a narrow fuscous costal band confluent with R_{2+3}, a broad pale fuscous anal streak, cells bc and c with a pale tint, microtrichia in outer half of cell c only; abdominal tergum I fuscous to dark fuscous, tergum II fuscous with large pale fulvous areas posterolaterally, abdominal terga III–V red-brown with dark fuscous to black lateral margins, a narrow medial longitudinal black band over terga I–V.

Description: Male.

Head: Vertical length 1.4 mm. Frons length 1.4 times breadth; entirely red-brown; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule red-brown. Ocellar triangle red-brown. Face fulvous with a pair of small oval black spots; length 0.44 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.

Thorax: Scutum red-brown centrally, fuscous laterally, with lateral longitudinal dark fuscous to black lines. Pleural areas red-brown with dark fuscous anterior to mesopleural stripe. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe slightly wider than notopleuron dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex red-brown); anterior two-thirds katatergite (remainder red-brown); a narrow lateral yellow band joining the postpronotal lobe and the notopleuron (absent or partly present in some specimens); two narrow parallel-sided lateral postsutural vittae ending at *ia*. seta; a broad medial postsutural yellow vitta, broadly rounded posteriorly and narrowing to a point anteriorly at level of mesonotal suture. Postnotum red-brown, tending to darker laterally. Scutellum yellow with a large triangular red-brown marking covering at least half of dorsal surface. Setae: *sc*. 4; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.

Legs: All femora entirely fulvous; fore tibiae pale fuscous, mid tibiae fuscous basally to fulvous apically, hind tibiae dark fuscous basally to fulvous apically; all tarsi with basal segment fulvous and apical four segments fuscous.

Wings: Length 5.1 mm; cells bc and c with a fuscous tint; microtrichia in outer half of cell c only; remainder of wings colourless except fuscous cell sc, a narrow fuscous costal band confluent with R_{2+3} and remaining narrow around apex of wing to end just beyond apex of R_{4+5}; a broad pale fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.

Abdomen: Elongate oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I fuscous to dark fuscous with a narrow transverse red-brown band along posterior margin; tergum II fuscous with large broad pale fulvous areas posterolaterally; terga III–V red-brown with a moderately broad black margin on tergum III, a narrow black margin on tergum IV and a narrow dark fuscous margin on tergum V, a distinct medial longitudinal black band over terga I–V. A pair of small oval red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a moderate concavity on posterior margin. Abdominal sternites pale coloured.

Attractant: Vanillylacetone.

Female: No known record.

Distribution: Madang Province, Papua New Guinea.

Hosts: No known record.

Etymology: The name *neoaglaiae* refers to the close morphological affinity to *Bactrocera aglaiae* (Hardy).

Comments: *B. neoaglaiae* new species is similar to *B. aglaiae* (Drew, 1989: Fig. 325), belonging to the same subgenus *Hemizeugodacus* and possessing a basic red-brown colour on the scutum and abdomen, wings with a narrow costal band confluent with R_{2+3} and fulvous femora. It differs from this species in having lateral longitudinal dark patterns on the scutum, a lateral yellow band connecting the postpronotal lobe and notopleuron (in some specimens), a large red-brown triangular pattern on the dorsal surface of the scutellum, a medial longitudinal black band over terga I–V and narrow black margins on terga III–V.

Bactrocera (Hemizeugodacus) wilhelmiae, new species

(Fig. 41)

Type data: Holotype ♂, PAPUA NEW GUINEA: Madang Province, Mt Wilhelm (1200 m), Oct–Nov 2012, V. Novotny, attracted to vanillylacetone. **Paratypes**: PAPUA NEW GUINEA: 3♂, same data as holotype.

Location of types: Holotype (T245707) in QMIC; 2 paratypes in QDPC; 1 paratype (T245708) in QMIC.

Diagnosis: A medium-sized species; face entirely pale fulvous without dark spots; postpronotal lobe and notopleuron yellow; scutum entirely black; two lateral postsutural yellow vittae present; medial postsutural yellow vitta present; mesopleural stripe equal in width to notopleuron dorsally; scutellum yellow; wings with a narrow dark fuscous costal band, a broad dark fuscous anal streak, cells bc and c pale fuscous, microtrichia in outer corner of cell c only; abdominal terga III–V entirely red-brown.

Description: Male.

Head: Vertical length 1.4 mm. Frons length 1.5 times breadth; fulvous with dark fuscous on anteromedial hump, around *i.or.* setae and on vertical margin adjacent to vertex; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face entirely pale fulvous without dark spots; length 0.39 mm. Occiput black, fulvous along eye margins; antennae short, with segments 1 and 2 dark fuscous, segment 3 red-brown with dark fuscous on apex and outer surface.

Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe equal in width to notopleuron dorsally, not continuing to katepisternum, anterior margin slightly convex; anterior half anatergite (posterior half black); anterior two-thirds katatergite (remainder black); two narrow parallel- to subparallel-sided lateral postsutural vittae ending just before *ia*. seta; a broad medial longitudinal postsutural yellow vitta broadly rounded posteriorly and narrowing to a point anteriorly at line of mesonotal suture. Postnotum black. Scutellum yellow with a narrow black basal band. Setae: *sc*. 4; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.

Legs: Fore and mid femora entirely fulvous, hind femora black except apical one-quarter red-brown; fore and hind tibiae fulvous with dark fuscous basally, mid tibiae entirely fulvous; fore tarsi with basal three-quarters of basal segment fulvous (apex and apical four segments fuscous), mid tarsi entirely fulvous, hind tarsi with basal segment fulvous and remaining segments fuscous.
Wings: Length 5.0 mm; cells bc and c pale fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except dark fuscous cell sc, a dark fuscous costal band confluent with R_{2+3} and remaining narrow around wing margin to end just beyond apex of R_{4+5}; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Elongate oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I dark fuscous; tergum II red-brown with a broad transverse fuscous band anteriorly and fulvous areas posterolaterally; terga III–V entirely red-brown. A pair of small red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a shallow to moderate concavity on posterior margin. Abdominal sternites red-brown.
Attractant: Vanillylacetone.
Female: No known record.
Distribution: Madang Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *wilhelmiae* refers to the type locality, Mt Wilhelm.
Comments: *B. wilhelmiae* new species is a unique species of *Hemizeugodacus* with no strong relationships to other species in this subgenus. It is diagnosed in having an entirely black scutum, face entirely pale fulvous, abdomen elongate oval in shape with terga III–V entirely red-brown and hind femora black except for apical one-quarter fulvous.

Bactrocera (Neozeugodacus) leblanci, new species
(Fig. 42)

Type data: Holotype ♀, PAPUA NEW GUINEA: Madang Province, Baitabag, 25.x.2000, bred from unidentified host.
Paratypes: PAPUA NEW GUINEA: 1♀, 3.v.2000, same data as holotype; 1♀ (19.iv.2000), 1♀ (4.x.2000), 4♀ (11.x.2000), 1♂ and 1♀ (18.x.2000), 1♂ and 2♀ (15.xi.2000), 1♂ (29.xi.2000), 1♂ (28.ii.2001), 2♂ (13.vi.2001), 1♂ and 1♀ (27.vi.2001), 1♂ (26.ix.2001), 1♂ (10.x.2001), 3♂ (31.x.2001), Madang Province, Baitabag, all bred from *Neisosperma oppositifolia* (family Apocynaceae), 2♂ (21.vi.2000), 4♀ (27.ix.2000), Madang Province, Baitabag, all bred from *Ochrosia citrodora* (family Apocynaceae), 1♂ (6.vi.2001), Madang Province, Baitabag, bred from *Galleria celebica* (family Pandaceae).
Location of types: Holotype (T245709) in QMIC; 5 paratypes in ANIC; 20 paratypes in QDPC; 5 paratypes (T245710–T245714) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of small circular black spots; postpronotal lobe and notopleuron yellow; scutum fuscous with longitudinal red-brown markings either side of mid-line and posterior to postpronotal lobe; two broad lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; a narrow lateral yellow band connecting postpronotal lobe to notopleuron; mesopleural stripe reaching anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow dark fuscous costal band overlapping R_{2+3} where it becomes paler, a moderately broad pale fuscous band across wing and enclosing both crossveins, a broad fuscous anal streak, cells bc and c fuscous, dense microtrichia covering both cells; abdominal terga entirely red-brown.
Description: Female.
Head: Vertical length 1.5 mm. Frons length 1.4 times breadth; red-brown with dark fuscous around *i.or*. setae and on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule red-brown. Ocellar triangle black. Face fulvous with a pair of small circular black spots; length 0.44 mm. Occiput red-brown, fulvous along eye margins; antennae short, with all segments entirely red-brown.
Thorax: Scutum fuscous with areas of red-brown longitudinally either side of mid-line and posterior to postpronotal lobe. Pleural areas red-brown. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching anterior *npl*. seta dorsally, not continuing to katepisternum, anterior margin straight; anatergite (posterior apex red-brown); anterior three-quarters katatergite (remainder red-brown); two broad parallel-sided lateral postsutural vittae widening posteriorly to end behind *ia*. seta; lateral yellow band joining the postpronotal lobe and notopleuron (this band is narrower anteriorly). Postnotum red-brown. Scutellum yellow with a narrow red-brown basal band. Setae: *sc*. 4; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous except hind tibiae dark fuscous and apical four segments of all tarsi fuscous.
Wings: Length 5.2 mm; cells bc and c fuscous; dense microtrichia covering both cells bc and c; remainder of wings colourless except dark fuscous cell sc, a narrow dark fuscous costal band overlapping R_{2+3} where it becomes paler, a moderately broad pale fuscous band across wing from costal band to hind margin and enclosing r-m and dm-cu crossveins; a broad fuscous anal streak; no dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak.
Abdomen: Oval; terga free; no pecten present on tergum III. Tergum I and sterna I and II wider than long. All abdominal terga entirely red-brown. Abdominal sternites red-brown. Ovipositor basal segment red-brown, dorsoventrally flattened and tapering posteriorly in dorsal view; ratio of length of oviscape to length of tergum V, 1.7:1. Apex of piercer needle-shaped.
Attractant: No known record.
Male: As for female except dense aggregation of microtrichia around A_1+CuA_2, pecten present on abdominal tergum III. Posterior lobe of surstylus short; abdominal sternum V with a moderate concavity.
Distribution: Madang Province, Papua New Guinea.
Hosts: *Ochrosia oppositifolia* (family Apocynaceae), *Ochrosia citrodora* (family Apocynaceae), *Galearia celebica* (family Pandaceae). Note: The species *oppositifolia* is now in the genus *Ochrosia*, not in the genus *Neisosperma*, which is recorded on the type label data. *Galearia* is the

correct spelling of the second host genus, not as on the type labels.
Etymology: This species is named after Dr Luc Leblanc in recognition of his field research in Papua New Guinea.
Comments: *B. leblanci* new species is a distinct species within the subgenus *Neozeugodacus* in having a red-brown scutum with a fuscous lanceolate pattern, an entirely red-brown abdomen, costal band overlapping R_{2+3} and a transverse fuscous band across the wing enclosing the r-m and dm-cu crossveins.

Bactrocera (Semicallantra) cerberae, new species
(Fig. 43)

Type data: Holotype ♂, PAPUA NEW GUINEA: Western Province, Waidoro Village, 15.x.1999, D. Tenakanai and A. Kawi, bred from *Cerbera floribunda* (Family Apocynaceae).
Paratypes: PAPUA NEW GUINEA: 3♂ and 14♀, same data as holotype; 3♀ (13.x.2000), 3♂ and 7♀ (25.x.2000), 1♂ (14.xii.2000), Madang Province, Ohu, bred from *Cerbera manghas* (family Apocynaceae); 1♂ and 1♀ (29. xi.2000), 1♀ (25.vii.2001), 1♀ (27.vii.2001), Madang Province, Baitabag, bred from *Cerbera manghas* (family Apocynaceae).
Location of types: Holotype (T245715) in QMIC; 7 paratypes in ANIC; 20 paratypes in QDPC; 8 paratypes (T245716–T245723) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of large subquadrate black spots; postpronotal lobe dark fuscous; notopleuron yellow; scutum black with dark fuscous below lateral postsutural vittae; two lateral postsutural yellow vittae present (in some specimens, they are parallel sided and in others they are broader posteriorly and narrowing anteriorly); medial postsutural yellow vitta absent; mesopleural stripe reaching postpronotal lobe dorsally; scutellum yellow; wings with a broad dark fuscous costal band overlapping R_{4+5}, a broad fuscous to pale fuscous anal streak, cells bc and c dark fuscous and covered with dense microtrichia; abdominal terga III and IV black with a small area of red-brown posterocentrally on tergum IV, tergum V red-brown with dark fuscous on anterolateral corners.
Description: Male.
Head: Vertical length 1.6 mm. Frons length 1.6 times breadth; red-brown with fuscous on anteromedial hump; orbital setae black: 1 *s.or*.; 3 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of large subquadrate black spots; length 0.49 mm. Occiput dark fuscous to black, fulvous along eye margins; antennae with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface; length of segments: 0.51 mm, 0.51 mm, 1.13 mm.
Thorax: Scutum black with dark fuscous below lateral postsutural vittae. Pleural areas dark fuscous to black. Yellow markings as follows: notopleuron; mesopleural stripe reaching postpronotal lobe dorsally, not continuing to katepisternum, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two moderately broad parallel-sided lateral postsutural vittae ending at *ia*. seta (in some specimens, they are parallel sided and in others they are broader posteriorly and narrowing anteriorly). Postpronotal lobe dark fuscous. Postnotum black. Scutellum yellow except for narrow black basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: Fore femora fulvous with black on outer surface, mid femora entirely dark fuscous to black, hind femora dark fuscous to black except fulvous on basal one-third; fore tibiae dark fuscous, mid tibiae fuscous, hind tibiae dark fuscous to black; fore tarsi with basal segment fulvous and apical four segments fuscous, mid and hind tarsi with all segments entirely fulvous.
Wings: Elongate and narrow, length 6.0 mm; cells bc and c dark fuscous and covered with dense microtrichia; remainder of wings colourless except dark fuscous cell sc, a broad dark fuscous costal band distinctly overlapping R_{4+5}; a broad fuscous anal streak becoming paler apically; no dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak.
Abdomen: Elongate oval (slightly wider than long); terga free; no pecten present on tergum III. Tergum I and sterna I and II slightly wider than long. Tergum I entirely dark fuscous; tergum II black with fulvous across posterior margin; terga III and IV mostly black with a small area of red-brown posterocentrally on tergum IV, tergum V red-brown with dark fuscous on anterolateral corners. A pair of oval red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous to black.
Attractant: No known record.
Female: As for male except ovipositor basal segment dark fuscous, dorsoventrally flattened and tapering posteriorly in dorsal view; ratio of length of oviscape to length of tergum V, 0.9:1; apex of piercer needle-shaped.
Distribution: Western and Madang Provinces, Papua New Guinea.
Hosts: *Cerbera floribunda* and *Cerbera manghas* (family Apocynaceae).
Etymology: The name *cerberae* refers to the generic name of the recorded host plants.
Comments: *B. cerberae* new species is similar to *B. nigricula* (Drew, 1989: Fig. 445) in possessing a black scutum and abdomen, dark-coloured postpronotal lobes and lateral postsutural yellow vittae on the scutum. It differs from this species in having fore and hind femora not entirely black, the costal band overlapping R_{4+5} and cells bc and c dark fuscous and covered with dense microtrichia.

Bactrocera (Semicallantra) malasaitiae, new species
(Fig. 44)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, Bainings Mts, 3 km S W Malasait, 8. vii.1998, L. Leblanc *et al*., attracted to methyl eugenol.
Paratypes: PAPUA NEW GUINEA: 2 ♂, East New Britain Province, Bainings Mts, Raunsepna 1160 m, 8.vii.1998, L. Leblanc *et al*., attracted to methyl eugenol; 1 ♂, East New Britain Province, Bainings Mts, Yayam Village, 15.ix.1999, L. Leblanc *et al.*, attracted to methyl eugenol; 2 ♂, East New

Britain Province, Bainings Mts, Raunsepna School, 13.v.1999, L. Leblanc *et al*., attracted to methyl eugenol; 2 ♂ (5.v.1999), 1 ♂ (12.v.1999), 1 ♂ (19.v.1999), 1 ♂ (9.vi.1999), East New Britain Province, Raunsepna, C. Mitparingi, attracted to methyl eugenol; 1 ♂, East New Britain Province, Bainings Mts, Raunsepna 1160 m, 9–28.iv.1998, methyl eugenol No. 8, S. Balagawi, L. Leblanc & A. Mararuai; 1 ♂ (28.iv–15.v.1998), 3 ♂ (9–28.iv.1998), East New Britain Province, Bainings Mts, Raunsepna forest, methyl eugenol No. 7, S. Balagawi, L. Leblanc & A. Mararuai; 1 ♂ (27.iii–9.iv.1998), 1 ♂ (9–28.iv.1998), East New Britain Province, Bainings Mts, DPI Station 840 m, methyl eugenol No. 5, S. Balagawi, L. Leblanc & A. Mararuai; 1 ♂, East New Britain Province, Bainings Mts, DPI Station 840 m, methyl eugenol No. 5, L. Leblanc & J. Bokosou; 1 ♂, East New Britain Province, Bainings Mts, Raunsepna 1160 m, 23.ii–13.iii.1998, methyl eugenol trap No. 8, L. Leblanc & J. Bokosou; 1 ♂, East New Britain Province, Bainings Mts, Malasait 526 m, 23.ii–13.iii.1998, methyl eugenol trap No. 9, L. Leblanc & J. Bokosou; 1 ♂, East New Britain Province, Bainings Mts, Raunsepna forest, 3–19.vi.1998, ME No. 7, A. Mararuai, S. Balagawi & L. Leblanc; 1 ♂, East New Britain Province, Bainings Mts, Raunsepna forest, 13–27.iii.1998, meth eug trap No. 7, L. Leblanc & B. Deierl.

Location of types: Holotype (T245724) in QMIC; 6 paratypes in ANIC; 10 paratypes in QDPC; 6 paratypes (T245725–T245730) in QMIC.

Diagnosis: A large species; face fulvous with a pair of large oval black spots; postpronotal lobe and notopleuron yellow; scutum entirely black; two moderately broad lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow with a large triangular black marking over dorsal surface; wings with r-m crossvein oblique, a large dark fuscous marking across most of the membrane, a broad dark fuscous anal streak, cells bc and c with a pale tint, microtrichia in outer corner of cell c only; abdomen markedly elongate oval, terga I and II mostly black, tergum III dark fuscous to black, tergum IV fuscous medially to dark fuscous laterally, tergum V mostly fuscous with a medial longitudinal dark fuscous band and fulvous across posterior margin.

Description: Male.

Head: Vertical length 2.1 mm. Frons length 1.4 times breadth; fuscous with fulvous along lower lateral and ventral margins; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of large oval black spots; length 0.59 mm. Occiput dark fuscous, fulvous along eye margin; antennae with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface; length of segments: 0.34 mm; 0.34 mm; 1.23 mm.

Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, not continuing to katepisternum, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two moderately broad lateral postsutural vittae ending before *ia*. seta. Postnotum black. Scutellum yellow with a large black triangle over most of dorsal surface. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.

Legs: All femora fulvous with dark fuscous over apical half to two-thirds; all tibiae dark fuscous; all tarsi with basal segment fulvous and apical four segments fuscous.

Wings: Length 6.8 mm; cells bc and c with a pale tint; microtrichia over outer half of cell c only; remainder of wings covered with a large dark fuscous marking as per figure, dark fuscous cell sc; a broad dark fuscous anal streak; r-m crossvein extremely oblique; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.

Abdomen: Elongate oval similar to species in the subgenus *Semicallantra*; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Terga I and II black with fulvous posterolaterally on posterior margin of tergum II, tergum III dark fuscous to black, tergum IV fuscous medially to dark fuscous laterally, tergum V fuscous with a narrow medial longitudinal dark fuscous band and fulvous across posterior margin. A pair of oval dark fuscous shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Abdominal sternites dark fuscous.

Attractant: Methyl eugenol.

Female: No known record.

Distribution: Bainings Mountains, East New Britain Province, Papua New Guinea.

Hosts: No known record.

Etymology: The name *malasaitiae* refers to the type locality.

Comments: *B. malasaitiae* new species is similar to *B. biarcuata* (Drew, 1989: Fig. 208) in possessing a black scutum, dark-coloured abdominal terga and a unique fuscous pattern covering most of the wing membrane. It differs from this species in having broad lateral postsutural yellow vittae almost reaching the *ia*. seta, a large triangular dark fuscous marking on the dorsal surface of the scutellum, fore femora with extensive dark fuscous over apical two-thirds, cells bc and c pale and without a dense covering of microtrichia, and the abdomen shape elongate oval typical of species in subgenus *Semicallantra*.

Bactrocera (Tetradacus) arbuscula, new species
(Fig. 45)

Type data: Holotype ♂, PAPUA NEW GUINEA: Madang Province, Wanang, Oct–Nov 2012, V. Novotny, attracted to vanillyl acetone. **Paratypes**: PAPUA NEW GUINEA: 26♂, same data as holotype; 1♂, Madang Province, Mt Wilhelm (200 m), Oct–Nov 2012, V. Novotny, attracted to vanillylacetone.

Location of types: Holotype (T245738) in QMIC; 5 paratypes in ANIC; 17 paratypes in QDPC; 5 paratypes (T245739–T245743) in QMIC.

Diagnosis: A medium-sized species; face fulvous with a pair of small elongate black spots; postpronotal lobe with posterior one-quarter to one-third yellow (remainder fuscous); notopleuron yellow; scutum entirely dark fuscous

except for two short dark red-brown bands anteriorly either side of mid-line; two lateral postsutural yellow vittae turned inwards along mesonotal suture; medial postsutural yellow vitta absent; a lateral presutural yellow band connecting the postpronotal lobe to the notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous costal band overlapping R_{4+5} and becoming pale as it becomes confluent with vein M distally, anal streak absent, cells bc and c dark fuscous and covered with dense microtrichia; abdominal terga III–V dull black except red-brown posterocentrally on tergum IV and centrally on tergum V.

Description: Male.

Head: Vertical length 1.7 mm. Frons length 1.1 times breadth; red-brown with dark fuscous around orbital setae and fuscous on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of small elongate black spots; length 0.49 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface, length of segments: 0.25 mm; 0.44 mm; 0.83 mm.

Thorax: Scutum entirely dark fuscous except for two short dark red-brown bands anteriorly either side of mid-line. Pleural areas dark red-brown with fuscous on anterior and posterior margins of mesopleural stripe. Yellow markings as follows: posterior one-quarter to one-third of postpronotal lobe (remainder fuscous); notopleuron; a lateral presutural yellow band connecting the postpronotal lobe to the notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a small pale spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two narrow lateral postsutural vittae turned markedly inwards along the mesonotal suture and narrowing posteriorly to end before *ia*. seta. Postnotum dark red-brown centrally, black laterally. Scutellum yellow except for a narrow red-brown basal band. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. absent; *mpl*. 1; *npl*. 2; *scp*. 4.

Legs: Fore femora dark fuscous, mid femora dark fuscous with black along outer surface, hind femora dark fuscous with fulvous basally; all tibiae fuscous; fore tarsi with basal segment fulvous and apical four segments fuscous, mid and hind tarsi entirely fulvous.

Wings: Length 5.9 mm; cells bc and c dark fuscous and covered with dense microtrichia; remainder of wings colourless except broad dark fuscous costal band overlapping R_{4+5} and becoming pale as it becomes confluent with vein M distally; anal streak absent; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak.

Abdomen: Elongate oval; terga free; pecten present on tergum III. Tergum I and sterna I and II slightly wider than long. Tergum I dark fuscous; tergum II dark fuscous with fulvous across posterior half; terga III–V dull black except red-brown posterocentrally on tergum IV and centrally on tergum V. A pair of small oval red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a moderate concavity on posterior margin. Abdominal sternites dark fuscous.

Attractant: Vanillylacetone.

Female: No known record.

Distribution: Madang Province, Papua New Guinea.

Hosts: No known record.

Etymology: The name *arbuscula* refers to the rainforest habitat of this species.

Comments: *B. arbuscula* new species is similar to *Bactrocera (Tetradacus) novotnyi* new species (Fig. 46) in possessing a lateral presutural yellow band connecting the postpronotal lobe and notopleuron, lateral postsutural yellow vittae, a broad costal band overlapping R_{4+5} and cells bc and c dark fuscous and covered with dense microtrichia. It differs from this species in having the postpronotal lobe almost entirely fuscous, the lateral postsutural yellow vittae turned inwards markedly along the mesonotal suture, legs with femora and tibiae almost entirely dark fuscous, the costal band confluent with vein M distally and abdominal terga III–V almost entirely dull black. *B. arbuscula* also lacks a medial postsutural yellow vitta.

Bactrocera (Tetradacus) novotnyi, new species
(Fig. 46)

Type data: Holotype ♂, PAPUA NEW GUINEA: Madang Province, Mt Wilhelm (200 m), Oct–Nov 2012, V. Novotny, attracted to vanillylacetone. **Paratypes**: PAPUA NEW GUINEA: 23♂, same data as holotype; 1♂, Madang Province, Mt Wilhelm (700 m), Oct–Nov 2012, V. Novotny, attracted to Vanillyl Acetone; 18♂, Madang Province, Wanang, Oct–Nov 2012, V. Novotny, attracted to Vanillyl Acetone.

Location of types: Holotype (T245744) in QMIC; 10 paratypes in ANIC; 27 paratypes in QDPC; 5 paratypes (T245745–T245749) in QMIC.

Diagnosis: A medium-sized species; face fulvous with a pair of small oval black spots; postpronotal lobe and notopleuron yellow; a narrow lateral presutural yellow band connecting the postpronotal lobe and notopleuron; scutum entirely dull black except dark red-brown below lateral postsutural vittae; two narrow lateral postsutural yellow vittae turned inwards along mesonotal suture and narrowing posteriorly to end before *ia*. seta; a medial postsutural yellow vitta present; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous costal band overlapping R_{4+5}; anal streak absent; cells bc and c dark fuscous and covered with dense microtrichia; abdominal terga III–V red-brown with black along anterior margin of tergum III and moderately broad dark fuscous lateral longitudinal bands over all three terga.

Description: Male.

Head: Vertical length 1.7 mm. Frons length 1.1 times breadth; entirely red-brown; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule red-brown. Ocellar triangle black. Face fulvous with a pair of small oval black spots; length 0.49 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with

fuscous on apex and outer surface; length of segments: 0.19 mm; 0.36 mm; 0.96 mm.
Thorax: Scutum entirely dull black except dark red-brown below lateral postsutural vittae. Pleural areas entirely red-brown. Yellow markings as follows: postpronotal lobe; notopleuron; narrow lateral presutural band connecting postpronotal lobe and notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex dark red-brown); anterior half katatergite (remainder dark red-brown); two narrow lateral postsutural vittae slightly turned inwards anteriorly along mesonotal suture and narrowing posteriorly to end before *ia*. seta; a moderately broad medial longitudinal postsutural vitta. Postnotum dark red-brown. Scutellum yellow except for narrow red-brown basal band. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. absent; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous.
Wings: Length 6.2 mm; cells bc and c dark fuscous and covered with dense microtrichia; remainder of wings colourless except broad dark fuscous costal band overlapping R_{4+5} where it becomes paler towards the apex of the wing; anal streak absent; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak.
Abdomen: Elongate oval; terga free; pecten present on tergum III. Tergum I and sterna I and II slightly wider than long. Tergum I entirely dark fuscous; tergum II dark fuscous with a narrow fulvous band along posterior margin; terga III–V red-brown with black along anterior margin of tergum III and moderately broad dark fuscous lateral longitudinal bands over all three terga. A pair of small oval fuscous shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a slight concavity on posterior margin. Abdominal sternites red-brown.
Attractant: Vanillylacetone.
Female: No known record.
Distribution: Madang Province, Papua New Guinea.
Hosts: No known record.
Etymology: This species is named after Dr Vojtech Novotny in recognition of his ecological research in Papua New Guinea.
Comments: *B. novotnyi* new species is a unique species of the subgenus *Tetradacus* in having a dull black scutum, a presutural lateral yellow band connecting the postpronotal lobe and notopleuron, lateral and medial postsutural yellow vittae, leg segments entirely fulvous, cells bc and c dark fuscous and covered with dense microtrichia and the costal band broad and overlapping R_{4+5}.

Bactrocera (Tetradacus) procera, new species
(Fig. 47)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, Bainings Mts, 3 Km SW Malasait, 18. ii.1999, L. Leblanc *et al*., attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 5 ♂, same data as holotype; 5 ♂ (22.ix.1999), 2 ♂ (1.x.1999), 2 ♂ (13.xi.1999), East New Britain Province, Raunsepna, C. Mitparingi, attracted to cue lure; 11 ♂, East New Britain Province, Bainings Mts, Raunsepna (forest), 13.i.1999, L. Leblanc *et al*., attracted to cue lure; 3 ♂, East New Britain Province, Bainings Mts, Raunsepna School, 9.xi.1998, L. Leblanc *et al*., attracted to cue lure; 12 ♂ (25.xi.1998), 5 ♂ (29.xii.1998), East New Britain Province, Bainings Mts, Raunsepna (forest), L. Leblanc *et al*., attracted to cue lure; 4 ♂, East New Britain Province, Bainings Mts, Raunsepna, 11.xii.1998, L. Leblanc *et al*., attracted to cue lure; 2 ♂ (8.vii.1998), 7 ♂ (9.xi.1998), 6 ♂ (25.xi.1998), 6 ♂ (11.xii.1998), East New Britain Province, Bainings Mts, 3 Km SW Malasait, L. Leblanc *et al*., attracted to cue lure.
Location of types: Holotype (T245750) in QMIC; 10 paratypes in ANIC; 50 paratypes in QDPC; 10 paratypes (T245751–T245760) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of medium-sized circular black spots; postpronotal lobe and notopleuron yellow; scutum black; two lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching almost to postpronotal lobe dorsally; scutellum yellow; wings with a very narrow dark fuscous costal band confluent with R_{2+3}, a broad fuscous anal streak, cells bc and c pale fuscous, microtrichia in outer corner of cell c only; abdominal terga II–V bright orange-brown with a medial longitudinal dark band over all four terga or over terga III–V or terga IV and V.
Description: Male.
Head: Vertical length 1.6 mm. Frons length 1.6 times breadth; red-brown except narrow fulvous anterolateral margins and fuscous to dark fuscous around bases of orbital setae and on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fulvous. Ocellar triangle black. Face fulvous with a pair of medium-sized circular black spots; length 0.49 mm. Occiput black, fulvous along eye margins; antennae short, with segments 1 and 2 fulvous, segment 3 fulvous with dark fuscous on apex and outer surface; length of segments: 0.21 mm; 0.27 mm; 0.81 mm.
Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: postpronotal lobes; notopleura (black encroaching on to anterior and posterior margins in some specimens); mesopleural stripe reaching almost to postpronotal lobe dorsally, continuing to katepisternum as a large transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two narrow- to medium-width lateral postsutural vittae slightly subparallel in shape, and reaching to or just posterior to *ia*. seta. Postnotum black. Scutellum yellow with a narrow black basal band. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous except apical four segments of fore tarsi fuscous and apical three segments of mid and hind tarsi pale fuscous.
Wings: Length 6.2 mm; cells bc and c pale fuscous (cell c slightly paler); microtrichia in outer corner of cell c only; remainder of wings with a pale fuscous tint throughout membrane except fuscous cell sc, very narrow dark fuscous costal band confluent with R_{2+3} and becoming slightly paler apically to end between apices of veins R_{4+5} and M, narrow

fuscous to dark fuscous enclosing both r-m and dm-cu crossveins; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak.
Abdomen: Extremely elongate oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I black centrally tending to dark fuscous laterally; terga II–V bright orange-brown except for a medium-width medial longitudinal dark band that is narrow and dark fuscous on tergum III and widening steadily to be of medium width and black on tergum IV and broad and black on tergum V; in some specimens, the medial longitudinal dark band covers terga II–V while in other specimens it is present only on terga IV and V. A pair of oval orange-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a moderately deep concavity on posterior margin. Abdominal sternites pale coloured.
Attractant: Cue lure.
Female: No known record.
Distribution: East New Britain Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *procera* refers to the elongate, slender abdomen.
Comments: *B. procera* new species is unique in possessing an elongate, slender abdomen. It is similar to *B. abdolonginqua* (Drew, 1989: Fig. 90) and *Bactrocera (Bactrocera) elongata* Drew & Romig (Drew & Romig, 2013: Fig. 62) in having the same abdomen shape, a black scutum, yellow postpronotal lobes and notopleura, distinct lateral postsutural yellow vittae and legs with femora entirely fulvous. It differs from these species in having the abdominal terga mostly red-brown, wing with cells bc and c pale fuscous and infuscation enclosing the r-m and dm-cu crossveins.

Bactrocera (Zeugodacus) aiyurae, new species
(Fig. 48)

Type data: Holotype ♀, PAPUA NEW GUINEA: Eastern Highlands Province, Aiyura Research Station, Staff residential area, 5.iv.2001, Leon Saleu, in methyl eugenol trap.
Location of type: Holotype (T245761) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of small circular black spots; postpronotal lobe and notopleuron yellow; a narrow presutural lateral yellow band connecting the postpronotal lobe and notopleuron; scutum entirely black except dark fuscous below lateral postsutural yellow vittae; two narrow lateral postsutural yellow vittae present; a small yellow spot anterior to mesonotal suture; a broad medial postsutural yellow vitta present; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow dark fuscous costal band slightly overlapping R_{2+3}, a narrow dark fuscous band enclosing dm-cu crossvein and extending around posterior margin of wing where it becomes paler, a broad fuscous anal streak, cells bc and c fuscous, microtrichia in outer corner of cell c only; abdominal terga III–V red-brown with a 'T'-shaped pattern consisting of a narrow transverse fuscous to dark fuscous band across anterior margin of tergum III and a narrow medial longitudinal black band over all three terga, moderately broad dark fuscous to black lateral longitudinal bands over all three terga.
Description: Female.
Head: Vertical length 1.3 mm. Frons length 1.4 times breadth; red-brown with dark fuscous on anteromedial hump; orbital setae black: 1 *s.or*.; 3 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of small circular black spots; length 0.39 mm. Occiput dark fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum entirely black except dark fuscous below lateral postsutural vittae. Pleural areas entirely black except red-brown below postpronotal lobe. Yellow markings as follows: postpronotal lobe; notopleuron; a lateral presutural yellow band connecting postpronotal lobe to notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a small spot, anterior margin slightly convex; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two narrow lateral postsutural vittae beginning anterior to mesonotal suture as a small spot and narrowing slightly posteriorly to end at *ia*. seta; a broad medial postsutural yellow vitta. Postnotum black. Scutellum yellow except for narrow black basal band. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous except fore tibiae fuscous and hind tibiae dark fuscous.
Wings: Length 5.4 mm; cells bc and c fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except dark fuscous cell sc, narrow dark fuscous costal band slightly overlapping R_{2+3} where it becomes paler, a narrow dark fuscous band enclosing dm-cu crossvein and continuing around hind margin where it becomes paler; a broad fuscous anal streak that becomes paler apically; no dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak.
Abdomen: Elongate oval; terga free; pecten absent on tergum III. Tergum I and sterna I and II wider than long. Tergum I dark fuscous with a narrow red-brown transverse band across posterior margin but not reaching lateral margins; tergum II dark fuscous to black across anterior half and lateral margins, remainder fulvous; terga III–V red-brown with a 'T'-shaped pattern consisting of a fuscous to dark fuscous transverse band across anterior margin of tergum III and a narrow medial longitudinal black band over all three terga, moderately broad dark fuscous to black lateral longitudinal bands over all three terga. A pair of red-brown shining spots on tergum V. Ovipositor basal segment red-brown, conical in transverse cross section and tapering posteriorly in dorsal view. Ratio of length of oviscape to length of tergum V, 1.3:1.
Attractant: No known record; the response to the methyl eugenol trap probably coincidental.
Male: No known record.
Distribution: Eastern Highlands Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *aiyurae* refers to the type locality.

Comments: *B. aiyurae* new species is unique in possessing an elongated narrow wing, an elongate oval-shaped abdomen, 2 *sc*. setae, lateral and medial postsutural yellow vittae, *prsc*. seta absent. It also possesses a lateral yellow band connecting the postpronotal lobe and notopleuron, a yellow spot anterior to the mesonotal suture, dark fuscous coloration enclosing the dm-cu crossvein and abdominal terga III–V red-brown with a narrow medial and broad lateral longitudinal dark fuscous to black bands.

Bactrocera (Zeugodacus) anglimpiae, new species
(Fig. 49)

Type data: Holotype ♂, PAPUA NEW GUINEA: Jiwaka Province, Anglimp Area, Madan block, 7.7 Km E Kagamaga Airport, 25.vi.1999, A. Movis, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 2♂ (20.x.1999), same data as holotype; 1♂ (6.i.1999), 3♂ (1.iii.1999), 2♂ (25.iii.1999), 4♂ (5.v.1999), 3♂ (9.vi.1999), 1♂ (25.vi.1999), 5♂ (16.vii.1999), 2♂ (10.viii.1999), 1♂ (15.viii.1999), 1♂ (6.x.1999), 1♂ (20.x.1999), 1♂ (5.xi.1999), 3♂ (26.xi.1999), Western Highlands Province, Aviamp Area, Bob Hargreaves farm, A. Movis, attracted to cue lure; 2♂ (28.i.1999), 1♂ (9.ii.1999), 3♂ (10.xii.1999), Western Highlands Province, Mt Hagen, A. Movis house, Malaria Compound, A. Movis, attracted to cue lure.
Location of types: Holotype (T245762) in QMIC; 8 paratypes in ANIC; 20 paratypes in QDPC; 8 paratypes (T245763–T245770) in QMIC.
Diagnosis: A large species; face fulvous with a pair of small oval black spots; postpronotal lobe and notopleuron yellow; scutum black with red-brown below lateral postsutural vittae and two small red-brown bands anteriorly either side of mid-line; two broad lateral postsutural yellow vittae beginning with a spot anterior to mesonotal suture and ending before level of *p.sa*. seta; a narrow medial longitudinal postsutural yellow vitta; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow dark fuscous costal band overlapping R_{2+3} where it becomes paler and expanding into a small spot across apex of R_{4+5}, a narrow dark fuscous band enclosing dm-cu crossvein, a broad dark fuscous anal streak, cells bc and c pale fuscous, microtrichia in outer corner of cell c only; abdominal terga III–V fulvous with a moderately broad medial and two broad lateral longitudinal black bands over all three terga and joined along anterior margin of tergum III.
Description: Male.
Head: Vertical length 1.6 mm. Frons length 1.2 times breadth; fuscous dorsally and red-brown ventrally; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of small oval black spots; length 0.49 mm. Occiput fuscous with a black transverse line dorsally and fulvous along eye margins; antennae short, with all segments entirely fuscous.
Thorax: Scutum black with red-brown below lateral postsutural vittae and two elongate red-brown markings anteriorly either side of mid-line. Pleural areas entirely black. Yellow areas as follows: postpronotal lobe; notopleura; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a large spot, anterior margin strongly convex; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two broad lateral postsutural vittae beginning with a spot anterior to mesonotal suture and narrowing posteriorly to end before level of *p.sa*. seta; a narrow medial longitudinal postsutural vitta. Postnotum black. Scutellum yellow with a narrow black basal band. Setae: *sc*. 4; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: Fore femora fulvous with fuscous on outer apical two-thirds, mid and hind femora fulvous with dark fuscous on apical half; fore tibiae fuscous, mid tibiae fuscous basally to fulvous apically, hind tibiae dark fuscous; all tarsi with basal segment fulvous and apical four segments fuscous.
Wings: Length 7.0 mm; cells bc and c pale fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except for dark fuscous cell sc, a narrow dark fuscous costal band overlapping R_{2+3} where it becomes paler but not confluent with R_{4+5} and expanding to a small spot across apex of R_{4+5}, a dark fuscous band along dm-cu crossvein; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe large and rounded.
Abdomen: Elongate oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I black with a narrow transverse red-brown band along posterior margin but not reaching lateral margins; tergum II black with fulvous posteriorly; terga III–V fulvous with a moderately broad medial and two broad lateral longitudinal black bands over all three terga and joined along anterior margin of terga III. A pair of oval fulvous shining spots on tergum V. Posterior lobe of surstylus long and narrow, sternum V with a slight concavity on posterior margin. Abdominal sternites black.
Attractant: Cue lure.
Female: No known record.
Distribution: Jiwaka and Western Highlands Provinces, Papua New Guinea.
Hosts: No known record.
Etymology: The name *anglimpiae* refers to the type locality.
Comments: *B. anglimpiae* new species is similar to *B. curta* (Drew, 1989: Fig. 390) from New Britain and *Bactrocera (Zeugodacus) sasaotiae* Drew & Romig (Drew and Romig, 2013: Fig. 346) from Flores in possessing a black scutum, lateral and medial postsutural yellow vittae, a yellow spot anterior to the mesonotal suture and abdomen with dark colour patterns, and to *B. curta* in wing coloration. It differs from both species in having extensive dark fuscous patterns on all femora and the fore and hind tibiae, from *B. curta* in having a narrower costal band and no shading across the wing membrane, and from *B. sasaotiae* in having the dm-cu crossvein enclosed with dark fuscous coloration.

Bactrocera (Zeugodacus) bainingsiae, new species
(Fig. 50)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, Bainings Mts, DPI Station, 840 m, 22.i–6.ii.1998, cue lure trap No. 5, L. Leblanc & A. Winterer. **Paratypes**: PAPUA NEW GUINEA: 1♂, 9–28.iv.1998,

same data as holotype, S. Balagawi, L. Leblanc & A. Mararuai; 1♂, Bainings Mts, Raunsepna, 1160 m, 28.iv–15.v.1998, Cue No. 8, S. Balagawi, L. Leblanc & A. Mararuai; 2♂, Bainings Mts, DPI Station, 840 m, 15.v–3.vi.1998, Cue No. 5, A. Mararuai, S. Balagawi & L. Leblanc; 3♂, Bainings Mts, DPI Station, 840 m, 25.viii–14.ix.1998, Cue No P205, L. Leblanc & A. Mararuai; 1♂ (5.v.1999), 1♂ (12.v.1999), 8♂ (19.v.1999), 7♂ (26.v.1999), 7♂ (2.vi.1999), 2♂ (7.vi.1999), 6♂ (9.vi.1999), 9♂ (16.vi.1999), 1♂ (23.vi.1999), 1♂ (7.vii.1999), 1♂ (21.vii.1999), 1♂ (28.vii.1999), 6♂ (22.ix.1999), East New Britain Province, Raunsepna, C. Mitparingi, attracted to cue lure.

Location of types: Holotype (T245771) in QMIC; 10 paratypes in ANIC; 38 paratypes in QDPC; 10 paratypes (T245772–T245781) in QMIC.

Diagnosis: A large species; face fulvous with a pair of medium-sized circular black spots; postpronotal lobe yellow; notopleuron red-brown; scutum red-brown with shining black patterns anteriorly and posteriorly; two lateral postsutural yellow vittae present; medial postsutural yellow vitta present; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow with a large red-brown pattern on dorsal surface; wings with an extensive diffuse pattern across the central membrane, a broad fuscous costal band confluent with R_{4+5} and widening across wing apex, a broad fuscous anal streak, cells bc and c fuscous, microtrichia in outer half of cell c only; abdominal terga III–V red-brown with a narrow medial and two narrow lateral longitudinal black bands over all three terga.

Description: Male.

Head: Vertical length 1.6 mm. Frons length 1.4 times breadth; entirely red-brown; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule red-brown. Ocellar triangle black. Face fulvous with a pair of medium-sized circular black spots; length 0.44 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.

Thorax: Scutum red-brown with shining black markings anteriorly and posteriorly. Pleural areas shining black except red-brown below postpronotal lobes. Yellow markings as follows: postpronotal lobe; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a large spot, anterior margin straight; anatergite and katatergite almost entirely yellow; two broad lateral postsutural vittae narrowing slightly posteriorly to end well before *ia*. seta; a broad medial longitudinal postsutural vitta rounded posteriorly and narrowing anteriorly to end anterior to the mesonotal suture. Notopleuron red-brown. Postnotum shining black. Scutellum yellow with a large triangular red-brown pattern on dorsal surface. Setae: *sc*. 4 (basal pair usually small and weak); *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.

Legs: All segments entirely fulvous.

Wings: Length 6.9 mm; cells bc and c fuscous; microtrichia over outer half of cell c only; remainder of wings with fuscous cell sc, broad fuscous costal band confluent with R_{4+5} and widening across apex of wing; a broad fuscous anal streak; a diffuse fuscous pattern across the wing with darker fuscous enclosing r-m and dm-cu crossveins and spreading out as a paler fuscous area across posterior area of wing membrane; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe enlarged and rounded.

Abdomen: Elongate oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I black with red-brown along posterior margin; tergum II red-brown with a narrow transverse dark fuscous line subanteriorly; terga III–V red-brown with a medial longitudinal black band and narrow lateral longitudinal black bands over all three terga. A pair of small oval red-brown shining spots on tergum V. Posterior lobe of surstylus long and narrow, sternum V with a shallow concavity on posterior margin. Abdominal sternites red-brown.

Attractant: Cue lure.

Female: No known record.

Distribution: East New Britain Province, Papua New Guinea.

Hosts: No known record.

Etymology: The name *bainingsiae* refers to the type locality, Bainings Mountains.

Comments: *B. bainingsiae* new species is a unique species with no close morphological relationships to other species in subgenus *Zeugodacus*. It is recognized by having a red-brown scutum with distinct glossy black patterns anteriorly and posteriorly, a red-brown notopleuron, a large triangular red-brown pattern on the dorsal surface of the scutellum, the wing covered with extensive fuscous patterning and with a large supernumerary lobe, an elongate oval abdomen with terga III–V red-brown with narrow medial and lateral longitudinal black bands.

Bactrocera (Zeugodacus) madangiae, new species
(Fig. 51)

Type data: Holotype ♂, PAPUA NEW GUINEA: Madang Province, Mt Wilhelm (700 m), Oct.–Nov. 2012, V. Novotny, attracted to cue lure.

Location of type: Holotype (T245782) in QMIC.

Diagnosis: A medium-sized species; face fulvous with a pair of small circular black spots; postpronotal lobe and notopleuron yellow; a narrow presutural lateral yellow band connecting the postpronotal lobe and notopleuron; scutum entirely black except dark fuscous below lateral postsutural vittae; two lateral postsutural yellow vittae beginning as a spot anterior to mesonotal suture; a medial postsutural yellow vitta present; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow dark fuscous costal band slightly overlapping R_{2+3} where it becomes paler, a narrow dark fuscous band enclosing dm-cu crossvein, a broad dark fuscous anal streak, cells bc and c pale fuscous, microtrichia in outer corner of cell c only; abdominal terga II–V red-brown except for a narrow dark fuscous transverse band across anterior margin of tergum II but not reaching lateral margins and a distinct circular black spot in centre of tergum V.

Description: Male.

Head: Vertical length 1.5 mm. Frons length 1.3 times breadth; red-brown with dark fuscous on anteromedial hump; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of small circular black spots; length 0.44 mm. Occiput red-brown, fulvous along eye margins; antennae short, with all segments entirely red-brown.
Thorax: Scutum entirely black except dark fuscous below lateral postsutural vittae. Pleural areas red-brown except black along anterior and posterior margins of mesopleural stripe. Yellow markings as follows: postpronotal lobe; notopleuron; narrow lateral presutural yellow band connecting the postpronotal lobe to the notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a large transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two narrow lateral postsutural yellow vittae beginning as a spot anterior to mesonotal suture and narrowing slightly posteriorly to end at *ia*. seta; a long broad medial postsutural yellow vitta. Postnotum red-brown centrally, black laterally. Scutellum yellow except for a narrow black basal band. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous except fore tibiae pale fuscous and hind tibiae fuscous.
Wings: Length 5.9 mm; cells bc and c pale fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except dark fuscous cell sc, a narrow dark fuscous costal band slightly overlapping R_{2+3} where it becomes paler, a narrow dark fuscous band enclosing dm-cu crossvein; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe large and rounded.
Abdomen: Elongate oval and slightly narrow; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I fuscous with a narrow red-brown transverse band across posterior margin but not reaching lateral margins; terga II–V red-brown except for a narrow dark fuscous transverse band across anterior margin of tergum II but not reaching lateral margins and a distinct circular black spot in centre of tergum V. A pair of small oval red-brown shining spots on tergum V. Posterior lobe of surstylus long and narrow, sternum V with a shallow concavity on posterior margin. Abdominal sternites red-brown.
Attractant: Cue lure.
Female: No known record.
Distribution: Madang Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *madangiae* refers to the Province in which the type locality is situated.
Comments: *B. madangiae* new species is similar to *B. sepikae* (Drew, 1989: Fig. 373) in possessing a black scutum, a lateral yellow band connecting the postpronotal lobe and notopleuron, lateral and medial postsutural yellow vittae with a yellow spot anterior to mesonotal suture and abdominal terga mostly red-brown. It differs from this species in having broad lateral postsutural yellow vittae, a narrow costal band and infuscation only on the dm-cu crossvein.

Bactrocera (Zeugodacus) magiae, new species
(Fig. 52)

Type data: Holotype ♂, PAPUA NEW GUINEA: Central Province, Sivitatana turn off, Maji Highway, 10.vi.1999, D. Putulan, attracted to methyl eugenol. **Paratypes**: PAPUA NEW GUINEA: 1♂, 9.iii.1999, same data as holotype; 1♂, Central Province, Launakalana Estate, Magi Highway, 29. iii.1999, D. Tenakanai, attracted to methyl eugenol; 1♂, Central Province, Pacific Adventist University, 12.i.1999, D. Tenakanai, attracted to methyl eugenol.
Location of types: Holotype (T245783) in QMIC; 3 paratypes in QDPC.
Diagnosis: A medium-sized species; face fulvous with a pair of small circular black spots; postpronotal lobe yellow; notopleuron red-brown; scutum entirely red-brown; two broad lateral postsutural yellow vittae present; a broad and short medial postsutural yellow vitta present; mesopleural stripe reaching anterior *npl*. seta dorsally; scutellum yellow with a large red-brown triangular marking on dorsal surface; wings with a narrow fuscous costal band slightly overlapping R_{2+3}, a broad fuscous anal streak, cells bc and c fuscous, dense microtrichia covering both cells; abdominal terga III–V red-brown with a narrow medial longitudinal black band over terga IV and V.
Description: Male.
Head: Vertical length 1.5 mm. Frons length 1.3 times breadth; red-brown with fuscous around *s.or*. setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule red-brown. Ocellar triangle black. Face fulvous with a pair of small circular black spots; length 0.49 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum entirely red-brown. Pleural areas entirely red-brown. Yellow markings as follows: postpronotal lobe; mesopleural stripe reaching anterior *npl*. seta dorsally, continuing to katepisternum as a small spot, anterior margin straight; anatergite (posterior apex red-brown); anterior two-thirds katatergite (remainder red-brown); two broad parallel-sided lateral postsutural vittae widening slightly posteriorly to end behind *ia*. seta; a broad and short medial postsutural yellow vitta. Notopleuron red-brown. Postnotum red-brown. Scutellum yellow with a large triangular red-brown marking over dorsal surface. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All femora entirely fulvous; fore tibiae pale fuscous, mid tibiae fulvous, hind tibiae fuscous; all tarsi with basal segments fulvous and apical four segments fuscous.
Wings: Length 5.0 mm; cells bc and c fuscous and covered with dense microtrichia; remainder of wings colourless except fuscous cell sc, a fuscous costal band slightly overlapping R_{2+3} where it becomes paler; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely fuscous; tergum II fuscous over anterior half and red-brown over posterior half; terga III–V entirely red-brown

except for a narrow medial longitudinal black band over terga IV and V. A pair of oval red-brown shining spots on tergum V. Posterior lobe of surstylus long and wide, sternum V with a shallow concavity on posterior margin. Abdominal sternites red-brown.
Attractant: Methyl eugenol.
Female: No known record.
Distribution: Central Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *magiae* refers to the Magi Highway on which this species was collected.
Comments: *B. magiae* new species is similar to *B. daruensis* (Drew, 1989: Fig. 221) in possessing a general red-brown coloration of the thorax and abdomen, a red-brown notopleuron and a large red-brown triangle on the dorsal surface of the scutellum and a narrow medial longitudinal black band over abdominal terga IV and V. It differs from this species in having the posterior lobe of the surstylus long, a slight concavity on the posterior margin of abdominal sternite V, and broad lateral and medial postsutural yellow vittae on scutum.

Bactrocera (Zeugodacus) mitparingii, new species
(Fig. 53)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, Raunsepna, 19.v.1999, C. Mitparingi, attracted to cue lure. **Paratypes:** PAPUA NEW GUINEA: 7♂, same data as holotype; 3♂ (5.v.1999), 2♂ (12.v.1999), 1♂ (26.v.1999), 3♂ (2.vi.1999), 6♂ (16.vi.1999), 1♂ (23.vi.1999), 1♂ (7.vii.1999), 5♂ (14.vii.1999), 1♂ (21.vii.1999), 1♂ (11.viii.1999), 1♂ (22.ix.1999), 1♂ (29.ix.1999), same data as holotype; 1 ♂ (27.i.1999), 1♂ (15.iii.1999), East New Britain Province, Bainings Mts, Raunsepna (forest), L. Leblanc *et al*., attracted to cue lure; 1♂, East New Britain Province, Bainings Mts, Raunsepna School, 1.iv.1999, L. Leblanc *et al*., attracted to cue lure; 1♂, East New Britain Province, Bainings Mts, Yayam Village, 1.iv.1999, L. Leblanc *et al*., attracted to cue lure; 2♂, East New Britain Province, Bainings Mts Base Camp, DPI Stn near Raunsepna, 2.iii.2000, A. Mararuai, attracted to cue lure.
Location of types: Holotype (T245784) in QMIC; 10 paratypes in ANIC; 19 paratypes in QDPC; 10 paratypes (T245785–T245794) in QMIC.
Diagnosis: A large species; face fulvous with a pair of medium-sized circular black spots; postpronotal lobe and notopleuron yellow; scutum dark red-brown with diffuse dark fuscous patterns anterolaterally and posterolaterally; two broad lateral postsutural yellow vittae beginning with a spot anterior to mesonotal suture and ending at *ia*. seta; a broad medial postsutural yellow vitta present; mesopleural stripe reaching anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow fuscous costal band confluent with R_{2+3}, a broad fuscous anal streak, cells bc and c fuscous, microtrichia in outer corner of cell c only; abdominal terga II–V red-brown except for a narrow medial longitudinal black line over terga IV and V.
Description: Male.
Head: Vertical length 1.8 mm. Frons length 1.3 times breadth; entirely red-brown; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of medium-sized circular black spots; length 0.54 mm. Occiput dark fuscous dorsally, fuscous ventrally and fulvous along eye margins; antennae short, with all segments entirely red-brown.
Thorax: Scutum dark red-brown with diffuse dark fuscous patterns anterolaterally and posterolaterally. Pleural areas dark fuscous to black with red-brown below postpronotal lobes. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching anterior *npl*. seta dorsally, continuing to katepisternum as a large spot, anterior margin strongly convex; anatergite (posterior apex black); anterior three-quarters katatergite (remainder black); two broad parallel-sided lateral postsutural vittae beginning with a spot anterior to mesonotal suture and ending at *ia*. seta; a broad medial postsutural vitta. Postnotum dark red-brown centrally, black laterally. Scutellum yellow except for a narrow red-brown basal band. Setae: *sc*. 4; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous.
Wings: Length 7.8 mm; cells bc and c fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except for fuscous cell sc, a narrow fuscous costal band confluent with R_{2+3} and remaining narrow around apex of wing; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe large and rounded.
Abdomen: Elongate oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I dark fuscous with small red-brown spots posterolaterally; terga II–V entirely red-brown except for a narrow medial longitudinal black line over terga IV and V. Oval shining spots on tergum V not present. Posterior lobe of surstylus long and narrow, sternum V with a shallow concavity on posterior margin. Abdominal sternites red-brown.
Attractant: Cue lure.
Female: No known record.
Distribution: East New Britain Province, Papua New Guinea.
Hosts: No known record.
Etymology: This species is named after Mr C. Mitparingi who collected the type specimens.
Comments: *B. mitparingii* new species is similar to *B. aurantiventer* (Drew, 1989: Fig. 349) in lacking *prsc*. setae and in possessing 4 *sc*. setae, lateral and medial postsutural yellow vittae, leg segments fulvous, wings with a narrow costal band confluent with R_{2+3} and abdominal terga mostly red-brown. It differs from this species in having black facial spots, scutum mostly red-brown, broad parallel-sided lateral postsutural vittae reaching the *ia*. seta and a medial longitudinal black line on abdominal terga IV and V. *B. mitparingii* new species is also similar to *B. brachus* (Drew, 1989: Fig. 383) and *B. trichota* (Drew, 1989: Fig. 401) in the general colour patterns of the scutum, abdomen and legs but differs in lacking *prsc*. setae and in having a narrow dark fuscous costal band confluent with R_{2+3}.

Bactrocera (Zeugodacus) oiyaripensis, new species
(Fig. 54)

Type data: Holotype ♂, PAPUA NEW GUINEA: Southern Highlands Province, Oiyarip DPI Livestock Station, 17.x.2000, James Epart, attracted to cue lure. **Paratype**: PAPUA NEW GUINEA: 1♂, same data as holotype.
Location of types: Holotype (T245795) in QMIC; 1 paratype in QDPC.
Diagnosis: A medium-sized species; face entirely fulvous without dark spots; postpronotal lobe and notopleuron yellow; scutum entirely black; two very short and narrow lateral postsutural yellow vittae present; a large broad medial postsutural yellow vitta present; mesopleural stripe reaching anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow dark fuscous costal band confluent with R_{2+3}, a diffuse 'U'-shaped pattern across centre of wing membrane consisting of dark fuscous enclosing r-m and dm-cu crossveins and diffuse pale fuscous patterning on posterior area of wing membrane, a broad dark fuscous anal streak, cells bc and c pale fuscous, microtrichia in outer corner of cell c only; abdominal terga III–V entirely red-brown except for a narrow medial longitudinal black line on tergum V.
Description: Male.
Head: Vertical length 1.1 mm. Frons length 1.3 times breadth; red-brown with a dark fuscous line across *s.or*. setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face entirely fulvous without dark spots; length 0.39 mm. Occiput dark fuscous, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with dark fuscous on apex and outer surface.
Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching anterior *npl*. seta dorsally, continuing to katepisternum as a large spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two very short and narrow lateral postsutural vittae ending before or at level of *a.sa*. seta; a long and broad medial postsutural yellow vitta. Postnotum black. Scutellum yellow except for narrow black basal band. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous.
Wings: Length 5.0 mm; cells bc and c pale fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except dark fuscous cell sc, a narrow dark fuscous costal band confluent with R_{2+3} and widening slightly as it continues around apex of wing, a diffuse 'U'-shaped pattern across wing with dark fuscous enclosing both r-m and dm-cu crossveins and becoming pale and diffuse across posterior area of wing margin; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe large and broadly rounded.
Abdomen: Elongate oval and slightly narrow; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely dark fuscous; tergum II dark fuscous across anterior half, remainder red-brown; terga III–V entirely red-brown except for a narrow medial longitudinal black line on tergum V. A pair of large oval red-brown shining spots on tergum V. Posterior lobe of surstylus long and narrow, sternum V with a slight concavity on posterior margin. Abdominal sternites dark red-brown.
Attractant: Cue lure.
Female: No known record.
Distribution: Southern Highlands Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *oiyaripensis* refers to the type locality, Oiyarip in Papua New Guinea.
Comments: *B. oiyaripensis* new species is similar to *B. sepikae* (Drew, 1989: Fig. 373) in possessing a black scutum, abdominal terga mostly red-brown and similar transverse wing markings. It differs from this species in lacking a lateral yellow band connecting the postpronotal lobe and notopleuron and in having very short lateral postsutural yellow vittae, a large and broad medial postsutural yellow vitta and a narrow dark fuscous costal band confluent with R_{2+3}.

Bactrocera (Zeugodacus) parasepikae, new species
(Fig. 55)

Type data: Holotype ♂, PAPUA NEW GUINEA: Madang Province, Ramu Sugar Residential Area, 31.iii.1999, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1♂ (11.xi.1998), 1♂ (9.xii.1998), 1♂ (3.ii.1999), 3♂ (17.ii.1999), 1♂ (17.iii.1999), 4♂ (23.iii.1999), 1♂ (31.iii.1999), 3♂ (14.iv.1999), 1♂ (7.vii.1999), 2♂ (22.xii.1999), 2♂ (5.i.2000), 1♂ (19.i.2000), same data as holotype; 1♂, Eastern Highlands Province, Aiyura Agr Research Station, 3.iii.2000, James Enest, attracted to cue lure; 1♂, Morobe Province, Markham Farming, 21.ii.2000, S. Sar & S. Balagawi, attracted to cue lure.
Location of types: Holotype (T245796) in QMIC; 5 paratypes in ANIC; 13 paratypes in QDPC; 5 paratypes (T245797–T245801) in QMIC.
Diagnosis: A small species; face fulvous with a pair of very small oval black spots; postpronotal lobe and notopleuron yellow; a small spot anterior to the notopleuron in some specimens; scutum black over lateral half, red-brown over anterior half; two broad lateral postsutural yellow vittae beginning with a spot anterior to mesonotal suture; a large and moderately broad medial postsutural yellow vitta present; mesopleural stripe reaching anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow dark fuscous costal band confluent with R_{2+3}, a 'U'-shaped pattern across centre of wing consisting of fuscous bands enclosing r-m and dm-cu crossveins and diffuse light shading over posterior area of membrane, a broad fuscous anal streak, cells bc and c pale fuscous, microtrichia in outer corner of cell c only; abdominal terga II–V entirely red-brown except for a circular black spot in centre of tergum V.
Description: Male.
Head: Vertical length 1.2 mm. Frons length 1.4 times breadth; entirely red-brown; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule red-brown. Ocellar triangle black. Face fulvous with a pair of very small oval black spots; length 0.39 mm. Occiput red-brown, fulvous along eye margins; antennae short, with all segments entirely red-brown.

Thorax: Scutum black over posterior half, red-brown over anterior half and below lateral postsutural yellow vittae. Pleural areas red-brown except fuscous along anterior and posterior margins of mesopleural stripe. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching anterior *npl*. seta dorsally, continuing to katepisternum as a spot, anterior margin convex; anatergite (posterior apex black); anterior three-quarters katatergite (remainder black); two broad parallel-sided lateral postsutural vittae beginning as a spot anterior to mesonotal suture and narrowing posteriorly to end just before *ia*. seta; a long and moderately broad medial postsutural yellow vitta. In some specimens, there is a yellow spot anterior to notopleuron. Postnotum red-brown centrally, black laterally. Scutellum yellow except for narrow black basal band. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous.
Wings: Length 4.8 mm; cells bc and c pale fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except dark fuscous costal band confluent with R_{2+3} and remaining narrow around apex of wing, a 'U'-shaped pattern across centre of wing consisting of fuscous enclosing r-m and dm-cu crossveins and light shading across posterior area of wing membrane; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe large and broadly rounded.
Abdomen: Elongate oval and slightly narrow; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely fuscous; terga II–V entirely red-brown except for a circular black spot in centre of tergum V. A pair of small transverse red-brown shining spots on tergum V. Posterior lobe of surstylus long and narrow, sternum V with a slight concavity on posterior margin. Abdominal sternites red-brown.
Attractant: Cue lure.
Female: No known record.
Distribution: Eastern Highlands, Madang and Morobe Provinces, Papua New Guinea.
Hosts: No known record.
Etymology: The name *parasepikae* refers to the close morphological similarity to *Bactrocera sepikae* Drew.
Comments: *B. parasepikae* new species is similar to *B. sepikae* (Drew, 1989: Fig. 373) and *B. oiyaripensis* new species (Fig. 54) in possessing similar wing colour patterns and abdominal terga mostly red-brown. It differs from *B. sepikae* in having red-brown over the anterior half of the scutum, broad lateral postsutural yellow vittae, a narrow costal band confluent with R_{2+3} and in lacking a lateral presutural yellow band between the postpronotal lobe and notopleuron. It differs from *B. oiyaripensis* new species in possessing red-brown over the anterior half of the scutum and broad lateral postsutural yellow vittae.

Bactrocera (Zeugodacus) rufoscutella, new species
(Fig. 56)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, Bainings Mtns, Yayam Village, 25.xi.1998, A. Mararaui & L. Leblanc, attracted to cue lure. **Paratype**: PAPUA NEW GUINEA: 1♂, 22.x.1998, same data as holotype.
Location of types: Holotype (T245802) in QMIC; 1 paratype in QDPC.
Diagnosis: A small species; face fulvous with a pair of large circular black spots; postpronotal lobe yellow with red-brown around all margins; notopleuron red-brown; scutum entirely red-brown; lateral postsutural yellow vittae absent; medial postsutural yellow vitta present; mesopleural stripe reaching almost to postpronotal lobe dorsally; scutellum entirely red-brown; wings with a narrow dark fuscous costal band confluent with R_{2+3}, a distinct but diffuse 'U'-shaped pattern across centre of wing membrane, a broad fuscous anal streak, cells bc and c pale fuscous, microtrichia in outer corner of cell c only; abdominal terga I–V entirely red-brown except for a distinct circular black spot in centre of tergum V.
Description: Male.
Head: Vertical length 1.2 mm. Frons length 1.3 times breadth; red-brown without dark markings; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule red-brown. Ocellar triangle black. Face fulvous with a pair of large circular black spots; length 0.34 mm. Occiput red-brown, fulvous along eye margins; antennae short, with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface.
Thorax: Scutum entirely red-brown. Pleural areas entirely red-brown. Yellow markings as follows: postpronotal lobe (red-brown around the entire margins); mesopleural stripe reaching almost to postpronotal lobe dorsally, not continuing to katepisternum, anterior margin straight; anterior corner of anatergite (remainder red-brown); anterior half katatergite (remainder red-brown); a long narrow medial postsutural yellow vitta. Lateral postsutural yellow vittae absent. Notopleuron red-brown. Postnotum entirely red-brown. Scutellum entirely red-brown. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous.
Wings: Length 4.8 mm; cells bc and c pale fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except for dark fuscous cell sc, a narrow dark fuscous costal band confluent with R_{2+3} and remaining narrow around apex of wing, a diffuse 'U'-shaped pattern across wing consisting of dark fuscous enclosing r-m and dm-cu crossveins and becoming paler as it forms the 'U' across the remainder of the central wing membrane; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe large and rounded.
Abdomen: Elongate oval and slightly narrow; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Terga I–V entirely red-brown except for a distinct circular black spot in centre of tergum V. A pair of small red-brown shining spots on tergum V. Posterior lobe of surstylus long and narrow, sternum V with a shallow concavity on posterior margin. Abdominal sternites red-brown.
Attractant: Cue lure.
Female: No known record.
Distribution: East New Britain Province, Papua New Guinea.
Hosts: No known record.

Etymology: The name *rufoscutella* refers to the red-brown colour of the scutellum.
Comments: *B. rufoscutella* new species is similar to *B. sepikae* (Drew, 1989: Fig. 373) in possessing similar wing colour patterns and abdominal terga mostly red-brown. It differs from this species in lacking a lateral yellow band connecting the postpronotal lobe and notopleuron and lateral postsutural yellow vittae and in having a red-brown scutum, red-brown notopleura and an entirely red-brown scutellum.

Bactrocera (Zeugodacus) xanthovelata, new species
(Fig. 57)

Type data: Holotype ♂, PAPUA NEW GUINEA: North Solomons Province, Buka, Provincial DPI Station, 6.x.1999, Cletus Banak, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1♂, same data as holotype; 1♂ (22.ix.1999), 2♂ (13.x.1999), 1♂ (20.x.1999), 2♂ (26.i.2000), same data as holotype.
Location of types: Holotype (T245803) in QMIC; 1 paratype in ANIC; 5 paratypes in QDPC; 1 paratype (T245804) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of very small circular black spots; postpronotal lobe with anterior half red-brown and posterior half yellow; notopleuron red-brown; scutum entirely red-brown; lateral postsutural yellow vittae absent; medial postsutural yellow vitta present; notopleuron red-brown; mesopleural stripe reaching anterior *npl*. seta dorsally; scutellum angular in shape similar to *Bactrocera xanthodes* (Broun) and entirely red-brown; wings with a narrow dark fuscous costal band confluent with R_{2+3} and widening slightly across apex of wing, a broad dark fuscous anal streak, cells bc and c pale fuscous, microtrichia in outer corner of cell c only; abdominal terga entirely red-brown except for a narrow longitudinal black line on tergum V.
Description: Male.
Head: Vertical length 1.3 mm. Frons length 1.4 times breadth; entirely red-brown; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule red-brown. Ocellar triangle black. Face fulvous with a pair of very small circular black spots; length 0.44 mm. Occiput entirely red-brown; antennae short, with all segments entirely red-brown.
Thorax: Scutum entirely red-brown. Pleural areas entirely red-brown. Yellow markings as follows: posterior half postpronotal lobe, anterior half red-brown; mesopleural stripe reaching anterior *npl*. seta dorsally, not continuing to katepisternum, anterior margin slightly convex; anterior half katatergite (remainder red-brown); a broad medial longitudinal postsutural vitta broadly rounded posteriorly and narrowing slightly to a point anteriorly where it ends at level of mesonotal suture. Notopleuron red-brown. Anatergite entirely red-brown. Lateral postsutural yellow vittae absent. Postnotum entirely red-brown. Scutellum entirely red-brown. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All leg segments entirely fulvous.
Wings: Length 5.4 mm; cells bc and c pale fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except for dark fuscous cell sc, a narrow dark fuscous costal band confluent with R_{2+3} and remaining narrow beyond extremity of R_{2+3} but then widening slightly across apex of wing; a broad fuscous anal streak, a small area of fuscous shading around CuA_1 on posterior margin of wing; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe large and rounded.
Abdomen: Elongate oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Terga I–V entirely red-brown with a narrow medial longitudinal black line on tergum V. A pair of small red-brown shining spots on tergum V. Posterior lobe of surstylus long and narrow, sternum V with a slight concavity on posterior margin. Abdominal sternites red-brown.
Attractant: Cue lure.
Female: No known record.
Distribution: North Solomons Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *xanthovelata* refers to the overall orange-coloured integumen covering the body.
Comments: *B. xanthovelata* new species is morphologically similar to *Bactrocera (Notodacus) xanthodes* (Broun) in Fiji and Polynesia (Drew, 1989: Fig. 305) in possessing a transparent orange-coloured integumen and an angular-shaped scutellum. It differs from this species in having a long surstylus lobe, sternum V with a shallow posterior emargination, *prsc*. setae absent, postpronotal setae absent, lateral postsutural yellow vittae and lateral yellow band between postpronotal lobe and notopleuron absent, an elongate-oval abdomen shape and a markedly enlarged supernumerary lobe in the wing.

Genus *Dacus* Fabricius

Dacus (Callantra) nigrolobus, new species
(Fig. 58)

Type data: Holotype ♂, PAPUA NEW GUINEA: Central Province, Rouna Forest, 20.iv.1999, D. Tenakanai, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1♂ (1.iii.1999), same data as holotype; 1♂, Central Province, start of Kokoda track, 4.viii.1999, D. Tenakanai, attracted to cue lure; 1♂, Madang Province, Madang town, residential area, 6.v.1999, attracted to cue lure; 1♂, Morobe Province, Markham Farming, 20.vi.2000, S. Sar & S. Balagawi, attracted to cue lure; 1♂ (14.viii.2000), 1♂ (1.ix.2000), Morobe Province, Kabwum district station, Mr Ken, attracted to cue lure; 1♂, Morobe Province, Tikeling Village Forest, 24.i.2000, S. Balagawi & S. Sar.
Location of types: Holotype (T245816) in QMIC; 2 paratypes in ANIC; 4 paratypes in QDPC; 1 paratype (T245817) in QMIC.
Diagnosis: A large species; face almost entirely dark fuscous with a pair of large oval black spots and a red-brown spot centrally; postpronotal lobe dark fuscous; notopleuron black; a small triangular yellow marking along anterior margin of mesonotal suture; scutum entirely black; lateral and

medial postsutural yellow vittae absent; a narrow mesopleural stripe narrower than notopleuron dorsally and not extending to katepisternum; scutellum yellow with a broad black basal band; wings with a pale fuscous tint, a broad dark fuscous costal band confluent with vein M but paler along apical area of this vein, a broad dark fuscous anal streak, cells bc and c dark fuscous and covered with dense microtrichia; abdomen elongate oval and petiolate in shape, terga mostly dark fuscous to black with red-brown along posterior margin of tergum III, red-brown spots posterocentrally on tergum IV and red-brown medially and along posterior margin of tergum V.

Description: Male.

Head: Vertical length 2.1 mm. Frons length 0.9 times breadth; red-brown with dark fuscous patterns around orbital setae; orbital setae large and black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face almost entirely dark fuscous with a pair of large oval black spots and a small fulvous spot centrally; length 0.74 mm. Occiput entirely dark fuscous. Antennae with all segments dark fuscous; length of segments: 0.54 mm; 0.64 mm; 1.3 mm.

Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: a narrow mesopleural stripe slightly narrower than notopleuron dorsally and not reaching katepisternum ventrally; a small triangular marking along anterior margin of mesonotal suture. Lateral and medial postsutural yellow vittae absent. Postpronotal lobe dark fuscous. Notopleuron black. Anatergite and katatergite entirely black. Postnotum black with a narrow dark red-brown area centrally. Scutellum yellow with a broad black basal band. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2.

Legs: All femora entirely dark fuscous; all tibiae entirely fuscous; fore tarsi with basal four segments fuscous and apical segment fulvous, mid and hind tarsi with all segments entirely fulvous.

Wings: Length 8.2 mm; cells bc and c dark fuscous and covered with dense microtrichia; remainder of wings with a pale fuscous tint except a broad dark fuscous costal band confluent with M but slightly paler apically along M; a dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak.

Abdomen: Elongate oval and petiolate; terga fused; pecten present on tergum III. Tergum I and sterna I and II longer than wide. All terga mostly dark fuscous to black with a narrow red-brown band along posterior margin of tergum II, red-brown spots posterocentrally on tergum IV, red-brown medially and along posterior margin of tergum V. A pair of fuscous shining spots on tergum V. Posterior lobe of sursty-lus elongate, sternum V with a slight concavity on posterior margin. Abdominal sternites dark coloured.

Attractant: Cue lure.

Female: No known record.

Distribution: Central, Madang and Morobe Provinces, Papua New Guinea.

Hosts: No known record.

Etymology: The name *nigrolobus* refers to the dark-coloured postpronotal lobe and notopleuron.

Comments: *D. nigrolobus* new species is similar to *D. impar* (Drew, 1989: Fig. 410), *D. mayi* (Drew, 1989: Fig. 413) and *D. melanohumeralis* (Drew, 1989: Fig. 414) in possessing a black scutum, abdominal terga and leg segments mostly black. It differs from these species in having a black notopleuron, from *D. impar* and *D. melanohumeralis* in having the costal band confluent with vein M and a fuscous tint across the remainder of the wing membrane, and from *D. mayi* in having unique facial colour patterns being mostly black with a small central fulvous spot.

Dacus (Mellesis) alatifuscatus, new species
(Fig. 59)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, Bainings Mts, 3 km SW Malasait, 11. xii.1998, L. Leblanc *et al*., attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1♂, same data as holotype; 3♂ (18.ii.1998), 1♂ (23.vii.1998), 3♂ (7.viii.1998), 2♂ (14. ix.1998), 2♂ (29.ix.1998), 1♂ (22.x.1998), 2♂ (5.xi.1998), 4♂ (13.i.1999), same data as holotype; 8♂ (9.xi.1998), 2♂ (25.xi.1998), East New Britain Province, Bainings Mts, Malasait, L. Leblanc *et al*., attracted to cue lure; 1♂ (13.i.1999), 1♂(18.ii.1999), 1♂ (1.iv.1999), 1♂ (4. viii.1999), 1♂ (15.ix.1999), 3 ♂ (11.xi.1999), L. Leblanc *et al*., attracted to cue lure; 2♂ (29.xii.1998), 1♂ (30. ix.1999), East New Britain Province, Bainings Mts, Yayam Village, L. Leblanc *et al*., attracted to cue lure; 1♂, East New Britain Province, Bainings Mts, Yayam Village, 2.iii.2000, A. Mararuai, attracted to cue lure; 1♂, East New Britain Province, Bainings Mts, Base Camp, DPI Stn near Raunsepna, 14.x.1999, A. Mararuai, attracted to cue lure; 1♂ (27.i.1999), 6♂ (23.xii.1999), East New Britain Province, Bainings Mts, Malasaet Village, A. Mararuai, attracted to cue lure; 1♂ (29. ix.1999), 1♂ (6.x.1999), 1♂ (27.x.1999), 1♂ (11.xi.1999), East New Britain Province, Raunsepna, C. Mitparingi, attracted to cue lure.

Location of types: Holotype (T245805) in QMIC; 10 paratypes in ANIC; 33 paratypes in QDPC; 10 paratypes (T245806–T245815) in QMIC.

Diagnosis: A large species; face dark red-brown with a pair of large subquadrate black spots; postpronotal lobe yellow with fuscous lateral and anterior margins; notopleuron dark fuscous; a large triangular marking along anterior margin of mesonotal suture; scutum black with a broad fuscous pattern centrally; lateral and medial postsutural yellow vittae absent; mesopleural stripe slightly wider than notopleuron dorsally and not extending to katepisternum ventrally; scutellum yellow with a broad black basal band; wings almost entirely pale fuscous to dark fuscous, fuscous anal streak present, cells bc and c dark fuscous and covered with dense microtrichia; abdomen elongate, clavate and petiolate in shape, tergum III with a distinct concave posterior margin, all tergites mostly dark fuscous to black with red-brown across posterior margins.

Description: Male.

Head: Vertical length 2.1 mm. Frons length to breadth 1:1; fuscous with a narrow red-brown area ventrally; orbital setae small and dark: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face dark red-brown with a pair of large subquadrate black spots; length 0.64 mm. Occiput fuscous,

narrow fulvous along eye margins. Antennae with segments 1 and 2 fuscous, segment 3 red-brown; length of segments: 0.49 mm; 0.54 mm; 1.76 mm.
Thorax: Scutum black with a central fuscous area that is broad posteriorly and bifurcates as it approaches the anterior margin. Pleural areas dark fuscous to black, dark red-brown below postpronotal lobe. Yellow markings as follows: postpronotal lobe centrally with fuscous around lateral anterior margins; mesopleural stripe slightly wider than notopleuron dorsally, narrowing ventrally but not reaching katepisternum, anterior margin straight; a distinct large yellow marking along anterior margin of mesonotal suture; anatergite except with ventral and posterior margins black. Notopleuron dark fuscous. Anatergite black. Postnotum black. Scutellum yellow except for a broad black basal band. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2.
Legs: All leg segments entirely fuscous.
Wings: Length 8.4 mm; cells bc and c dark fuscous and covered with dense microtrichia; wings almost entirely dark fuscous to fuscous as follows: a broad dark fuscous costal band confluent with vein M and extending along dm-cu crossvein, a pale tint across rest of membrane, anal streak fuscous; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe extremely weak.
Abdomen: Elongate, clavate and petiolate; terga fused; pecten present on tergum III. Tergum I and sterna I and II longer than wide. Tergum I black with red-brown along posterior margin; tergum II dark fuscous to black with red-brown across posterior margin; tergum III with a large concave shaped posterior margin, red-brown with a large dark fuscous spot anterocentrally; tergum IV dark fuscous with red-brown along posterior margin; tergum V dark fuscous with red-brown medially and across posterior margin. A pair of black shining spots on tergum V. Posterior margin of surstylus short, sternum V with a slight concavity on posterior margin. Abdominal sternites dark fuscous.
Attractant: Cue lure.
Female: No known record.
Distribution: East New Britain Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *alatifuscatus* refers to the wing coloration, which is almost entirely fuscous.
Comments: *D. alatifuscatus* new species is similar to *D. axanus* (Drew, 1989: Fig. 405) and *Dacus (Mellesis) petioliforma* (May) (Drew, 1989: Fig. 415) in possessing similar colour patterns on the scutum and abdomen. It differs from these species in having the postpronotal lobe part fuscous and part yellow, the notopleuron dark fuscous and dark fuscous coloration over most of the wing membrane.

Dacus (Neodacus) asteriscus, new species
(Fig. 60)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, L.A.E.S., Cue 1, 21–28.iv.98, A. Mararuai, S. Balagawi, L. Leblanc. **Paratypes:** PAPUA NEW GUINEA: 1♂, East New Britain Province, Kerevat, CIS prison, Cue No 13, 29.v–12.vi.1998, L. Leblanc, S. Balagawi, A. Mararuai; 1♂, East New Britain Province, Bainings Mts Base Camp, DPI Stn, near Raunsepna, 2.iii.2000, A. Mararuai, attracted to cue lure; 2♂, East New Britain Province, Bainings Mts Base Camp, DPI Stn, near Raunsepna, 1.iv.1999, L. Leblanc, A. Mararuai; 1♂, PNG, East New Britain Province, Bainings Mts, DPI Station, 840 m, 25.viii–14.ix.1998, Cue No. P-205, L. Leblanc, A. Mararuai; 1♂, PNG, East New Britain, Bainings Mts, Raunsepna, 1160 m, 6–23.ii.1998, cue lure trap No. 8, L. Leblanc J. Bokosou; 1♂, PNG, East New Britain, Bainings Mts, Raunsepna (forest), 23.ii–13.iii.98, Cue trap No. 7, L. Leblanc, J. Bokosou; 1♂, PNG, East New Britain, Jacquinot Bay Airstrip, 17–28.viii.98, Cue lure, L. Leblanc, S. Balagawi, A. Mararuai; 1♂, West New Britain, Kandrian Airstrip, 18–29.viii.98, Cue lure, L. Leblanc, S. Balagawi, A. Mararuai.
Location of types: Holotype (T245818) in QMIC; 2 paratypes in ANIC; 5 paratypes in QDPC; 2 paratypes (T245819 and T245820) in QMIC.
Diagnosis: A small species; face dark red-brown with a pair of large circular black spots; postpronotal lobe with posterior half yellow and anterior half fuscous; notopleuron yellow; lateral and medial postsutural yellow vittae absent; a yellow band along anterior margin of mesonotal suture; scutum entirely black; mesopleural stripe reaching postpronotal lobe dorsally, extending to katepisternum as a small spot, anterior margin concave; scutellum yellow with a distinct triangular black pattern on dorsal surface; wings with a broad dark fuscous costal band confluent with R_{4+5}, a distinct dark fuscous star-shaped pattern across wing membrane, anal streak absent, cells bc and c dark fuscous and covered with dense microtrichia, r-m crossvein strongly oblique; abdominal terga almost entirely black.
Description: Male.
Head: Vertical length 1.2 mm. Frons length 1.3 times breadth; fuscous centrally, fulvous along lateral margins and dark fuscous around bases of orbital setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face dark red-brown with a pair of large circular black spots; length 0.34 mm. Occiput dark fuscous to black, fulvous along eye margins. Antennae with all segments dark fuscous; length of segments: 0.39 mm; 0.33 mm; 0.75 mm.
Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: posterior half postpronotal lobe (anterior half fuscous); notopleuron; mesopleural stripe extending to postpronotal lobe dorsally, continuing to katepisternum as a transverse spot, anterior margin concave; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); a transverse band along anterior margin of mesonotal suture. Lateral and medial postsutural yellow vittae absent. Postnotum black. Scutellum yellow with a distinct triangular black marking across dorsal surface. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2.
Legs: Fore femora fulvous with apical half black, mid femora entirely black, hind femora fulvous with apical one-quarter black; all tibiae entirely dark fuscous; fore tarsi with basal segment fulvous and apical four segments dark fuscous, mid and hind tarsi with all segments entirely fulvous.
Wings: Length 4.5 mm; cells bc and c dark fuscous and covered with dense microtrichia; remainder of wings colourless

with a broad dark fuscous costal band confluent with R_{4+5}, a dark fuscous star-shaped pattern across the wing membrane, anal streak absent, r-m crossvein strongly oblique; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak.
Abdomen: Elongate oval; terga fused; pecten present on tergum III. Tergum I and sterna I and II length equal to width. All terga entirely black except for a narrow fulvous transverse band across posterior margin of tergum I and red-brown posterolaterally on tergum II. Posterior lobe of surstylus elongate, sternum V with posterior margin straight. A pair of small black shining spots on tergum V. Abdominal sternites dark coloured.
Attractant: Cue lure.
Female: No known record.
Distribution: East New Britain and West New Britain Provinces, Papua New Guinea.
Hosts: No known record.
Etymology: The name *asteriscus* refers to the star-shaped fuscous pattern across the wing membrane.
Comments: *D. asteriscus* new species is a unique species with no close morphological relationships to other species in this subgenus *Neodacus*. It is demarcated by possessing a black scutum, fuscous over anterior portion of the postpronotal lobe, a triangular black marking over the dorsal surface of the scutellum, the abdominal terga mostly black, the wing with cells bc and c dark fuscous and covered with dense microtrichia, the costal band confluent with R_{4+5} and a dark fuscous star-shaped pattern across the membrane.

Dacus (Neodacus) bimaculosus, new species
(Fig. 61)

Type data: Holotype ♂, PAPUA NEW GUINEA: Madang Province, Mt Wilhelm (1200 m), Oct–Nov 2012, V. Novotny, attracted to vanillylacetone.
Location of type: Holotype (T245821) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of broad and elongate facial spots filling antennal furrows; postpronotal lobe and notopleuron yellow; a presutural triangular yellow marking; scutum entirely black; lateral postsutural yellow vittae absent; a short and narrow medial longitudinal postsutural yellow vitta present; mesopleural stripe reaching postpronotal lobe dorsally; scutellum entirely dark fuscous except for two anterolateral yellow spots; wings with a broad dark fuscous costal band confluent with R_{4+5} and expanding into a large spot across apex of wing, a narrow dark fuscous transverse band across wing, a narrow dark fuscous anal streak, cells bc and c with a pale tint and microtrichia in outer corner of cell c only; abdomen elongate oval and slightly petiolate, terga II–V red-brown with a narrow medial longitudinal pale fuscous band over terga II–IV and a large black spot across tergum V.
Description: Male.
Head: Vertical length 1.3 mm. Frons length 1.3 times breadth; fuscous with dark fuscous around bases of orbital setae and red-brown centrally; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of broad and elongate black spots filling the entire antennal furrows; length 0.39 mm. Occiput dark fuscous to black, fulvous along eye margins. Antennae with segments 1 and 2 fuscous, segment 3 absent; length of segments: 0.22 mm; 0.31 mm.
Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching postpronotal lobe dorsally, continuing to katepisternum as a small dull spot, anterior margin slightly concave; a triangular marking along anterior margin of mesonotal suture; anterior half anatergite (posterior half black); anterior two-thirds katatergite (remainder black); a short narrow medial longitudinal postsutural vitta. Lateral postsutural yellow vittae absent. Postnotum black. Scutellum almost entirely dark fuscous with anterolateral yellow spots. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2.
Legs: All femora dark fuscous; fore and hind tibiae fuscous, mid tibia fuscous basally to fulvous apically; fore tarsi with basal segment fulvous and apical four segments fuscous, mid and hind tarsi with all segments entirely fulvous.
Wings: Length 5.1 mm; cells bc and c with a pale tint, microtrichia in outer corner of cell c only; remainder of wings with a broad dark fuscous costal band confluent with R_{4+5} and expanding to a large spot across apex of wing, a narrow transverse dark fuscous band across wing from costal band to hind margin; a narrow dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak.
Abdomen: Elongate oval and slightly petiolate; terga fused; pecten present on tergum III. Tergum I and sterna I and II with length equal to width. Tergum I entirely fuscous; terga II–V red-brown with a medial longitudinal pale fuscous band over terga II–IV and a large black spot over tergum V. A pair of oval black shining spots on tergum V. Posterior lobe of surstylus elongate, sternum V with posterior margin straight. Abdominal sternites red-brown.
Attractant: Vanillylacetone.
Female: No known record.
Distribution: Madang Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *bimaculosus* refers to the two lateral yellow spots on the scutellum.
Comments: *D. bimaculosus* new species is similar to *D. alulapictus* (Drew, 1989: Fig. 425) in possessing large oval facial spots and distinct fuscous patterns across the wing. It differs from this species in having a black scutum, black postnotum, the anatergite 50% black, the scutellum dark fuscous with two lateral yellow spots, all femora entirely dark fuscous and wing with the anal streak present.

Dacus (Neodacus) curvabilis, new species
(Fig. 62)

Type data: Holotype ♂, PAPUA NEW GUINEA: East New Britain Province, Bainings Mts Base Camp, DPI Station, near Raunsepna, 2.iii.2000, A. Mararuai, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1♂ (13.x.1999), 1♂ (11.xi.1999), East New Britain Province, Raunsepna, C. Mitparingi, attracted to cue lure.

Location of types: Holotype (T245822) in QMIC; 2 paratypes in QDPC.
Diagnosis: A large species; face dark red-brown with a pair of large oval black spots; postpronotal lobe dark fuscous with yellow posterocentrally; notopleuron black; scutum entirely black; lateral postsutural yellow vittae absent; a long narrow medial postsutural yellow vitta present; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; a yellow triangle along anterior margin of mesonotal suture; scutellum yellow with a narrow black basal band; wings with a broad dark fuscous costal band expanding over apical half of wing and recurving back along vein CuA_1, a broad dark fuscous anal streak, cells bc and c dark fuscous and covered with dense microtrichia; abdomen extremely elongate and oval, terga III–V red-brown with a broad medial and two broad lateral longitudinal black bands joined over tergum III and extending to posterior area of tergum V, dark fuscous to black across posterior margin of tergum V.
Description: Male.
Head: Vertical length 1.96 mm. Frons length 1.2 times breadth; entirely red-brown; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Vertex dark fuscous with an extension down to *s.or.* setae. Face dark red-brown with a pair of large oval black spots; length 0.64 mm. Occiput dark fuscous with black dorsocentrally and fulvous along eye margins. Antennae with segments 1 and 2 dark fuscous, segment 3 absent; length of segments: 0.44 mm; 0.54 mm.
Thorax: Scutum entirely black. Pleural areas entirely black. Yellow markings as follows: postpronotal lobe posterocentrally (remainder dark fuscous); mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); a triangular marking along anterior margin of mesonotal suture; a long narrow medial longitudinal postsutural yellow vitta. Lateral postsutural yellow vittae absent. Postnotum black. Scutellum yellow except for a narrow black basal band. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. absent; *mpl*. 1; *npl*. 2.
Legs: All femora dark fuscous to black with a narrow fulvous basal margin; fore and hind tibiae dark fuscous, mid tibiae fuscous; all tarsi with basal segment fulvous and apical four segments dark fuscous.
Wings: Length 7.8 mm; cells bc and c dark fuscous and covered with dense microtrichia; remainder of wings with a broad dark fuscous costal band expanding over apical half of wing and recurving back along vein CuA_1; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak.
Abdomen: Extremely elongate and oval; terga fused; pecten present on tergum III. Tergum I and sterna I and II wider than long. Terga I and II black with small red-brown posterocentral spots on tergum II; terga III–V red-brown with a broad medial and broad lateral longitudinal black bands extending over all three terga and joined over anterior three-quarters of tergum III, dark fuscous to black across posterior margin of tergum V. A pair of dark fuscous to black shining spots on tergum V. Posterior lobe of surstylus short, sternum V with posterior margin straight. Abdominal sternites black.
Attractant: Cue lure.
Female: No known record.
Distribution: East New Britain Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *curvabilis* refers to the bent or recurved fuscous pattern over the wing.
Comments: *D. curvabilis* new species is a unique species with no similar morphological relationships to other *Dacus* species. It is recognized by possessing a black scutum, a postpronotal lobe with the anterior half dark fuscous and the posterior half yellow, a black notopleuron, a yellow triangular presutural marking, a medial longitudinal postsutural yellow vitta, an elongate-shaped abdomen and the wing with a large dark fuscous apical spot with a recurved band along vein CuA_1.

Dacus (Neodacus) kreeriae, new species
(Fig. 63)

Type data: Holotype ♂, PAPUA NEW GUINEA: East Sepik Province, Wewak town, Kreer Heights, NAQIA staff residence, 7.v.1999, NAQIA, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1♂, same data as holotype; 2♂ (30.iii.1999), 1♂ (14.iv.1999), 1♂ (20.iv.1999), 5♂ (28.x.1999), East Sepik Province, Angorom District, Saramandi Ag Res Stn, Gavien, attracted to cue lure; 1♂ (22.iii.1999), 1♂ (29.iii.1999), 2♂ (4.iv.1999), 1♂ (12.iv.1999), 3♂ (19.iv.1999), 2 ♂ (26.iv.1999), 1♂ (3.v.1999), 2♂ (10.v.1999), East Sepik Province, Hawain CCRI Station, near Boiken Village, attracted to cue lure; 1♂ (22.vi.2000), 3♂ (8.vii.2000), 1♂ (9.ix.2000), 1♂ (9.xi.2000), Madang Province, Ohu Conservation Area, M. Damag & C. Pato, attracted to cue lure; 1♂ (9.i.1999), 1♂ (19.ii.1999), Madang Province, Murunas (CCRI Station), attracted to cue lure; 1♂ (1.iv.1999), 1♂ (19.xi.1999), 1♂ (2.ii.2000), 1♂(28.iv.2000), Madang Province, Bogia Station, attracted to cue lure; 1♂ (16.iv.1999), 2♂ (23.iv.1999), 1♂ (30.iv.1999), 1♂ (7.v.1999), 2♂ (11.ii.2000), West Sepik Province, Yako Village, attracted to cue lure; 1♂ (9.iv.1999), 3♂ (30.iv.1999), West Sepik Province, Wutung Govt Station (PNG Irian Jaya border), NAQIA, attracted to cue lure; 1♂, West Sepik Province, Pasi DPI Station, between Krissa and Osima, 4.ii.2000, DPI, attracted to cue lure.
Location of types: Holotype (T245823) in QMIC; 10 paratypes in ANIC; 27 paratypes in QDPC; 10 paratypes (T245824–T245833) in QMIC.
Diagnosis: A medium-sized species; face fulvous with a pair of small oval black spots; postpronotal lobe and notopleuron yellow; scutum entirely red-brown; a triangular yellow marking along anterior margin of mesonotal suture; lateral postsutural yellow vittae absent; a medial postsutural yellow vitta present as a large triangular marking; mesopleural stripe reaching anterior *npl*. seta dorsally; scutellum yellow; wings with a broad dark fuscous costal band confluent with R_{4+5} and overlapping this vein at the apex where it

fades to fuscous and pale fuscous, a broad fuscous anal streak present, cells bc and c dark fuscous and covered with dense microtrichia; abdomen elongate and oval, terga almost entirely red-brown with fulvous posterolaterally on tergum II and a narrow medial longitudinal dull fuscous to black band over terga III–V.

Description: Male.

Head: Vertical length 2.0 mm. Frons length 1.1 times breadth; entirely red-brown; orbital setae small and pale: 1 *s.or*.; 2 *i.or*.; lunule red-brown. Ocellar triangle black. Face fulvous with a pair of small oval black spots; length 0.59 mm. Occiput red-brown, fulvous along eye margins. Antennae with segments 1 and 2 red-brown, segment 3 red-brown with fuscous on apex and outer surface; length of segments: 0.29 mm; 0.44 mm; 1.13 mm.

Thorax: Scutum entirely red-brown. Pleural areas entirely red-brown. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching anterior *npl*. seta dorsally, continuing to katepisternum as a small transverse spot, anterior margin straight; a triangular marking along anterior margin of mesonotal suture; anatergite entirely yellow; anterior three-quarters katatergite (remainder red-brown); a large triangular medial longitudinal postsutural vitta. Lateral postsutural yellow vittae absent. Postnotum red-brown. Scutellum yellow with a narrow red-brown basal band. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. absent; *mpl*. 1; *npl*. 2.

Legs: All segments entirely fulvous.

Wings: Length 6.5 mm; cells bc and c dark fuscous and covered with dense microtrichia; remainder of wings colourless except broad dark fuscous costal band confluent with R_{4+5} but extending from fuscous to a pale fuscous tint across apex of wing to vein M; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak.

Abdomen: Extremely elongate and oval; terga fused; pecten present on tergum III. Tergum I and sterna I and II with length equal to width. All terga entirely red-brown except fulvous markings posterolaterally on tergum II and a narrow medial longitudinal band which is dull fuscous on terga III and IV and black on tergum V. A pair of red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with posterior margin straight. Abdominal sternites red-brown.

Attractant: Cue lure.

Female: No known record.

Distribution: East Sepik, West Sepik and Madang Provinces, Papua New Guinea.

Hosts: No known record.

Etymology: The name *kreeriae* refers to the type locality, Kreer Heights in Wewak.

Comments: *D. kreeriae* new species is similar to *D. dissimilis* (Drew, 1989: Fig. 437) in possessing a red-brown scutum with a triangular-shaped medial longitudinal postsutural yellow vitta, leg segments mostly fulvous and abdomen elongate oval and costal band confluent with R_{4+5}. It differs from this species in having the abdominal terga entirely red-brown, infuscation extending across the apex of the wing and the mesopleural stripe reaching the anterior *npl*. seta dorsally.

Dacus (Neodacus) lalokiae, new species

(Fig. 64)

Type data: Holotype ♂, PAPUA NEW GUINEA: Central Province, Laloki, 10 March 1996, D.B. Tenakanai, hand picked off *Aristolochia tagela* leaves.

Location of type: Holotype (T245834) in QMIC.

Diagnosis: A large species; face red-brown with a pair of medium-sized pear-shaped black spots; postpronotal lobe with posterior half yellow and anterior half dark fuscous; notopleuron yellow; scutum entirely black; a yellow triangular marking along anterior margin of mesonotal suture; a medial postsutural yellow vitta present; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; lateral postsutural yellow vittae absent; scutellum yellow; wings with a broad dark fuscous costal band confluent with M, a broad dark fuscous anal streak, a pale fuscous tint across remainder of wing membrane, cells bc and c dark fuscous and covered with dense microtrichia; abdomen elongate oval and slightly petiolate, pecten absent on tergum III, terga II–V with basic red-brown coloration, black across anterior and lateral margins of tergum II, a broad medial longitudinal black band over all four terga, broad lateral longitudinal black bands tending to dark fuscous towards the mid-line and extending over terga III–V.

Description: Male.

Head: Vertical length 2.3 mm. Frons length 1.2 times breadth; fuscous with dark fuscous around bases of orbital setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of medium-sized pear-shaped black spots; length 0.69 mm. Occiput pale fuscous, fulvous along eye margins. Antennae with segments 1 and 2 dark fuscous, segment 3 absent; length of segments: 0.34 mm; 0.44 mm.

Thorax: Scutum entirely black. Pleural areas entirely dark fuscous to black. Yellow markings as follows: posterior half postpronotal lobe (anterior half dark fuscous); notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin straight; a triangular marking along anterior margin of mesonotal suture; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); a short narrow medial postsutural longitudinal vitta. Lateral postsutural yellow vittae absent. Postnotum black. Scutellum yellow except for narrow black basal band. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. absent; *mpl*. 1; *npl*. 2.

Legs: Fore and mid femora entirely dark fuscous, hind femora dark fuscous with fulvous on basal one-third; fore and mid tibiae fuscous, hind tibiae dark fuscous; all tarsal segments fulvous.

Wings: Length 8.2 mm; cells bc and c dark fuscous and covered with dense microtrichia; remainder of wings with a broad dark fuscous costal band confluent with vein M; a broad dark fuscous anal streak; a pale fuscous tint across remainder of membrane; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak.

Abdomen: Elongate oval and slightly petiolate; terga fused; pecten absent on tergum III. Tergum I and sterna I and II

slightly longer than wide. Tergum I entirely black; tergum II black with large dark red-brown areas posterolaterally; terga III–V with broad lateral longitudinal black bands over all three terga, a broad medial longitudinal black band from the middle of tergum II to the posterior margin of tergum V, dark fuscous between the broad black bands on terga III and IV and the medial longitudinal black band, small areas of red-brown posterocentrally on tergum IV and red-brown either side of the medial longitudinal black band on tergum V. A pair of oval fuscous shining spots on tergum V. Posterior lobe of surstylus short, sternum V with posterior margin straight. Abdominal sternites black.
Attractant: No known record.
Female: No known record.
Distribution: Central Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *lalokiae* refers to the type locality.
Comments: *D. lalokiae* new species is similar to *D. dissimilis* (Drew, 1989: Fig. 437) in lacking *prsc*. and *a.sa*. setae and in possessing a medial longitudinal dark band over abdominal terga II–V and broad lateral longitudinal dark bands over terga III–V. It differs from this species in having a black scutum, a short and narrow medial longitudinal postsutural yellow vitta, the anterior half of postpronotal lobe dark fuscous, leg segments mostly fuscous to dark fuscous and wings with costal band confluent with M and a pale tint extending across remainder of membrane.

Dacus (Neodacus) neosignatifrons, new species
(Fig. 65)

Type data: Holotype ♂, PAPUA NEW GUINEA: Morobe Province, Bulolo Forestry Uni, 24.ix.1998, S. Sar, S. Balagawi, attracted to cue lure. **Paratypes**: PAPUA NEW GUINEA: 1♂ (20.viii.1998), 1♂ (10.ix.1998), 3♂ (1.xii.1998), same data as holotype.
Location of types: Holotype (T245835) in QMIC; 1 paratype in ANIC; 3 paratypes in QDPC; 1 paratype (T245836) in QMIC.
Diagnosis: A small species; face fulvous with a pair of narrow elongate black spots; postpronotal lobe and notopleuron yellow; scutum entirely red-brown; a large triangular marking along anterior margin of mesonotal suture; lateral and medial postsutural yellow vittae absent; mesopleural stripe reaching anterior *npl*. seta dorsally; scutellum yellow; wings with a narrow dark fuscous costal band and anal streak, cells bc and c dark fuscous and covered with dense microtrichia; abdomen elongate oval, terga II–V red-brown with a medial longitudinal fuscous band over terga II–IV and moderately broad lateral longitudinal pale fuscous bands over terga II–V.
Description: Male.
Head: Vertical length 1.3 mm. Frons length 1.1 times breadth; fuscous with red-brown ventrally; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Face fulvous with a pair of narrow elongate black spots; length 0.49 mm. Occiput fuscous, fulvous along eye margins. Antennae with segments 1 and 2 fuscous, segment 3 red-brown with fuscous on apex and outer surface; length of segments: 0.15 mm; 0.29 mm; 0.69 mm.
Thorax: Scutum entirely red-brown. Pleural areas entirely red-brown. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching anterior *npl*. seta dorsally, continuing to katepisternum as a small transverse spot, anterior margin slightly convex; a broad yellow triangular marking along anterior margin of mesonotal suture; anatergite (posterior apex red-brown); anterior half katatergite (remainder red-brown). Lateral and medial postsutural yellow vittae absent. Postnotum red-brown. Scutellum yellow except for a narrow red-brown basal band. Setae: *sc*. 2; *prsc*. absent; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2.
Legs: All femora entirely fulvous; fore and hind tibiae fuscous, mid tibiae fulvous; all tarsi with basal segment fulvous and apical four segments fuscous.
Wings: Length 4.5 mm; cells bc and c dark fuscous and covered with dense microtrichia; remainder of wings colourless except for a narrow dark fuscous costal band slightly overlapping R_{2+3} where it becomes paler; a broad dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; supernumerary lobe weak.
Abdomen: Elongate oval; terga fused; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely fuscous; terga II–V red-brown with a medial longitudinal fuscous band over terga II–IV and moderately broad lateral longitudinal pale fuscous bands over terga II–V. Posterior lobe of surstylus short, sternum V with a shallow concavity on posterior margin. Abdominal sternites dark red-brown to fuscous.
Attractant: Cue lure.
Female: No known record.
Distribution: Morobe Province, Papua New Guinea.
Hosts: No known record.
Etymology: The name *neosignatifrons* refers to the close morphological similarity to *Dacus signatifrons* (May).
Comments: *D. neosignatifrons* new species is similar to *Dacus (Neodacus) signatifrons* (May) (Drew, 1989: Fig. 433), which is restricted geographically to South East Queensland, in possessing narrow elongate facial spots, a red-brown scutum with a large triangular presutural yellow mark, legs mostly fulvous, cells bc and c dark fuscous and covered with dense microtrichia and wing with a narrow costal band just overlapping R_{2+3}. It differs from this species in having the costal band narrower apically and extending just beyond the apex of R_{4+5}, the abdominal tergum I fuscous, and terga II–V red-brown with medial and lateral longitudinal dark bands joined across the anterior margin of tergum II.

New Information on Known Species

Bactrocera (Bactrocera) daruensis Drew
(Fig. 66)

Bactrocera (Bactrocera) daruensis Drew, 1989: 129–130; – Norrbom *et al.*, 1989: 89.

Material studied: PAPUA NEW GUINEA: 1♀, Morobe Province, Mt Susu logging area (LA), Bulolo, 17.v.1988, H. Roberts, in fly trap, Klinkii & mixed hardwood forest. Specimen in QDPC.

Description of female: As for male described by Drew (1989; Fig. 221), except no dense aggregation of microtrichia around A_1+CuA_2, supernumerary lobe weak, costal band slightly overlapping R_{2+3}, more extensive red-brown coloration over dorsal surface of scutellum, the medial longitudinal black band extending over abdominal terga III–V, basal segment of ovipositor red-brown, ratio of length of oviscape to length of tergum V, 0.73:1.

Comments: This is the first record of a female of this species, having previously only been known from hand-collected males from Daru Island and Murray Island. This specimen provides a new geographic record, being the first collected on mainland Papua New Guinea.

Bactrocera (Bactrocera) denigrata (Drew), stat. rev
(Fig. 67)

Dacus (Strumeta) denigratus Drew, 1971: 61–63; – Hardy, 1976: 245–249 as synonym of *Bactrocera longicornis* Macquart; Drew, 1989: 142; Norrbom *et al.*, 1998: 92, as synonym of *Bactrocera (Bactrocera) longicornis* Macquart.

Material studied: PAPUA NEW GUINEA: Holotype ♂, New Ireland, Namatanai, April 1970, D.F. O'Sullivan, ex lure trap baited with 1-(p-acetoxyphenyl)-butan-3-one, Reg. No. T. 6946 in QMIC. Holotype and 27 specimens of *B. longicornis* listed under the description of that species.

Diagnosis: A medium-sized species; face fulvous with a pair of large oval black spots; postpronotal lobe and notopleuron yellow; scutum entirely dull black; two narrow lateral postsutural yellow vittae narrowing posteriorly to end just before *ia.* seta; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl.* seta dorsally; scutellum yellow with a narrow medial longitudinal black band ending before apex of scutellum; wings with a dark fulvous stigma, fuscous costal band confluent with R_{4+5} except distal to r-m crossvein, a moderately broad transverse fuscous band across wing enclosing both crossveins and recurving back along posterior margin of vein CuA_1, a narrow transverse fuscous band across apex of wing, a broad fuscous anal streak, cells bc and c colourless, microtrichia in outer corner of cell c only; apices of all femora fuscous; abdominal terga mostly dull black; posterior lobe of surstylus short, sternum V with a deep concavity on posterior margin. Head measurements of holotype: vertical length 1.6 mm; length of face 0.45 mm; length of antennal segments: 0.24 mm; 0.27 mm; 0.93 mm.

Attractant: Cue lure

Female: No known record.

Distribution: New Ireland (type locality), Lihir Island, Bougainville Island, all Papua New Guinea territory.

Hosts: No known record.

Comments: *B. denigrata* was described from a male holotype and two male paratypes (Drew, 1971: Fig. 16) collected in New Ireland, Lihir Island and Bougainville. *Bactrocera (Bactrocera) longicornis* Macquart was described from the male holotype (Hardy, 1976) collected at Fort Praslin, Gagi Island, Solomon Islands, and the only specimen known until our recent collection of 27 specimens from the Bainings Mountains, East New Britain. These new specimens are conspecific with the holotype of *B. longicornis* and have enabled us to undertake a detailed description of this species and a comparison with *B. denigrata*. We have examined the clear photographs of the *B. longicornis* holotype sent from MNHN (received March 2020) and the holotype of *B. denigrata* on loan from the QMIC. Hardy (1976) synonymized *B. denigrata* with *B. longicornis* by comparing the published description of *B. denigrata* by Drew (1971) with early notes and photographs of the *B. longicornis* holotype taken at MNHN on a personal visit, without

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examining the specimens of *B. denigrata.* Our study has concluded that *B. denigrata* differs from *B. longicornis* in possessing shorter antennal segments (combined lengths of all three segments less than vertical length of head); lateral postsutural yellow vittae longer and narrower and ending just before the *ia.* seta; the medial longitudinal black band on the scutellum narrower and in the wing patterns as follows: cell *sc.* paler (fulvous) in colour, the transverse band across the centre of the wing narrower and the costal band not confluent with R_{4+5} distal to r-m crossvein, a broad anal streak; posterior margin of abdominal sternum V with a deep concavity. On the basis of these specific differences, we herein formally withdraw *B. denigrata* from synonymy with *B. longicornis*.

Bactrocera (Bactrocera) longicornis Macquart
(Fig. 68)

Bactrocera longicornis Macquart, 1835: 452.
Dacus (Bactrocera) longicornis – Hardy, 1976: 245–249.
Bactrocera (Bactrocera) longicornis – Drew, 1989: 142; Norrbom *et al*., 1998: 92; Drew and Romig, 2013: 12.
Dacus (Strumeta) denigratus Drew, 1971: 61–63; – Hardy, 1976: 245–249; Norrbom *et al*., 1998: 92; as synonym of *B. longicornis* Macquart.

Material studied: SOLOMON ISLANDS: Holotype ♂, Fort Praslin, Gagi Island, No. ED9860, MNHN, Paris. PAPUA NEW GUINEA: 2♂, East New Britain Province, Bainings Mts, Raunsepna (village), 11.xii.1998, L. Leblanc *et al*., attracted to cue lure; 1♂ (5.v.1999), 1♂ (12.v.1999), 1♂ (19.v.1999), 2♂ (26.v.1999), 1♂ (2.vi.1999), 1♂ (7.vi.1999), 1♂ (9.vi.1999), 1♂ (16.vi.1999), 4♂ (16.vi.1999), 2♂ (7.vii.1999), 1♂ (21.vii.1999), 1♂ (11.viii.1999), 1♂ (24.xi.1999), 2♂ (1.xii.1999), East New Britain Province, Raunsepna, C. Mitparingi, attracted to cue lure; 1♂, East New Britain Province, Bainings Mts, Raunsepna (forest), 13.v.1999, A. Mararuai *et al*., attracted to cue lure; 2♂ (18.ii.1999), 1♂ (9.xi.1998), East New Britain Province, Bainings Mts, Raunsepna (forest), L. Leblanc *et al*., attracted to cue lure; 1♂, East New Britain Province, Bainings Mts, Raunsepna School, 18.ii.1999, L. Leblanc *et al*., attracted to cue lure. Specimens in QDPC, QMIC and MNHN.

Diagnosis: A medium-sized species; face fulvous with a pair of very large oval black spots; postpronotal lobe yellow (anteromedial corners black); notopleuron yellow; scutum entirely black; two short lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching postpronotal lobe dorsally; scutellum yellow with a broad triangular black marking on dorsal surface; wings with a broad dark fuscous costal band confluent with R_{4+5}, a broad dark fuscous anal streak, a large dark fuscous rounded pattern across centre of wing, a narrow dark fuscous transverse band across apex of wing from R_{4+5} to hind margin, cells bc and c colourless, microtrichia in outer corner of cell c only; abdominal tergum III black, terga IV and V dark red-brown centrally with broad dark fuscous to black lateral margins.

Description: Male.

Head: Vertical length 1.5 mm. Frons length 1.5 times breadth; fuscous with narrow fulvous lateral margins and dark fuscous around bases of orbital setae; orbital setae black: 1 *s.or*.; 2 *i.or*.; lunule dark fuscous. Ocellar triangle black. Vertex black with patterning extending forward on to the frons. Face fulvous with a pair of very large oval black spots; length 0.45 mm. Occiput black, fulvous along eye margins; antennae with segments 1 and 2 fuscous, segment 3 red-brown with fuscous on apex and outer surface; extremely elongate, length of segments: 0.36 mm; 0.36 mm; 1.02 mm.

Thorax: Scutum entirely black. Pleural areas entirely black except dark fuscous below postpronotal lobes. Yellow markings as follows: postpronotal lobe (anteromedial corners black); notopleuron; mesopleural stripe reaching to or almost to postpronotal lobe dorsally, continuing to katepisternum as a small spot, anterior margin slightly concave; anatergite (posterior apex black); anterior two-thirds katatergite (remainder black); two lateral postsutural vittae narrowing anteriorly and posteriorly and ending before level of *a.sa*. seta. Postnotum black. Scutellum yellow with a large triangular black marking over dorsal surface. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. 1; *mpl*. 1; *npl*. 2; *scp*. 4.

Legs: All femora fulvous with apical one-third to one-quarter fuscous to dark fuscous; fore and mid tibiae fuscous basally to fulvous apically, hind tibiae fuscous to dark fuscous; fore tarsi with basal segment fulvous and apical four segments fuscous, mid and hind tarsi with all segments entirely fulvous.

Wings: Length 6.0 mm; cells bc and c colourless; microtrichia in outer corner of cell c only; remainder of wings with dark fuscous cell sc, a broad dark fuscous costal band confluent with R_{4+5} and narrowing towards apex of wing, a large dark fuscous pattern across centre of wing enclosing r-m and dm-cu crossveins and recurving along vein CuA_1 (this pattern is broadly rounded and may be confluent with R_{4+5}), a narrow transverse dark fuscous band across apex of wing from R_{4+5} to hind margin; a narrow dark fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.

Abdomen: Elongate oval; terga free; pecten present on tergum III. Tergum I and sterna I and II slightly wider than long. Tergum I entirely black; tergum II black with fulvous areas posterolaterally; tergum III black; terga IV and V dark red-brown centrally with broad dark fuscous to black lateral margins and a medial longitudinal pale fuscous line beginning on posterior area of tergum III and ending on centre of tergum V. A pair of oval fuscous shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a moderate concavity on posterior margin. Abdominal sternites dark fuscous to black.

Attractant: Cue lure.

Female: No known record.

Distribution: Fort Praslin, Gagi Island, Solomon Islands (type locality); Bainings Mountains, East New Britain Province, Papua New Guinea.

Hosts: No known record.

Etymology: The species name *longicornis* probably was given originally because of the elongate antennae.

Comments: *B. longicornis* is similar to *B. denigrata* in the general colour patterns of the thorax, legs, wings and abdomen. It differs from this species in having elongate antennal segments (combined lengths of segments I and II considerably longer than the face, and segments I, II and III combined longer than the vertical length of head), a broad mesopleural stripe reaching or almost reaching the postpronotal lobe dorsally, short and broad lateral postsutural yellow vittae ending well before the *ia*. seta (usually at level of *a.sa*. seta), the medial longitudinal black band on the scutellum broad, cell sc dark fuscous (not pale), the anal streak narrow, the fuscous pattern across the centre of the wing narrow at the base of the r-m crossvein and broadening markedly towards the wing apex and the posterior margin of abdominal sternum V with a moderate concavity. A handwritten note on the holotype in the MNHN is worth noting: 'Similar to *Dacus denigratus* Drew but larger, det. I.M. White, 1986'.
B. longicornis possesses most of the characters of subgenus *Semicallantra* Drew as defined by Hancock and Drew (2018a) and differs only in possessing *a.sa*. seta. The elongate antennae and elongate-oval abdomen shape are significant characters that also relate to the genus *Dacus* Fabricius. A revised definition of the genus *Bactrocera*, its status and that of some subgenera will be reviewed in a future study.

Bactrocera (Bactrocera) nigella (Drew)
(Fig. 69)

Strumeta nigella Drew, 1968: 78–79.
Dacus (Strumeta) nigellus – Drew, 1972: 21.
Bactrocera (Bactrocera) nigella – Drew, 1989: 96; Norrbom *et al*., 1998: 93.
Material studied: PAPUA NEW GUINEA: 2♀ and 4♂, Madang Province, Baitabag, 1.xi.2000, bred from *Timonius timon* (Spreng) Merr. (Family Rubiaceae). Specimens in QDPC.
Description of female: As for male described by Drew (1968, 1989: Fig. 156) except no dense aggregation of microtrichia around A_1+CuA_2, supernumerary lobe weak, basal segment of ovipositor dark fuscous to black, ratio of length of oviscape to length of tergum V, 1:1; apex of piercer fulvous and needle-shaped.
Comments: This is the first record of a female of this species; large numbers of males have been collected previously in methyl eugenol traps.

Bactrocera (Bactrocera) thistletoni Drew
(Fig. 70)

Bactrocera (Bactrocera) thistletoni Drew, 1989: 163–165; – Norrbom *et al*., 1989: 95.
Material studied: PAPUA NEW GUINEA: 1 ♀, Central Province, 20 km SE of Port Moresby, 23.xii.1984, J.W. Ismay, hand collected in bushes, Ex Papua New Guinea DPI-CRIC, Konedobu.
Description of female: As for male described by Drew (1989: Fig. 296) except no dense aggregation of microtrichia around A_1+CuA_2, supernumerary lobe weak, costal band distinctly overlapping R_{2+3}, basal segment of ovipositor dark red-brown, ratio of length of oviscape to length of tergum V, 0.65:1.
Comments: This is the first record of a female for this species, having previously been collected in large numbers of males in cue lure traps.

Bactrocera (Bactrocera) torresiae Huxham & Hancock
(Fig. 71)

Bactrocera (Bactrocera) torresiae Huxham & Hancock, in Huxham *et al*., 2006: 35–37.
Material examined: PAPUA NEW GUINEA: Western Province, 1♂ (3.xi.1999), 1♂ (16.xi.1999), 1♂ (22.xi.1999), Daru Island, NAQIA, attracted to cue lure. Specimens in QDPC. Holotype male of *B. torresiae* in QMIC.
Diagnosis: A small species; face fulvous with a pair of small circular black spots; postpronotal lobe and notopleuron yellow; scutum entirely red-brown; two broad lateral postsutural yellow vittae present; medial postsutural yellow vitta absent; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally; scutellum yellow; wings with a broad fuscous costal band confluent with R_{4+5}, a moderately broad transverse fuscous band across wing enclosing both crossveins, a broad fuscous anal streak, cells bc and c fuscous, microtrichia in outer corner of cell c only; abdominal terga III–V entirely red-brown except for a narrow medial longitudinal fuscous line over terga IV and V.
Description: Male.
Head: Vertical length 1.2 mm. Frons length 1.4 times breadth; entirely red-brown; orbital setae red-brown: 1 *s.or*.; 2 *i.or*.; lunule fuscous. Ocellar triangle black. Face fulvous with a pair of small circular black spots; length 0.29 mm. Occiput red-brown, fulvous along eye margins. Antennae short, with all segments entirely red-brown.
Thorax: Scutum entirely red-brown. Pleural areas entirely red-brown. Yellow markings as follows: postpronotal lobe; notopleuron; mesopleural stripe reaching midway between anterior margin of notopleuron and anterior *npl*. seta dorsally, continuing to katepisternum as a transverse spot, anterior margin slightly convex; anatergite (posterior apex red-brown); anterior two-thirds katatergite (remainder red-brown); two broad lateral postsutural vittae ending well before *ia*. seta. Postnotum red-brown. Scutellum yellow with a narrow red-brown basal band. Setae: *sc*. 2; *prsc*. 2; *ia*. 1; *p.sa*. 1; *a.sa*. absent; *mpl*. 1; *npl*. 2; *scp*. 4.
Legs: All segments entirely fulvous.
Wings: Length 3.7 mm; cells bc and c fuscous; microtrichia in outer corner of cell c only; remainder of wings colourless except for a fuscous cell sc, a broad fuscous costal band confluent with R_{4+5}, a moderately broad fuscous transverse band across wing and enclosing r-m and dm-cu crossveins; a broad fuscous anal streak; a dense aggregation of microtrichia around A_1+CuA_2; a supernumerary lobe of medium development.
Abdomen: Oval; terga free; pecten present on tergum III. Tergum I and sterna I and II wider than long. Tergum I entirely red-brown; tergum II fulvous with red-brown across anterior

half; terga III–V entirely red-brown except for a narrow fuscous medial longitudinal line over terga IV and V. A pair of oval dark red-brown shining spots on tergum V. Posterior lobe of surstylus short, sternum V with a moderate concavity on posterior margin. Abdominal sternites pale coloured.
Attractant: Cue lure.
Female: No known record.
Distribution: Papua New Guinea, Western Province, Buzi and Daru Island; Australia, Torres Strait, Boigu Island and Saibai Island.
Hosts: No known record.

Comments: *B. torresiae* is revised herein as the original description and illustration did not define the species adequately. It is similar to *B. ochracea* (Drew, 1989: Fig. 11) and *B. morobiensis* (Drew, 1989: Fig. 84) in possessing a red-brown scutum and predominantly red-brown abdomen. It differs from *B. ochracea* in having a narrow mesopleural stripe, a wing with a broad costal band confluent with R_{4+5} and a fuscous transverse band enclosing both crossveins and from *B. morobiensis* in lacking the *a.sa.* seta and a lateral yellow band connecting the postpronotal lobe and notopleuron.

New Geographical Distribution Records

***Bactrocera (Bactrocera) abscondita* (Drew & Hancock)**
Previously recorded: Queensland – Cape York Peninsula; Torres Strait Islands (Drew, 1989).
New records: Papua New Guinea – Madang Province (Wanang; Mt Wilhelm (200 m)).

***Bactrocera (Bactrocera) aeroginosa* (Drew & Hancock)**
Previously recorded: Queensland – coastal areas from Innisfail north to Cape York; Torres Strait Islands (Drew, 1989).
New record: Papua New Guinea – Madang Province (Wanang).

***Bactrocera (Bactrocera) angustifasciata* Drew**
Previously recorded: Papua New Guinea – New Ireland Province (Lihir Island) (Drew, 1989); New Ireland Province (New Ireland), East New Britain Province, Eastern Highlands Province, Western Highlands Province (Clarke *et al*., 2004).
New record: Papua New Guinea – North Bougainville District (Buka Island).

***Bactrocera (Bactrocera) antigone* (Drew & Hancock)**
Previously recorded: Queensland – Cape York Peninsula (Drew, 1989).
New record: Papua New Guinea – Morobe Province (Markham Farming).

***Bactrocera (Bactrocera) decurtans* (May)**
Previously recorded: Australia – Northern Western Australia; Northern Territory; Melville Island; Queensland – Torres Strait Islands, eastern coastal areas of Cape York Peninsula (Drew, 1989).
New record: Papua New Guinea – Western Province (Daru Island).

***Bactrocera (Bactrocera) dyscrita* (Drew)**
Previously recorded: Papua New Guinea – East New Britain Province (Keravat) (Drew, 1989).
New records: Papua New Guinea – Central Province, Morobe Province.

***Bactrocera (Bactrocera) epicharis* (Hardy)**
Previously recorded: Papua New Guinea – New Ireland Province (Mussau Island); Solomon Islands (Shortland Island) (Drew, 1989); Indonesia – North Maluku (Ternate) (Drew & Romig, 2013).
New record: Papua New Guinea – Manus Province (Manus Island).

***Bactrocera (Bactrocera) exspoliata* (Hering)**
Previously recorded: Papua New Guinea – Central Province (Kapakapa) (Drew, 1989).
New record: Queensland – Nepean Island in Torres Strait.

***Bactrocera (Bactrocera) hollingsworthi* Drew & Romig**
Previously recorded: Solomon Islands – Santa Cruz Island (Drew and Romig, 2001).
New record: Solomon Islands – Gizo Island.

***Bactrocera (Bactrocera) latissima* Drew**
Previously recorded: Papua New Guinea – Morobe Province, Western Highlands Province (Drew, 1989); Central Province, Madang Province, East Sepik Province, East New Britain Province, Manus Province (Clarke *et al*., 2004).
New records: Papua New Guinea – North Bougainville District (Buka Island); Bougainville Province (Bougainville Island, Tinputz).

***Bactrocera (Bactrocera) melanothoracica* Drew**
Previously recorded: Queensland – Cape York Peninsula, Torres Strait Islands (Drew, 1989).
New record: Papua New Guinea – Western Province (Daru Island).

***Bactrocera (Bactrocera) neonigrita* Drew**
Previously recorded: Papua New Guinea – East New Britain Province, West New Britain Province, New Ireland Province, Bougainville Province (Bougainville Island); Solomon Islands – Shortland Island (Korovou) (Drew, 1989); West Sepik Province, Western Highlands Province (Clarke *et al*., 2004).
New records: Papua New Guinea – Central Province, Madang Province, Morobe Province.

***Bactrocera (Bactrocera) papayae* Drew & Hancock**
Previously recorded: Indonesian Papua and Papua New Guinea (Drew and Romig, 2013; Leblanc *et al*., 2012).

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New records: Papua New Guinea – Manus Province (Manus Island, Lorengau), New Ireland Province (Lihir Island, Londolovit).

***Bactrocera (Bactrocera) parafroggatti* Drew & Romig**
Previously recorded: Widespread over Solomon Islands (Drew and Romig, 2001).
New records: Papua New Guinea – East New Britain Province (Bainings Mountains), New Ireland Province (New Ireland).

***Bactrocera (Bactrocera) picea* (Drew)**
Previously recorded: Papua New Guinea – Bougainville Province (Bougainville Island); Solomon Islands – Russel Island, Shortland Island (Drew, 1989).
New record: Papua New Guinea – New Ireland Province (New Ireland).

***Bactrocera (Bactrocera) pseudodistincta* (Drew)**
Previously recorded: Queensland – Torres Strait Islands; Papua New Guinea – Central Province, Morobe Province, East New Britain Province (Keravat), New Ireland Province (New Ireland, Lihir Island) (Drew, 1989).
New records: Papua New Guinea – Bougainville Province (Bougainville Island), North Bougainville District (Buka Island).

***Bactrocera (Bactrocera) redunca* (Drew)**
Previously recorded: Vanuatu; Solomon Islands; Papua New Guinea – Bougainville Province (Bougainville Island, Papua New Guinea mainland, East and West New Britain Provinces); Queensland – Torres Strait Islands (Drew, 1989; Drew and Romig, 2001; Leblanc *et al*., 2012); East Sepik Province, West Sepik Province, Central Province, Madang Province, Morobe Province (Clarke *et al*., 2004).
New record: Papua New Guinea – North Bougainville District (Buka Island).

***Bactrocera (Bactrocera) romigae* (Drew & Hancock)**
Previously recorded: Queensland – Cape York Peninsula (Drew, 1989).
New records: Papua New Guinea – Central Province (Rouna), Madang Province.

***Bactrocera (Bactrocera) rufofuscula* (Drew & Hancock)**
Previously recorded: Queensland – Cape York Peninsula, Torres Strait Islands (Drew, 1989).
New records: Papua New Guinea – Central Province, Morobe Province (Wau).

***Bactrocera (Bactrocera) terminaliae* Drew**
Previously recorded: Papua New Guinea – Morobe Province (Oomsis) (Drew, 1989).
New record: Papua New Guinea – East New Britain Province (Gonalie Airstrip).

***Bactrocera (Calodacus) calophylli* (Perkins & May)**
Previously recorded: South-east Asia; Palau; Australia (north-eastern Queensland); Solomon Islands (Guadalcanal Island); Vanuatu (Santo Island) (Drew, 1989; Drew and Romig, 2001; Leblanc *et al*., 2012); Papua New Guinea – Central Province (Clarke *et al*., 2004).
New record: Papua New Guinea – Madang Province (Madang).

***Bactrocera (Javadacus) abdoangusta* (Drew)**
Previously recorded: Papua New Guinea – Bougainville Province (Daru Village, Bougainville Island) (Drew, 1989; Drew and Romig, 2013).
New record: Papua New Guinea – North Bougainville District (DPI Station, Buka Island).

***Bactrocera (Sinodacus) hamaceki* Drew & Romig**
Previously recorded: Solomon Islands – Guadalcanal Island, Santa Isabel Island, Kolombangara Island (Drew and Romig, 2001).
New record: Papua New Guinea – Bougainville Province (Tinputz, Bougainville Island).

***Bactrocera (Zeugodacus) abnormis* (Hardy)**
Previously recorded: Indonesia – Sulawesi (North Maluku); East Malaysia (Sabah) (Drew and Romig, 2013).
New record: Indonesian Papua (Keerom, Wiantre).

***Bactrocera (Zeugodacus) univittata* (Drew)**
Previously recorded: Papua New Guinea – Bougainville Province (Kieta, Bougainville Island) (Drew, 1989); Solomon Islands (Drew and Romig, 2001).
New records: Papua New Guinea – East New Britain Province (Bainings Mountains), North Bougainville District (Buka Island).

***Dacus (Mellesis) capillaris* (Drew)**
Previously recorded: Papua New Guinea – Bougainville Province (Kieta, Bougainville Island) (Drew, 1989).
New record: Papua New Guinea – North Bougainville District (Buka Island).

***Dacus (Mellesis) concolor* Drew**
Previously recorded: Queensland – Bamaga, Cape York Peninsula (Drew, 1989).
New record: Papua New Guinea – Madang Province (CCRI Station, Murunas).

New Male Lure Records

***Bactrocera (Apodacus) neocheesmanae* Drew**
Previous record: Methyl eugenol (Drew, 1989).
New record: Vanillylacetone (zingerone).

***Bactrocera (Bactrocera) angustifasciata* Drew**
Previous record: No known record (Drew, 1989).
New record: Cue lure.

***Bactrocera (Bactrocera) morula* Drew**
Previous record: No known record (Drew, 1989).
New record: Cue lure.

***Bactrocera (Bactrocera) nigrovittata* Drew**
Previous record: No known record (Drew, 1989).
New record: Methyl eugenol.

***Bactrocera (Bactrocera) propedistincta* Drew**
Previous record: No known record (Drew, 1989).
New record: Cue lure.

***Bactrocera (Bactrocera) repanda* Drew**
Previous record: No known record (Drew, 1989).
New record: Cue lure.

***Bactrocera (Bactrocera) resima* (Drew)**
Previous record: No known record (Drew, 1989).
New record: Cue lure.

***Bactrocera (Bactrocera) rutila* (Hering)**
Previous record: No known record (Drew, 1989).
New record: Cue lure.

***Bactrocera (Bactrocera) terminaliae* Drew**
Previous record: No known record (Drew, 1989; Leblanc *et al*., 2012).
New record: Cue lure.

***Bactrocera (Heminotodacus) dissidens* Drew**
Previous record: No known record (Drew, 1989).
New record: Cue lure.

***Bactrocera (Javadacus) sandaracina* Drew**
Previous record: No known record (Drew, 1989).
New record: Cue lure.

***Bactrocera (Neozeugodacus) abdomininigra* Drew**
Previous record: No known record (Drew, 1989).
New records: Methyl eugenol, vanillylacetone (zingerone).

***Bactrocera (Semicallantra) memnonia* (Drew)**
Previous record: methyl eugenol, probable error based on one specimen (Drew, 1989).
New record: Cue lure, based on a large collection of specimens caught at Wanang, Madang Province, Papua New Guinea, Oct–Nov 2012, V. Novotny.

***Bactrocera (Semicallantra) nigricula* (Drew)**
Previous record: No known record (Drew, 1989).
New record: Cue lure.

***Bactrocera (Tetradacus) mesonotochra* Drew**
Previous record: No known record (Drew, 1989).
New record: Vanillylacetone (zingerone).

***Dacus (Mellesis) impar* Drew**
Previous record: No known record (Drew, 1989).
New record: Cue lure.

***Dacus (Neodacus) alulapictus* Drew**
Previous record: No known record (Drew, 1989).
New record: Vanillylacetone (zingerone).

***Dacus (Neodacus) maprikensis* Drew**
Previous record: No known record (Drew, 1989).
New record: Cue lure.

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New Host Plant Records

***Bactrocera (Apodacus) neocheesmanae* Drew**
Family Apocynaceae
Cerbera manghas L.
Madang Province, Baitabag, 1.viii.2001.

***Bactrocera (Bactrocera) bancroftii* (Tryon)**
Family Rubiaceae
Anthocephalus cadamba (Roxb.) Miq.
Morobe Province, Lae, FRI Botanical Gardens, 29.iii.2000; Lae, Labu Livestock Station, 18.ix.1998.
Nauclea orientalis (L.) L.
Madang Province, Ohu, 7.vi.2001; Baitabag, 12.ix.2001.

***Bactrocera (Bactrocera) contermina* Drew**
Family Apocynaceae
Neisosperma oppositifolia (Lam.) Fosberg & Sachet (now in genus *Ochrosia*)
Madang Province, Baitabag, 15.viii.2001.
Family Caricaceae
Carica papaya L.
Morobe Province, Lae, Bukawa, Tikeling 2 Forest, 22.ix.1999.
Family Euphorbiaceae
Pimelodendron amboinicum Hassk
Madang Province, Baitabag, 7.iii.2001.
Family Moraceae
Ficus hispidiodes S. Moore
Madang Province, Baitabag, 26.ix.2001.
Family Xanthophyllaceae
Xanthophyllum papuanum Whitmore ex Meijden
Morobe Province, Oomsis Forest, 30.vii.2000; 2.viii.2000.

***Bactrocera (Bactrocera) frauenfeldi* (Schiner)**
Family Euphorbiaceae
Baccaurea sp.
Morobe Province, Lae, 11 Mile, Syambu Farm, 3.v.1999.
Family Myrtaceae
Syzygium trivene (Ridl.) Merr. & L.M. Perry
Madang Province, Ohu, 13.x.2000.
Family Rubiaceae
Anthocephalus cadamba (Roxb.) Miq.
Morobe Province, Lae, Labu Livestock Station, 18.ix.1998.
Family Solanaceae
Capsicum frutescens L.
Morobe Province, Lae, Bubia Agriculture Station, 1.v.2000.

***Bactrocera (Bactrocera) musae* (Tryon)**
Family Myrtaceae
Psidium guajava L.
Morobe Province, Lae, Bubia Agriculture Station, 18.xi.1999.

***Bactrocera (Bactrocera) speculifera* (Walker)**
Family Moraceae
Artocarpus altilis (Parkinson) Fosberg
Madang Province, Baitabag, 13.x.2000.
New record due to removal of *B. speculifera* from synonymy with *Bactrocera curvifera* (Walker) (Drew and Romig, 2013). See Leblanc *et al*. (2012) for records incorrectly attributed to *B. curvifera*.

***Bactrocera (Bactrocera) trivialis* (Drew)**
Family Anacardiaceae
Mangifera minor Blume
Madang Province, Baitabag, 17.x.2001.
Family Caricaceae
Carica papaya L.
Morobe Province, Lae, Bubia Agriculture Station, 16.v.2000.
Family Stemonuraceae
Gomphandra montana (Schellenb.) Sleumer
Central Province, Rouna Forest, 17.xii.1998, coll. Drew *et al*.
Family Moraceae
Artocarpus altilis (Parkinson) Fosberg
Morobe Province, Lae, Bundun Conference Centre, 3.xi.1999.
Family Myrtaceae
Syzygium trivene (Ridl.) Merr. & L.M. Perry
Madang Province, Plot Baitabag, 21.vi.2000.
Family Sapindaceae
Elattostachys tetraporandra Radik
Madang Province, Ohu, 3.viii.2000.

***Dacus (Mellesis) axanus* (Hering)**
Family Cucurbitaceae
Momordica charantia L.
Central Province, Laloki Agric. Res. Stn., 5.xii.94, Ento. Section.

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Figures

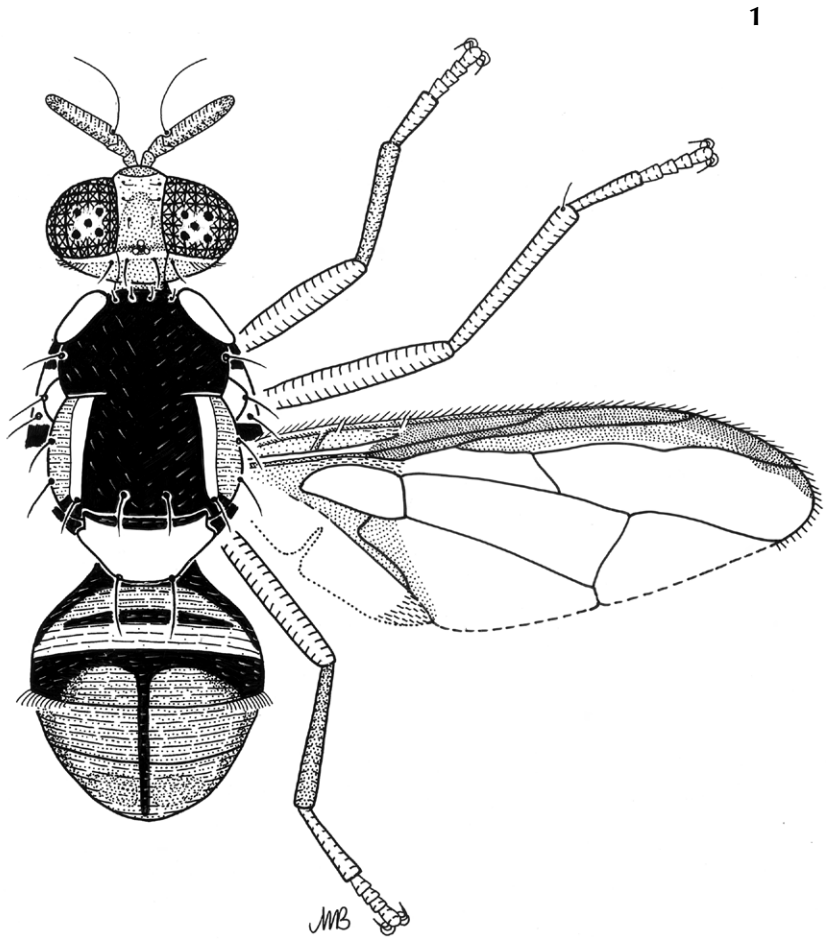


Fig. 1. *Bactrocera (Bactrocera) atriscuta*, new species, holotype male.

DOI: 10.1079/9781789249514.0015

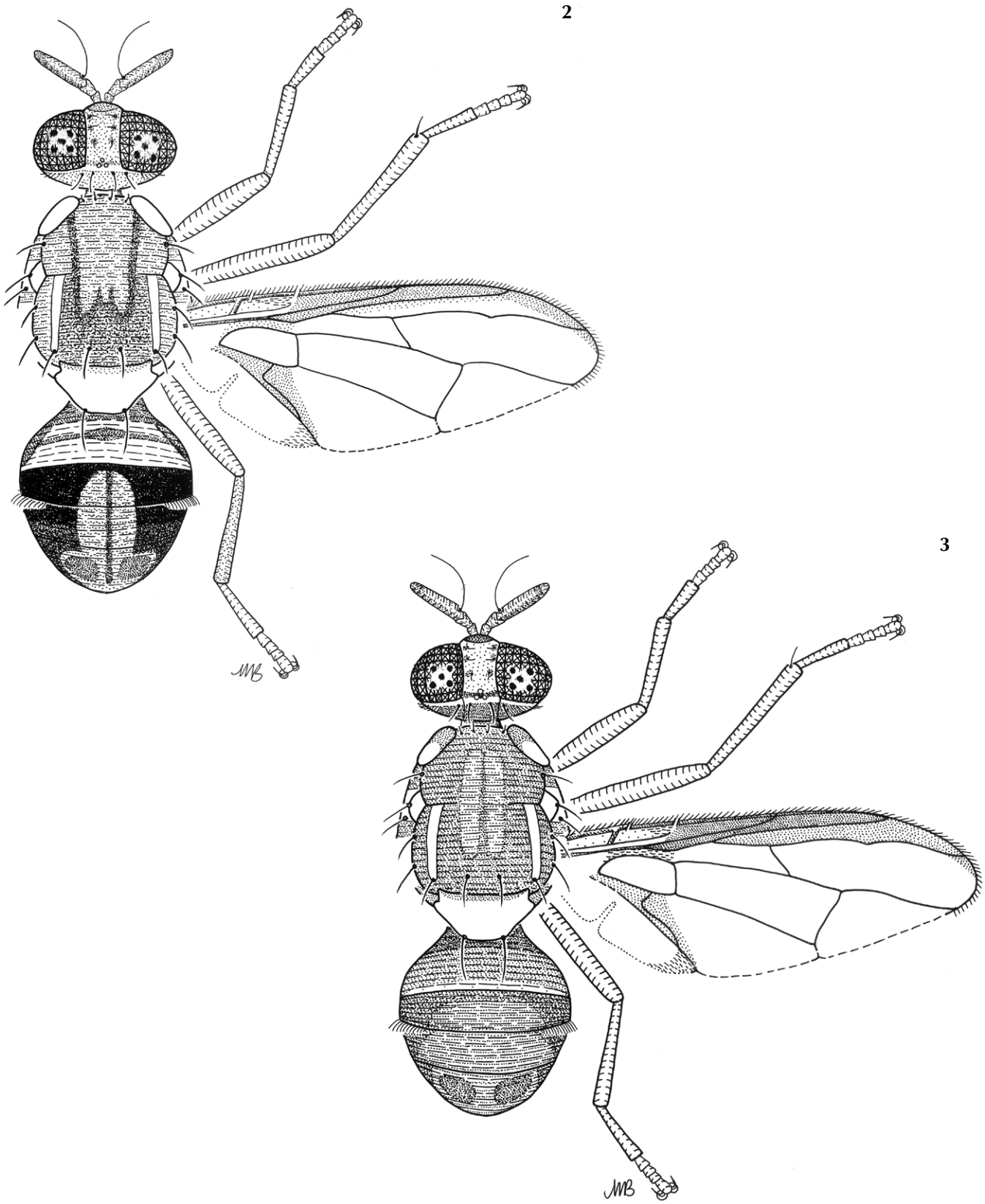


Fig. 2. *Bactrocera (Bactrocera) bisianumu*, new species, holotype male. **Fig. 3.** *Bactrocera (Bactrocera) bogiae*, new species, holotype male.

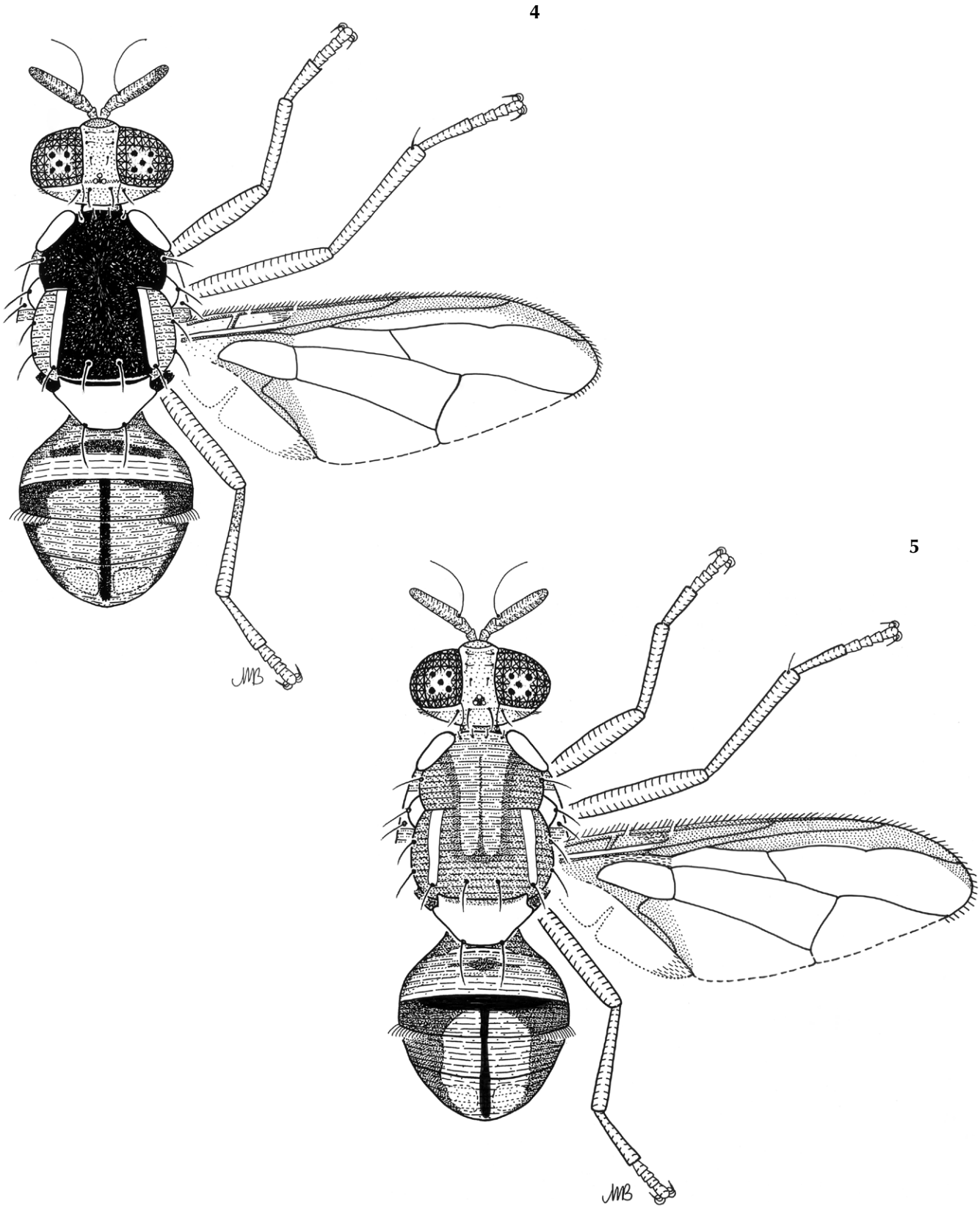
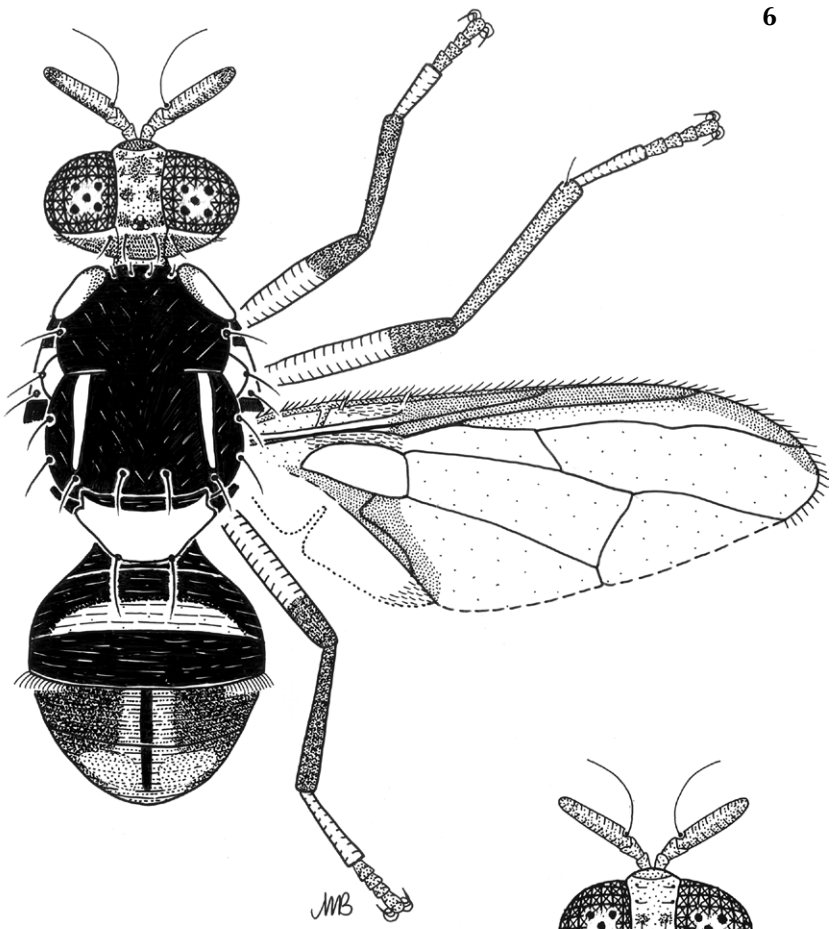


Fig. 4. *Bactrocera (Bactrocera) bubiae*, new species, holotype male. **Fig. 5.** *Bactrocera (Bactrocera) bukaensis*, new species, holotype male.



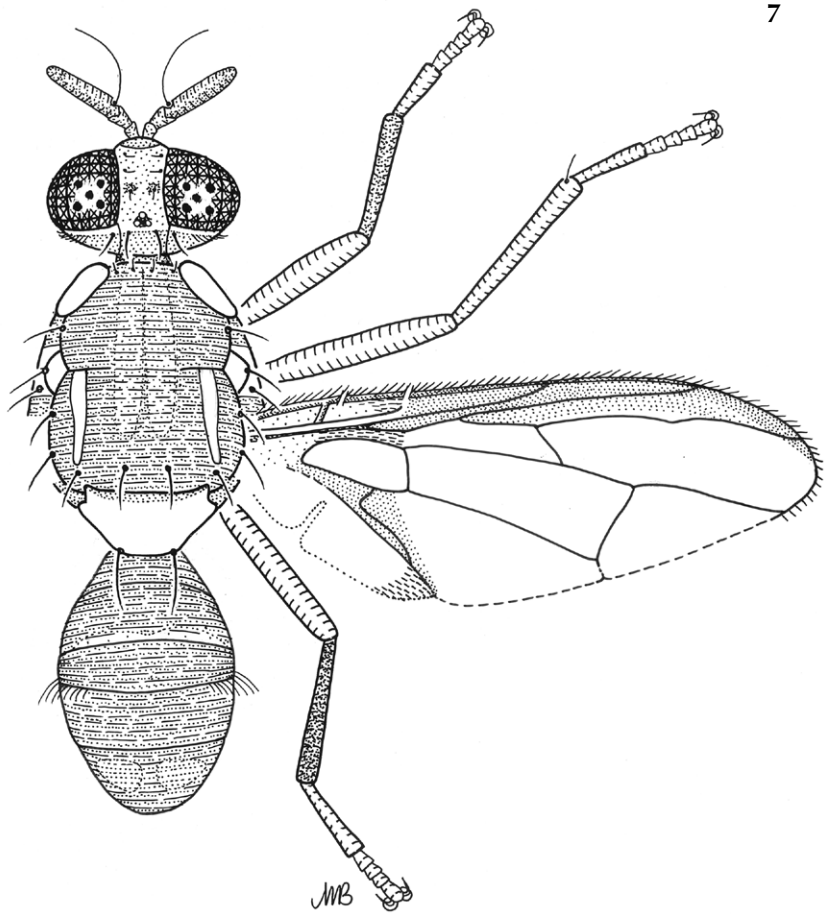
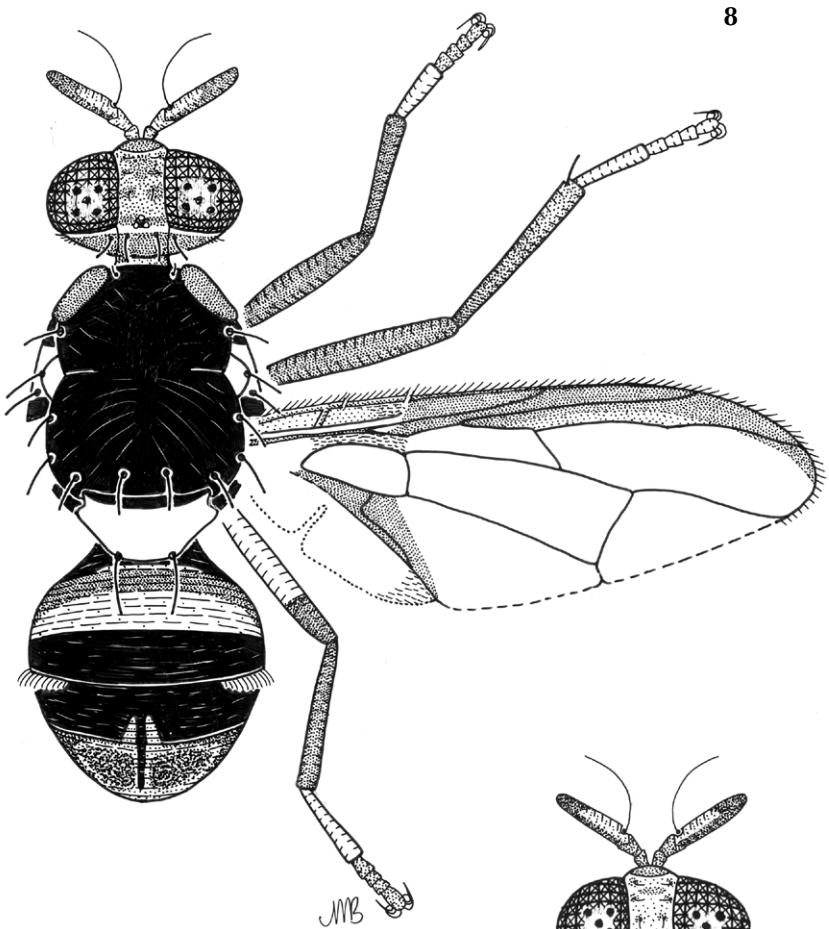


Fig. 6. *Bactrocera (Bactrocera) caccabata*, new species, holotype male. **Fig. 7.** *Bactrocera (Bactrocera) centraliae*, new species, holotype male.



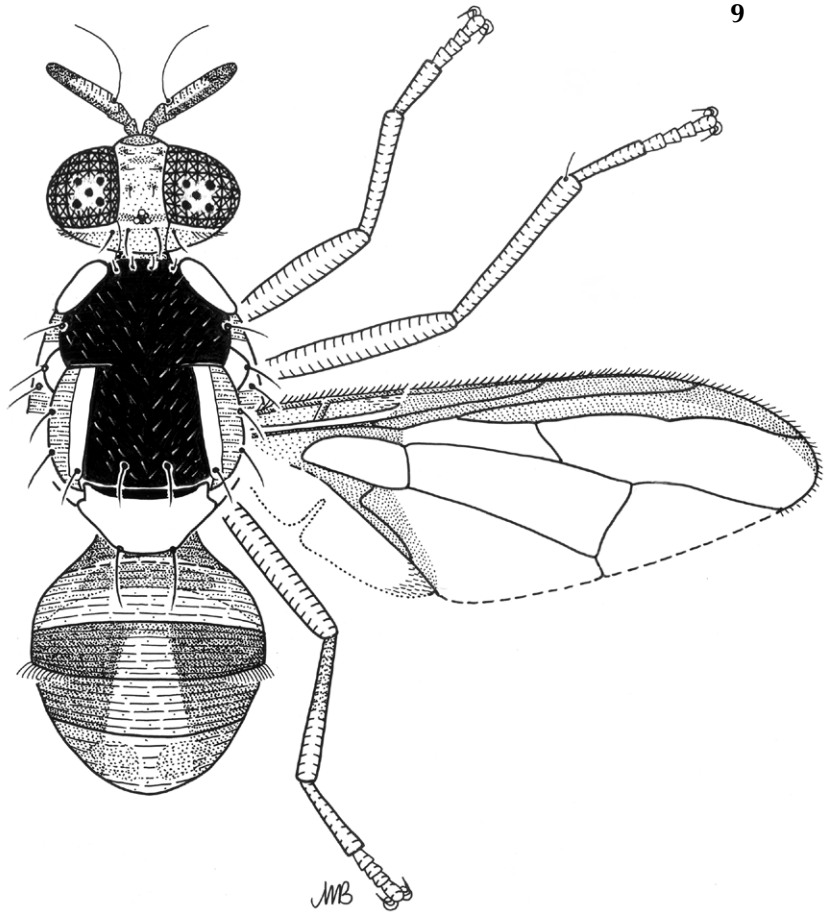
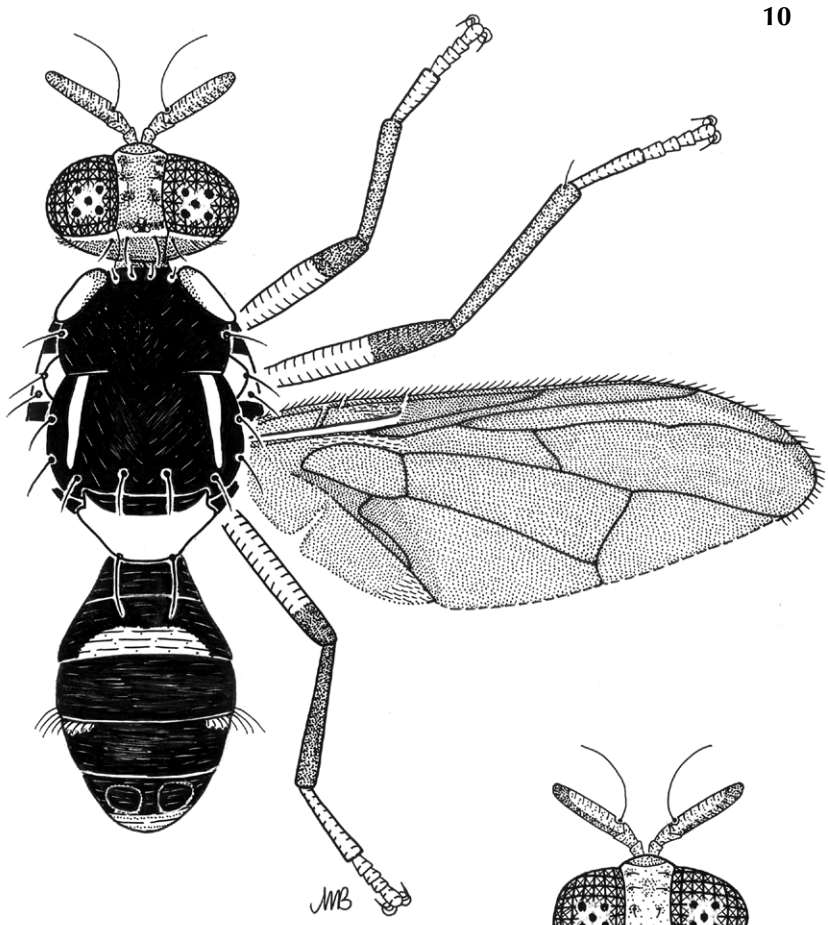


Fig. 8. *Bactrocera (Bactrocera) dysoxyli*, new species, holoytype male. **Fig. 9.** *Bactrocera (Bactrocera) expandosa*, new species, holotype male.



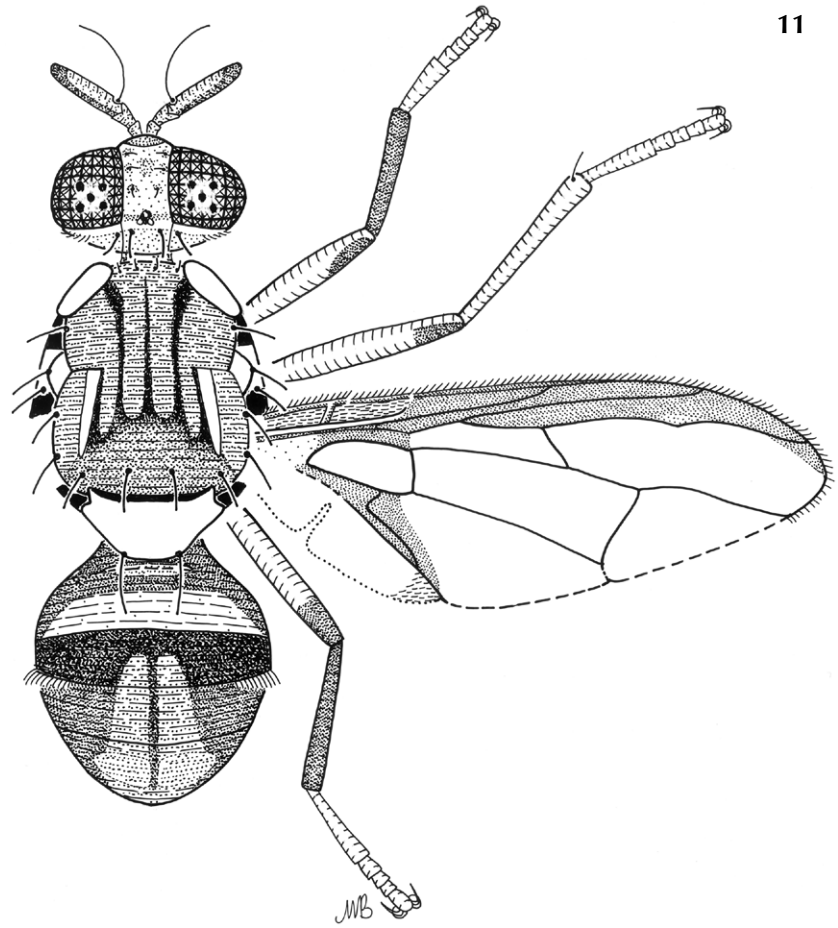


Fig. 10. *Bactrocera (Bactrocera) fumica*, new species, holotype male. **Fig. 11.** *Bactrocera (Bactrocera) gabensiae*, new species, holotype male.

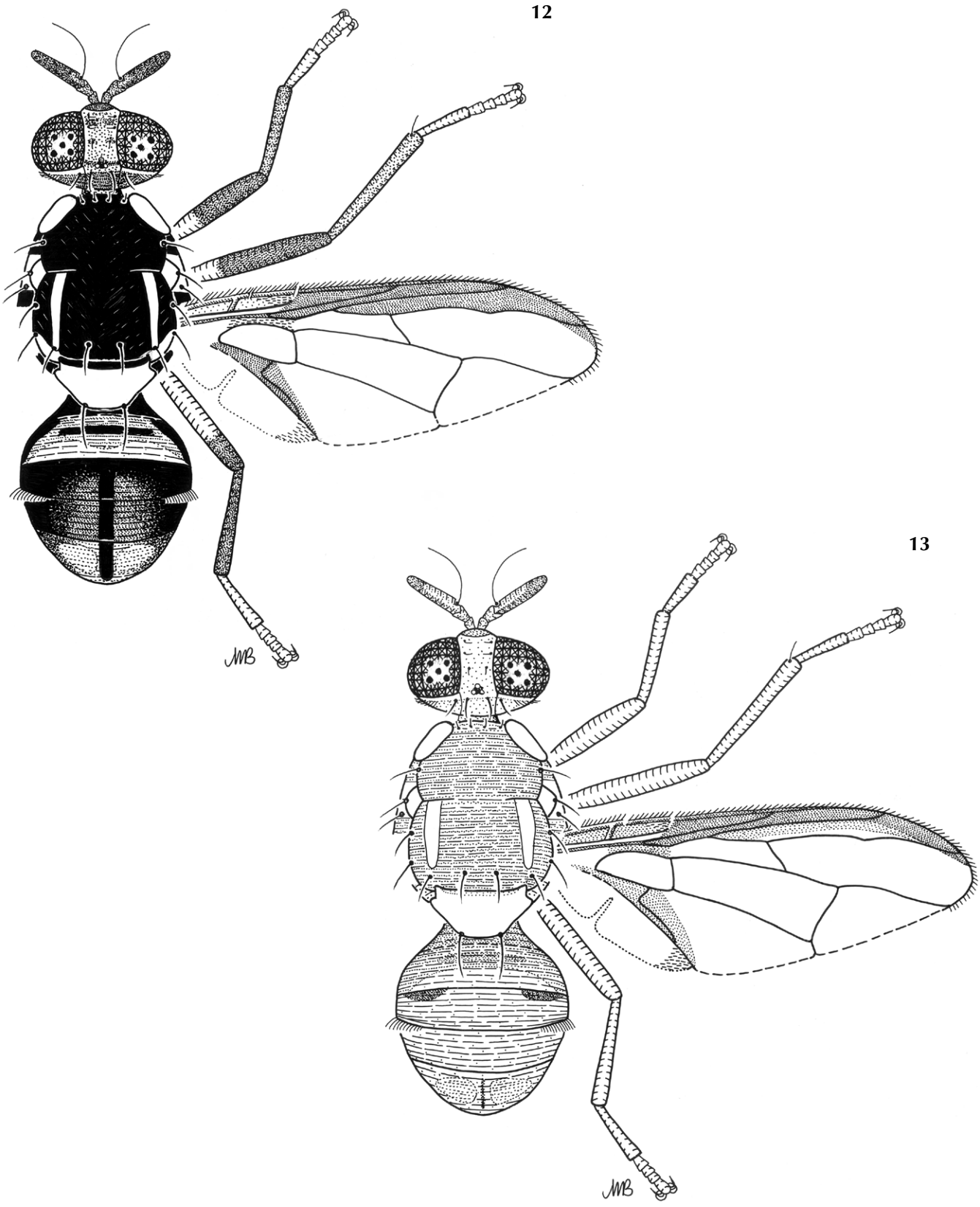
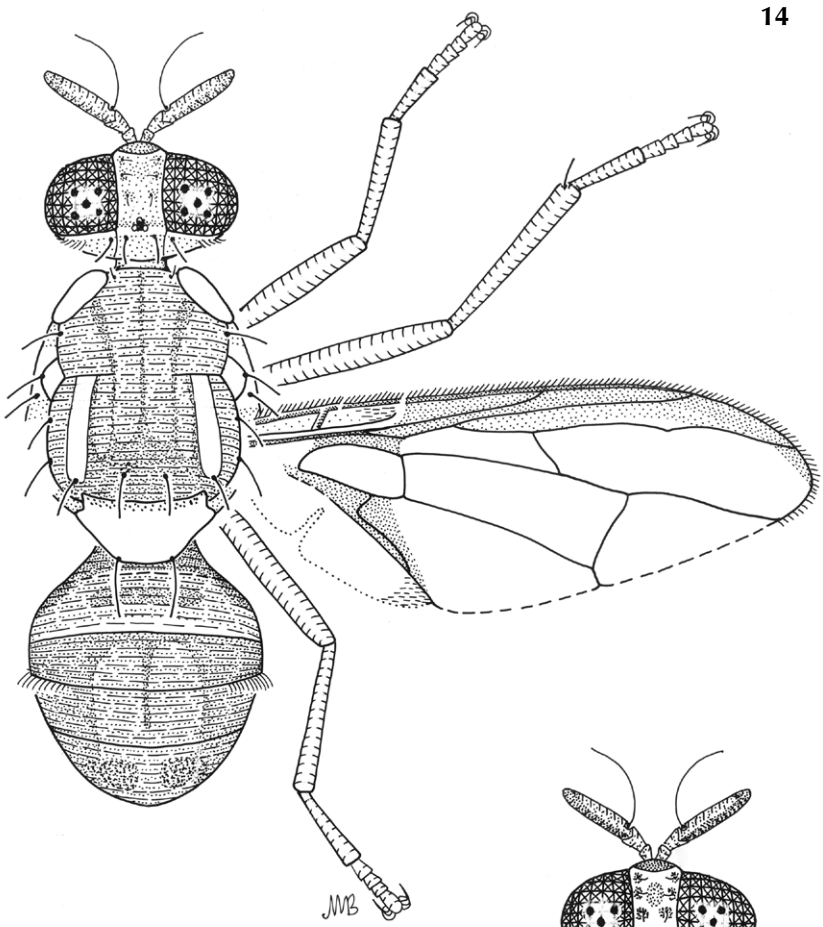


Fig. 12. *Bactrocera (Bactrocera) kaiauiae*, new species, holotype male. **Fig. 13.** *Bactrocera (Bactrocera) kauiae*, new species, holotype male.



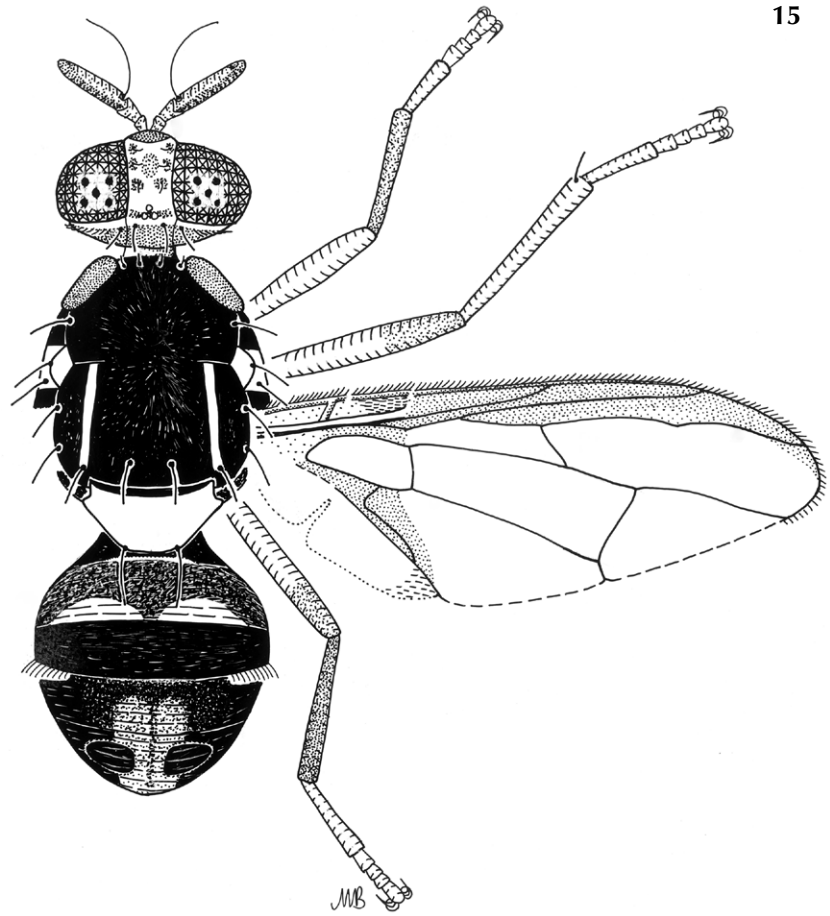


Fig. 14. *Bactrocera (Bactrocera) keravatiae*, new species, holotype male. **Fig. 15.** *Bactrocera (Bactrocera) kokodiae*, new species, holotype male.

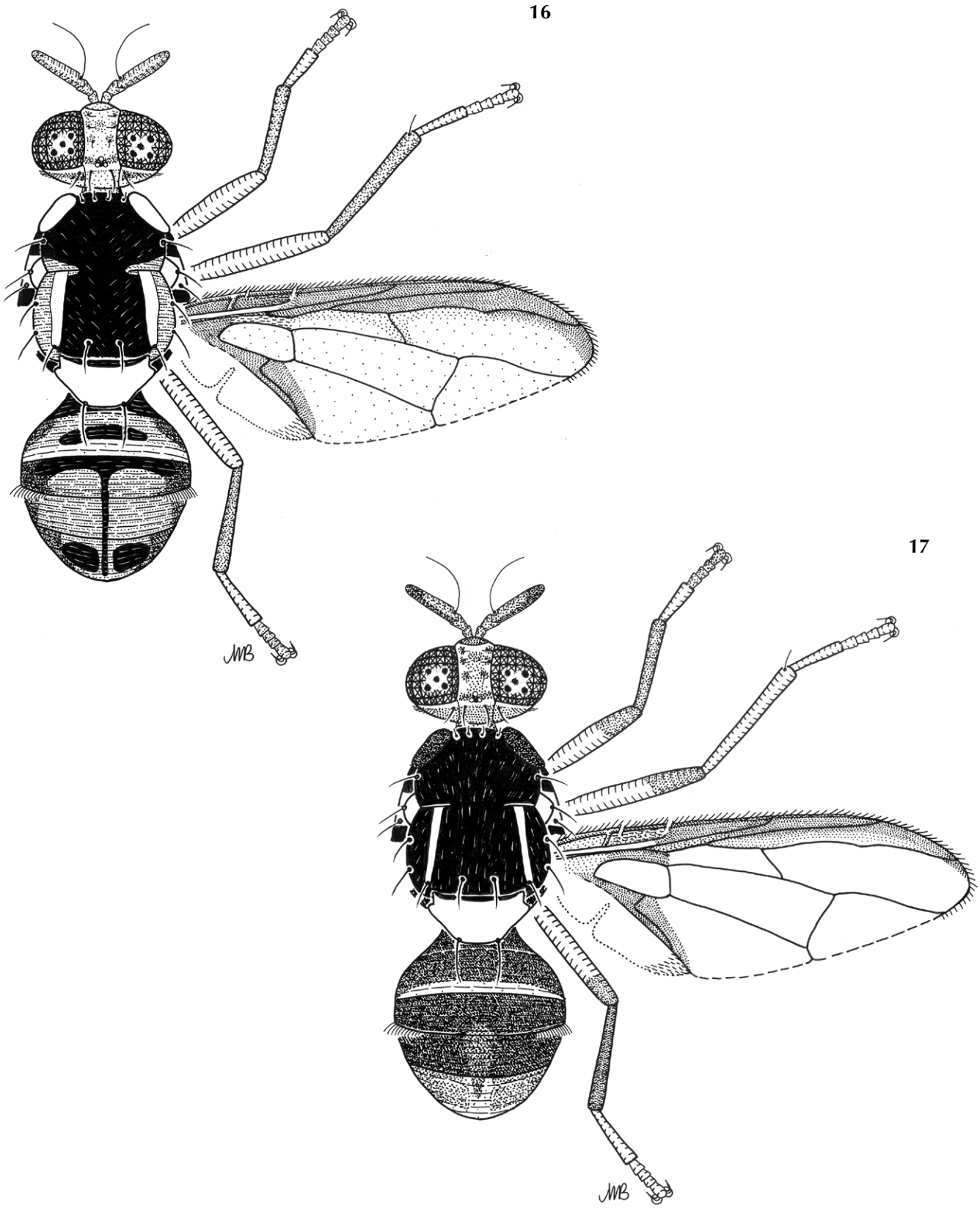
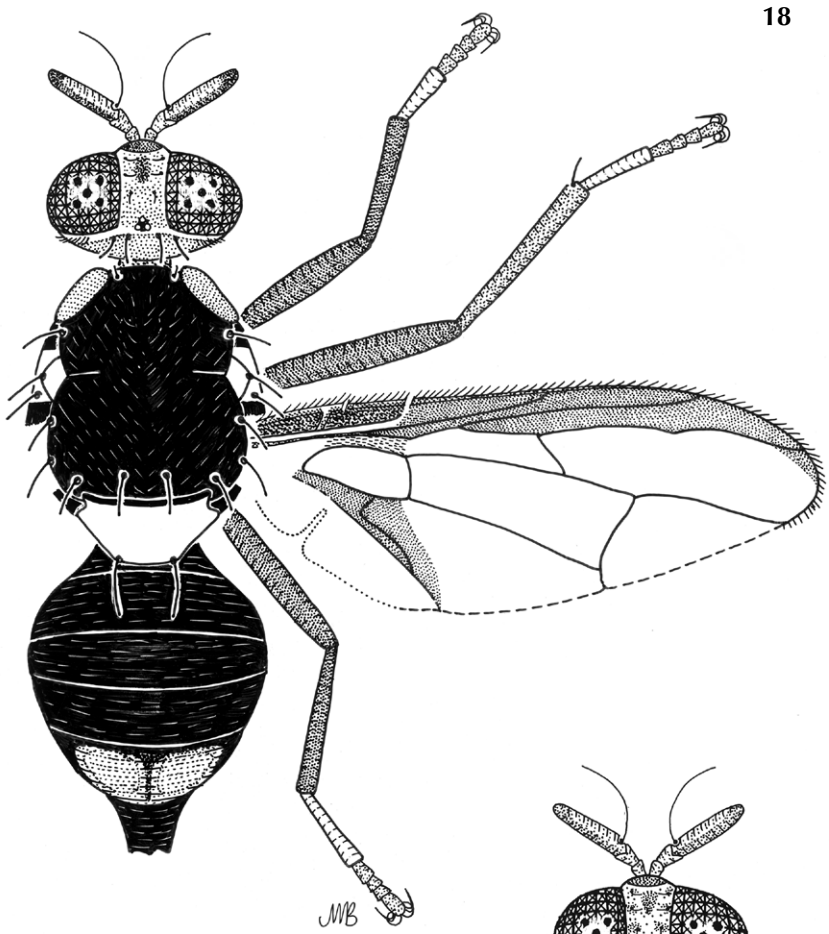


Fig. 16. *Bactrocera (Bactrocera) kunvawaensis*, new species, holotype male. **Fig. 17.** *Bactrocera (Bactrocera) labubulu*, new species, holotype male.



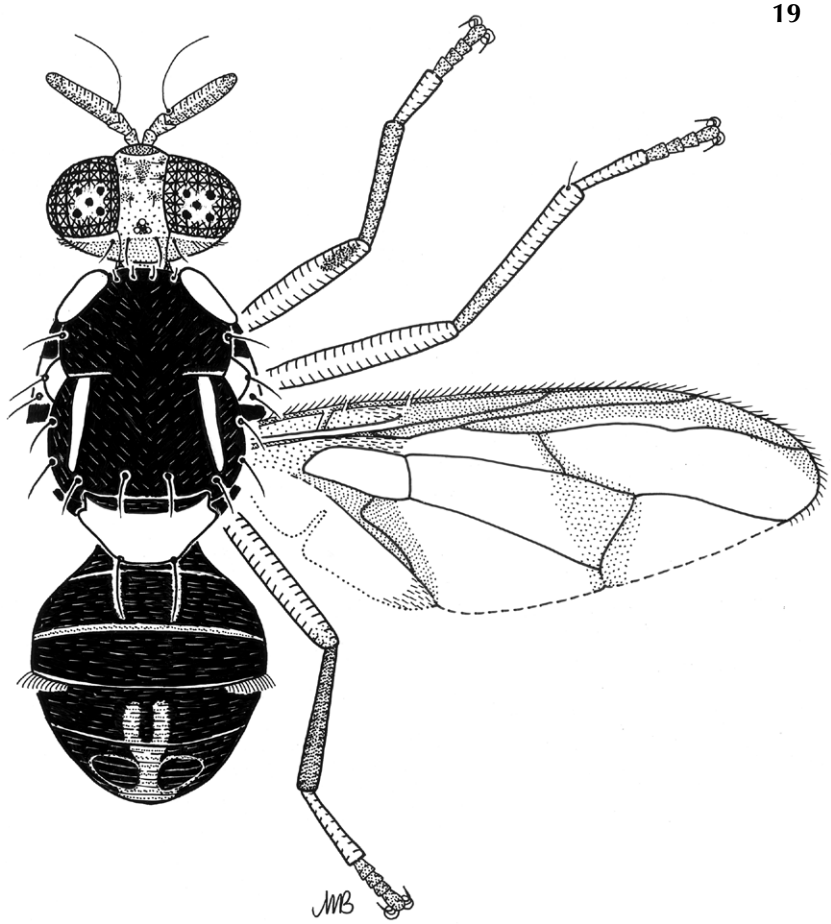
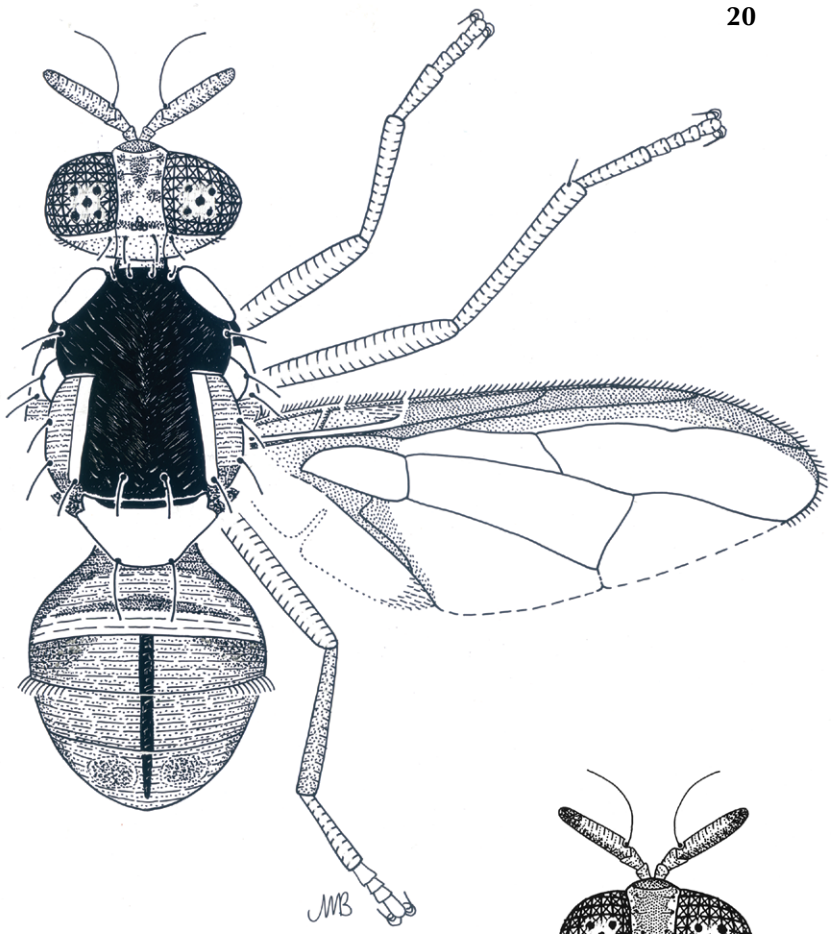


Fig. 18. *Bactrocera (Bactrocera) laensis*, new species, holotype female. **Fig. 19.** *Bactrocera (Bactrocera) manusiae*, new species, holotype male.



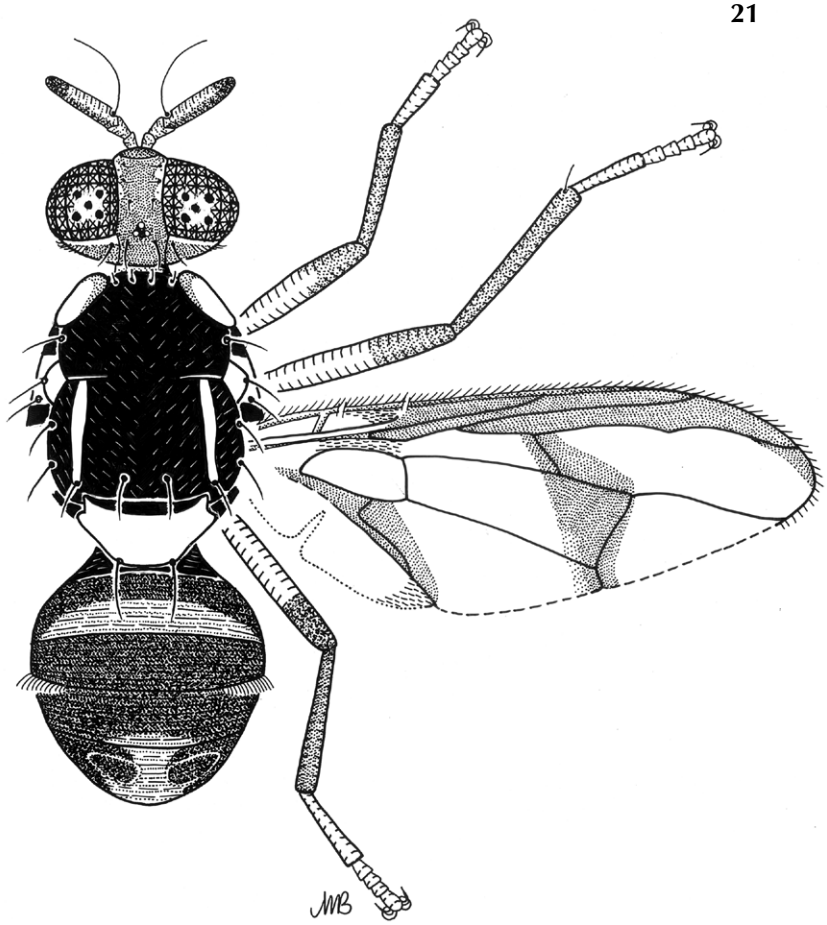
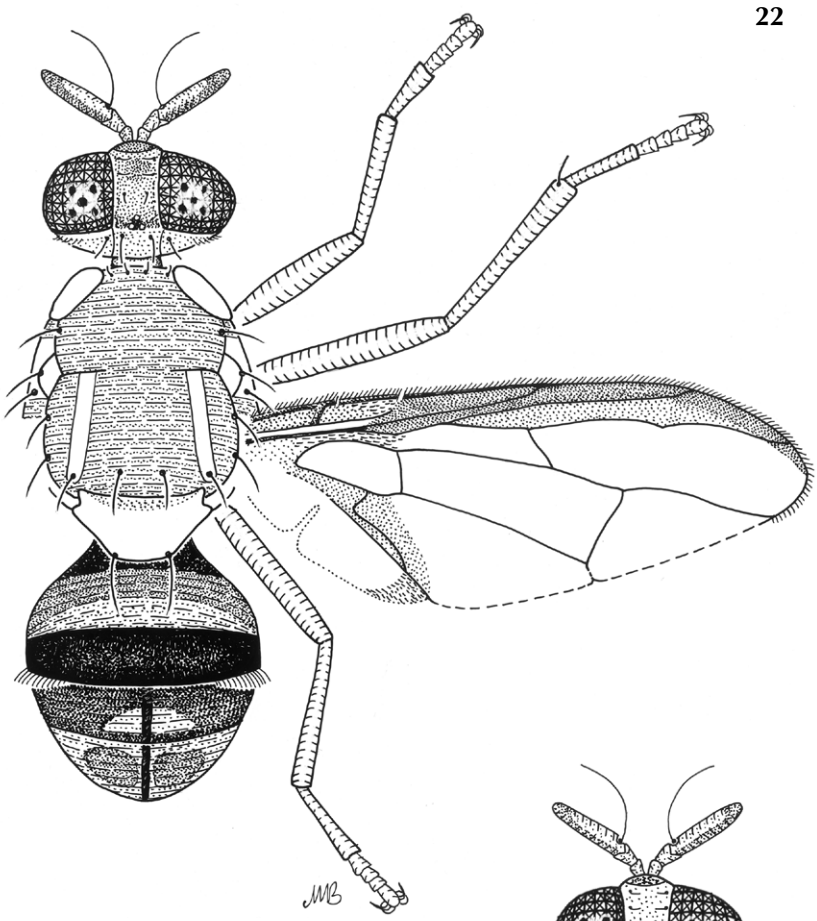


Fig. 20. *Bactrocera (Bactrocera) meraiensis*, new species, holotype male. **Fig. 21.** *Bactrocera (Bactrocera) monostriata*, new species, holotype male.



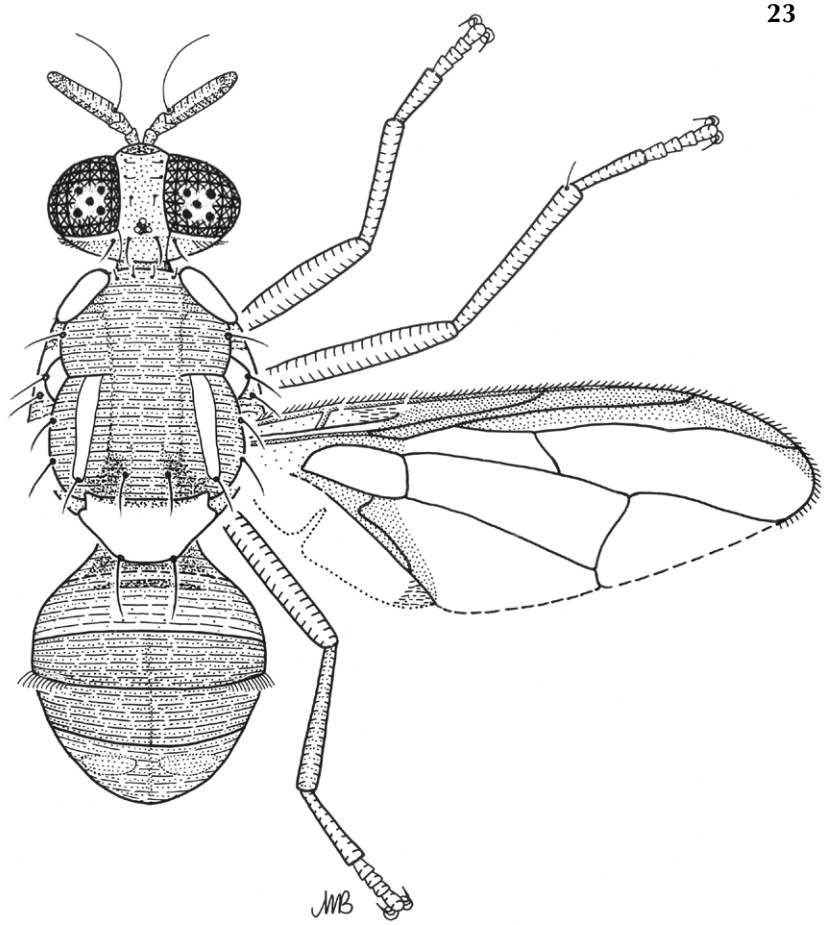


Fig. 22. *Bactrocera (Bactrocera) neoabdonigella*, new species, holotype male. **Fig. 23.** *Bactrocera (Bactrocera) neoaeroginosa*, new species, holotype male.

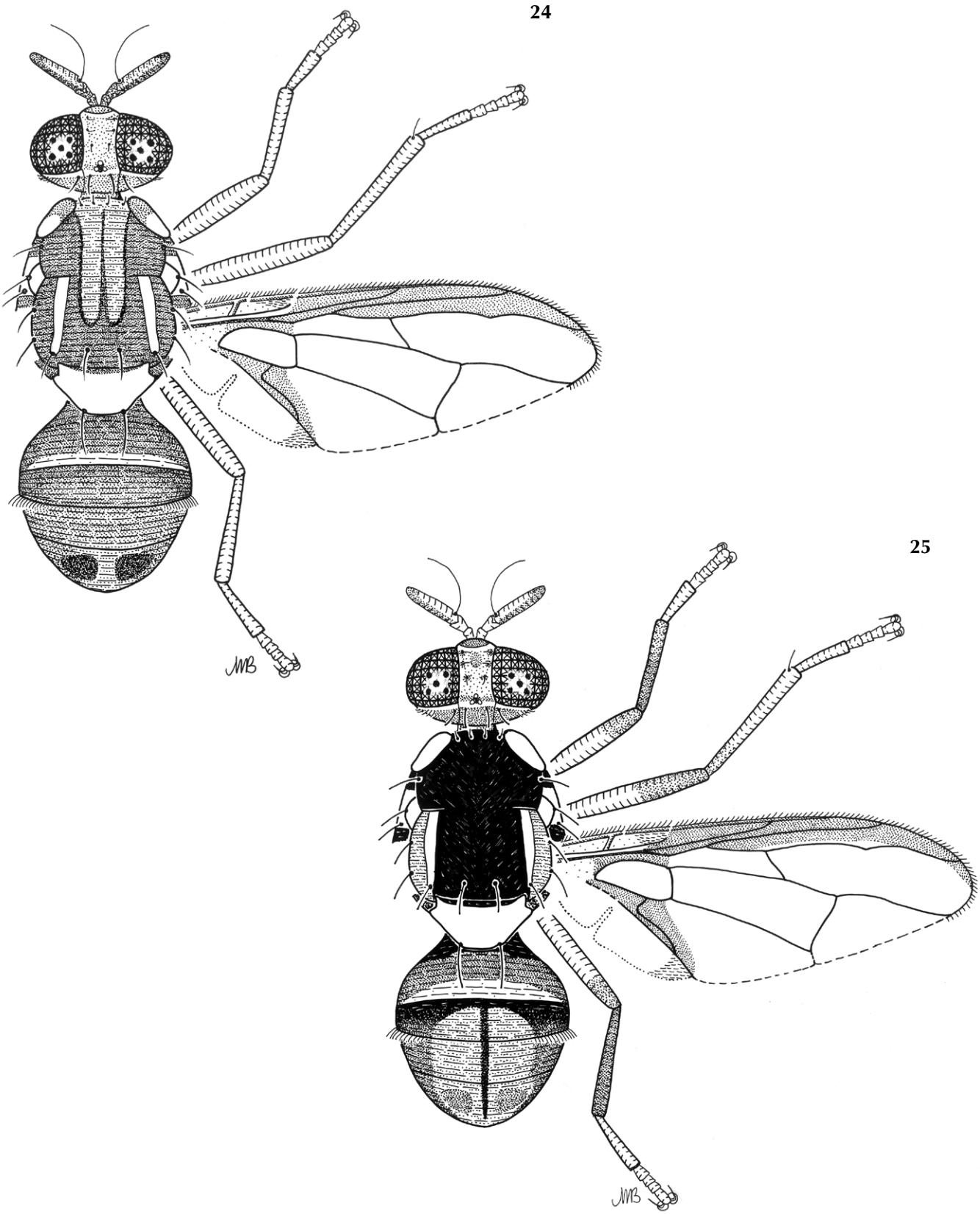
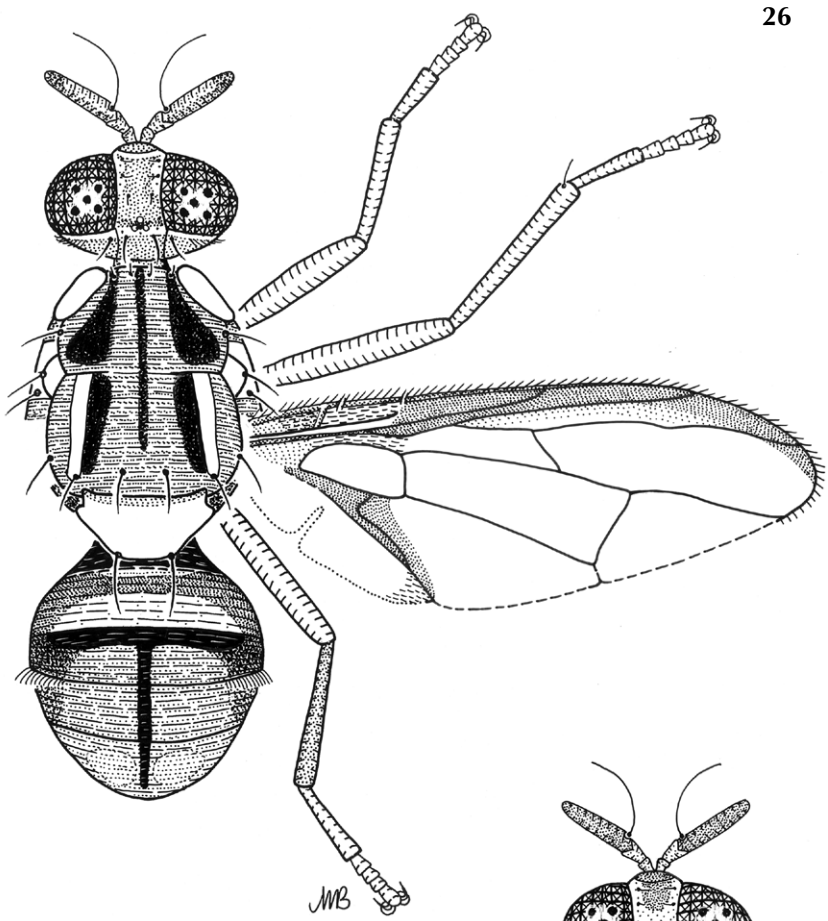


Fig. 24. *Bactrocera (Bactrocera) ohuiae*, new species, holotype male. **Fig. 25.** *Bactrocera (Bactrocera) paraendiandrae*, new species, holotype male.



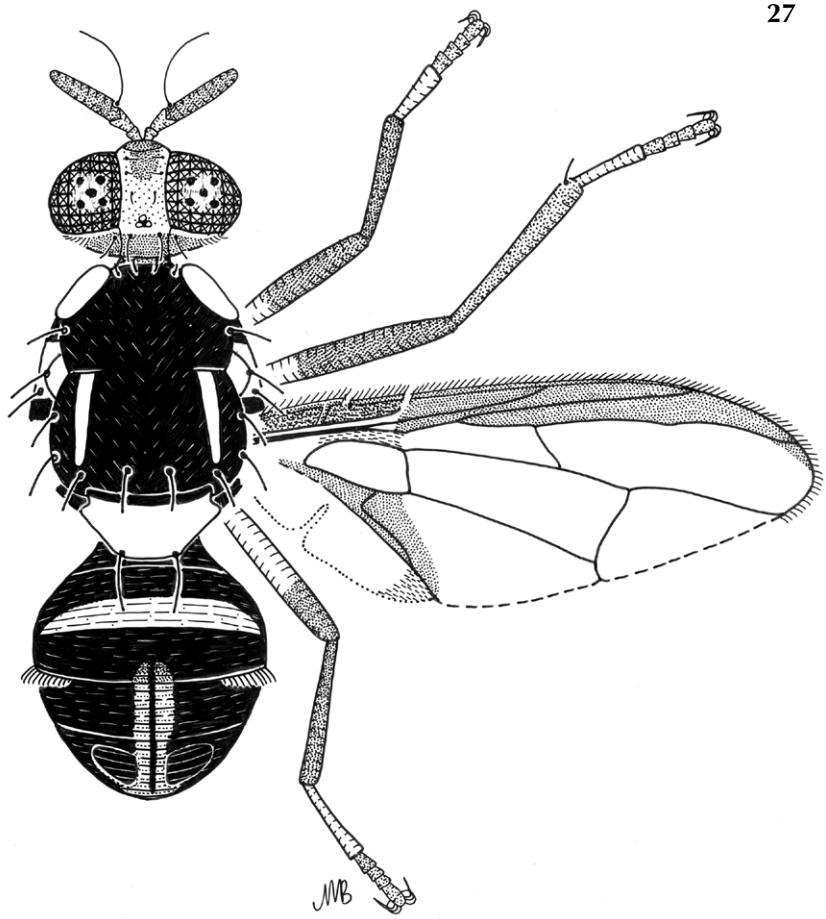


Fig. 26. *Bactrocera (Bactrocera) paraochracea*, new species, holotype male. **Fig. 27.** *Bactrocera (Bactrocera) pometiae*, new species, holotype male.

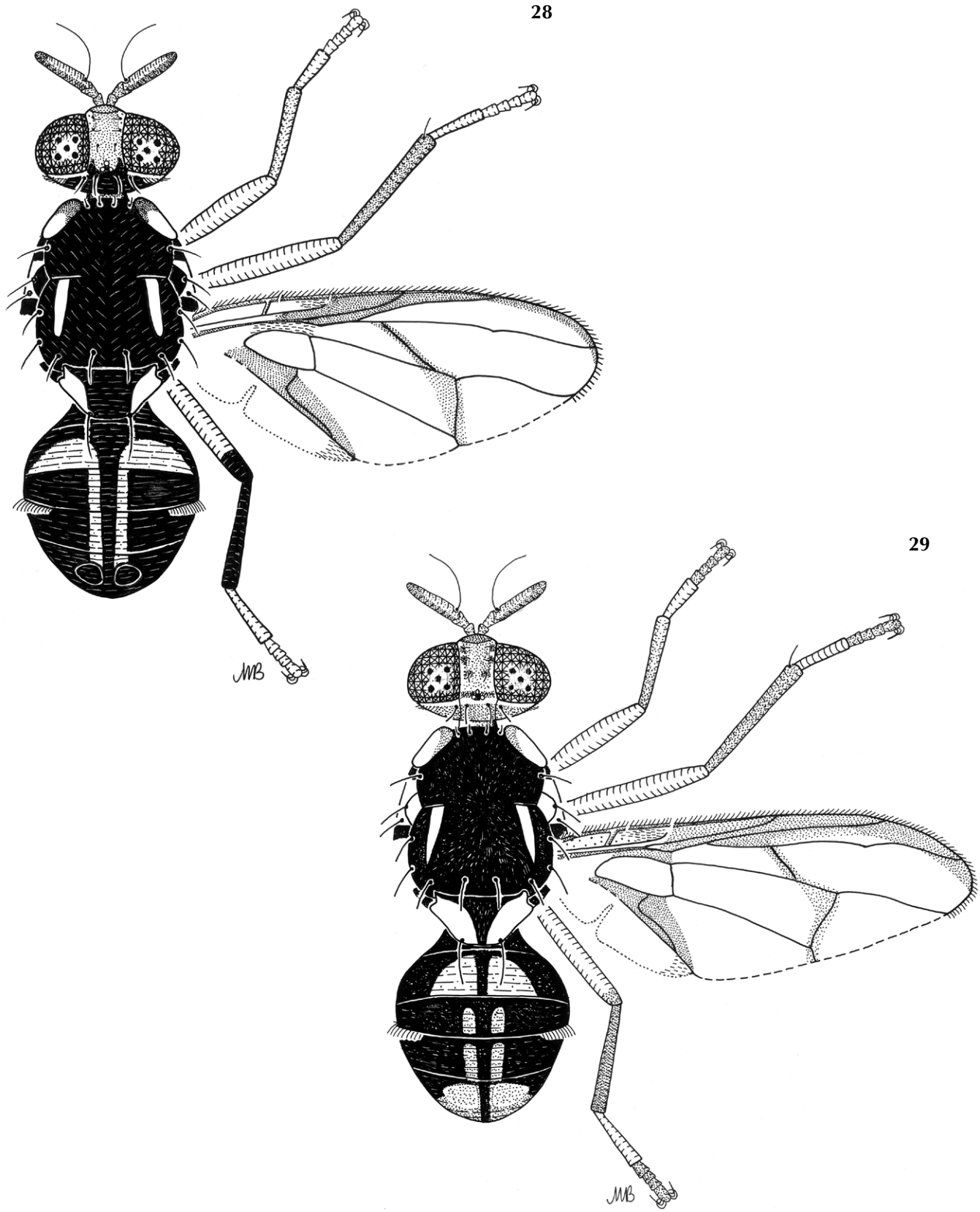
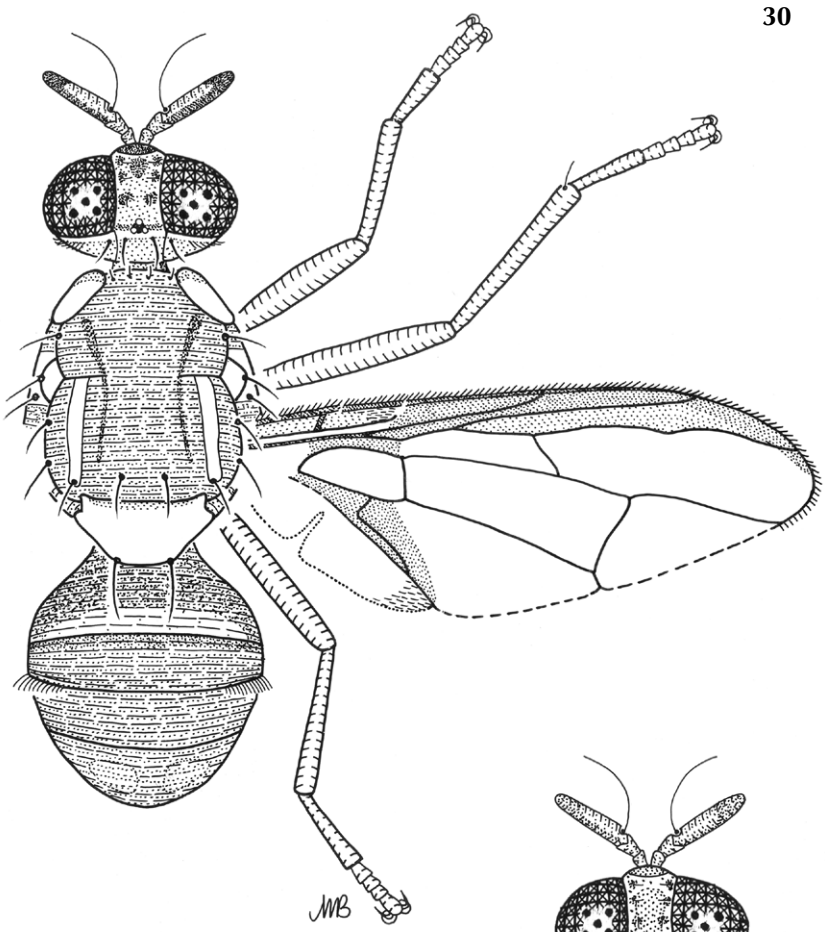


Fig. 28. *Bactrocera (Bactrocera) raunsepnaensis*, new species, holotype male. **Fig. 29.** *Bactrocera (Bactrocera) rounaensis*, new species, holotype male.



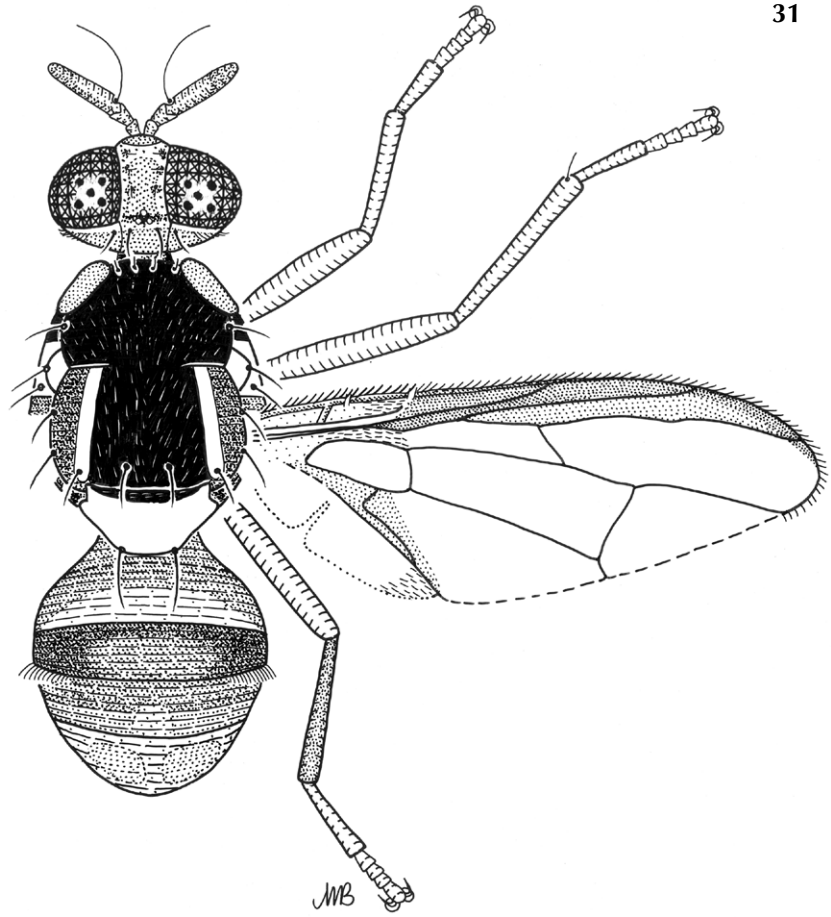


Fig. 30. *Bactrocera (Bactrocera) rutilana*, new species, holotype male. **Fig. 31.** *Bactrocera (Bactrocera) saramandiae*, new species, holotype male.

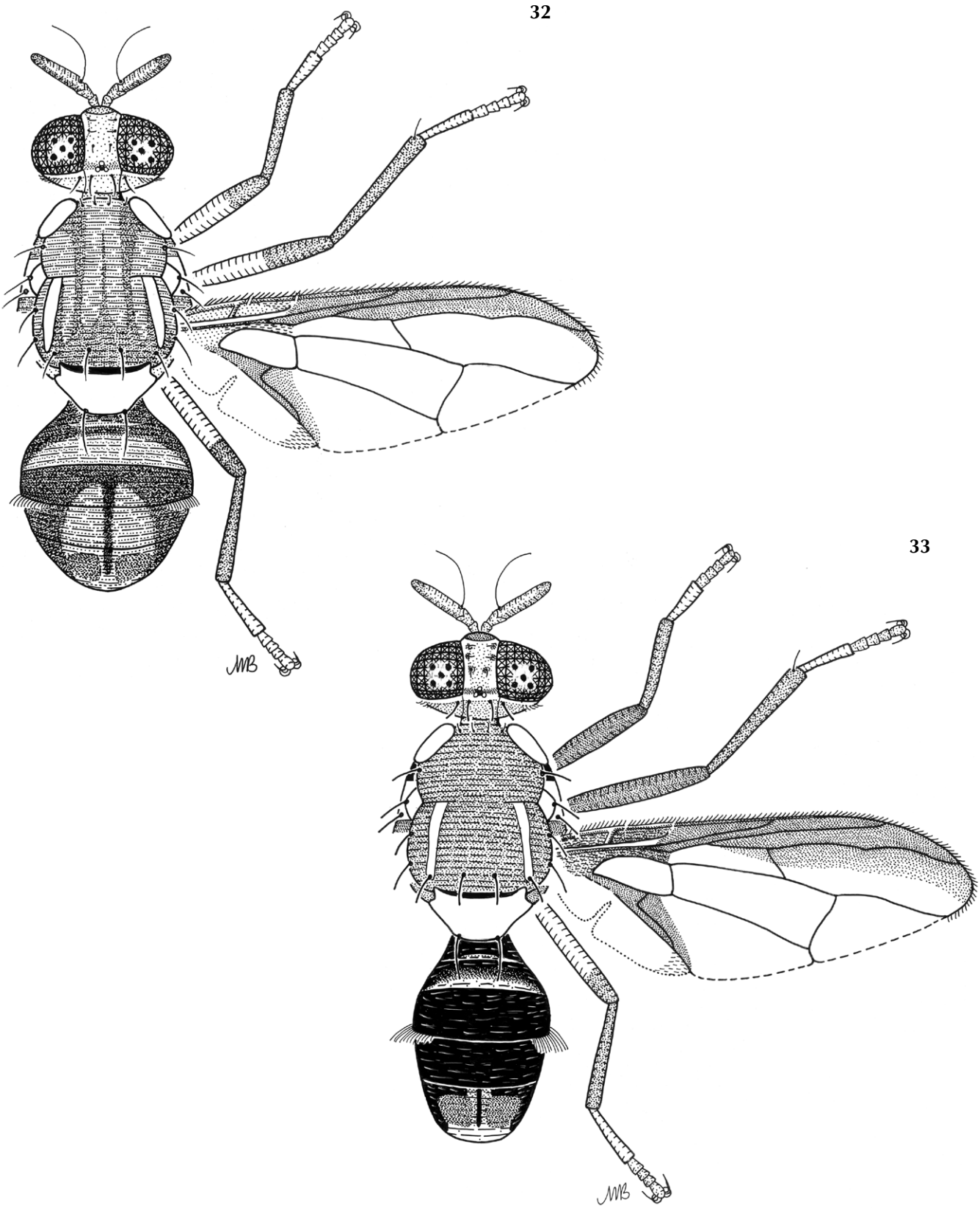
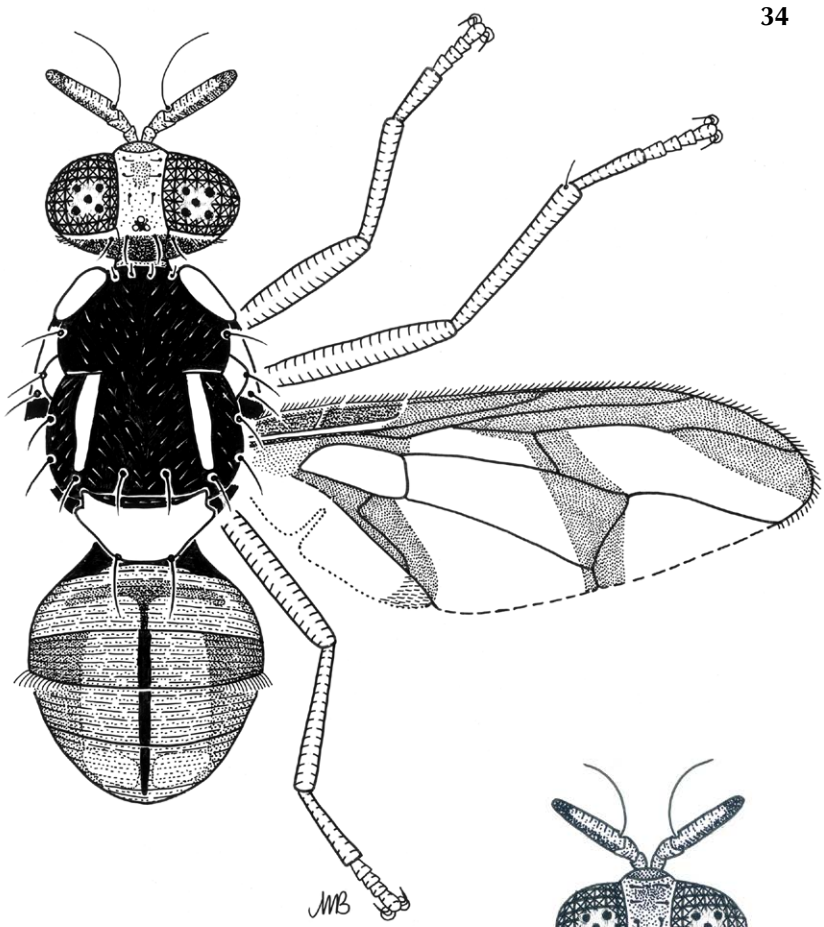


Fig. 32. *Bactrocera (Bactrocera) sari*, new species, holotype male. **Fig. 33.** *Bactrocera (Bactrocera) sylvania*, new species, holotype male.



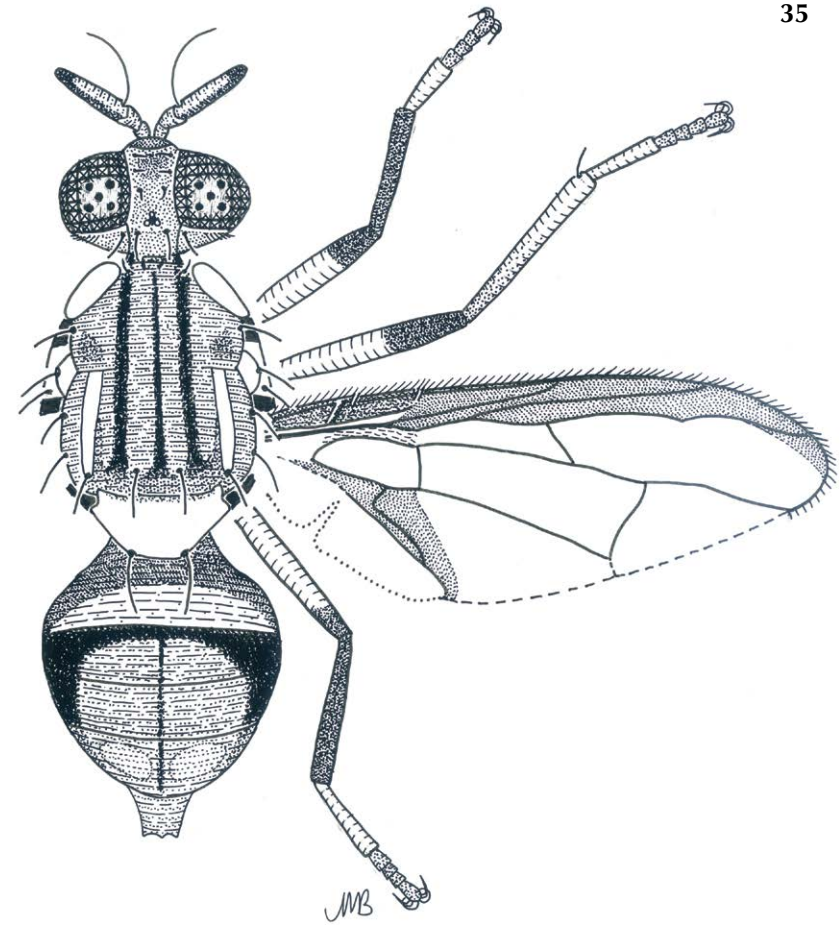


Fig. 34. *Bactrocera (Bactrocera) tikelingiae*, new species, holotype male. **Fig. 35.** *Bactrocera (Bactrocera) trivirgulata*, new species, holotype female.

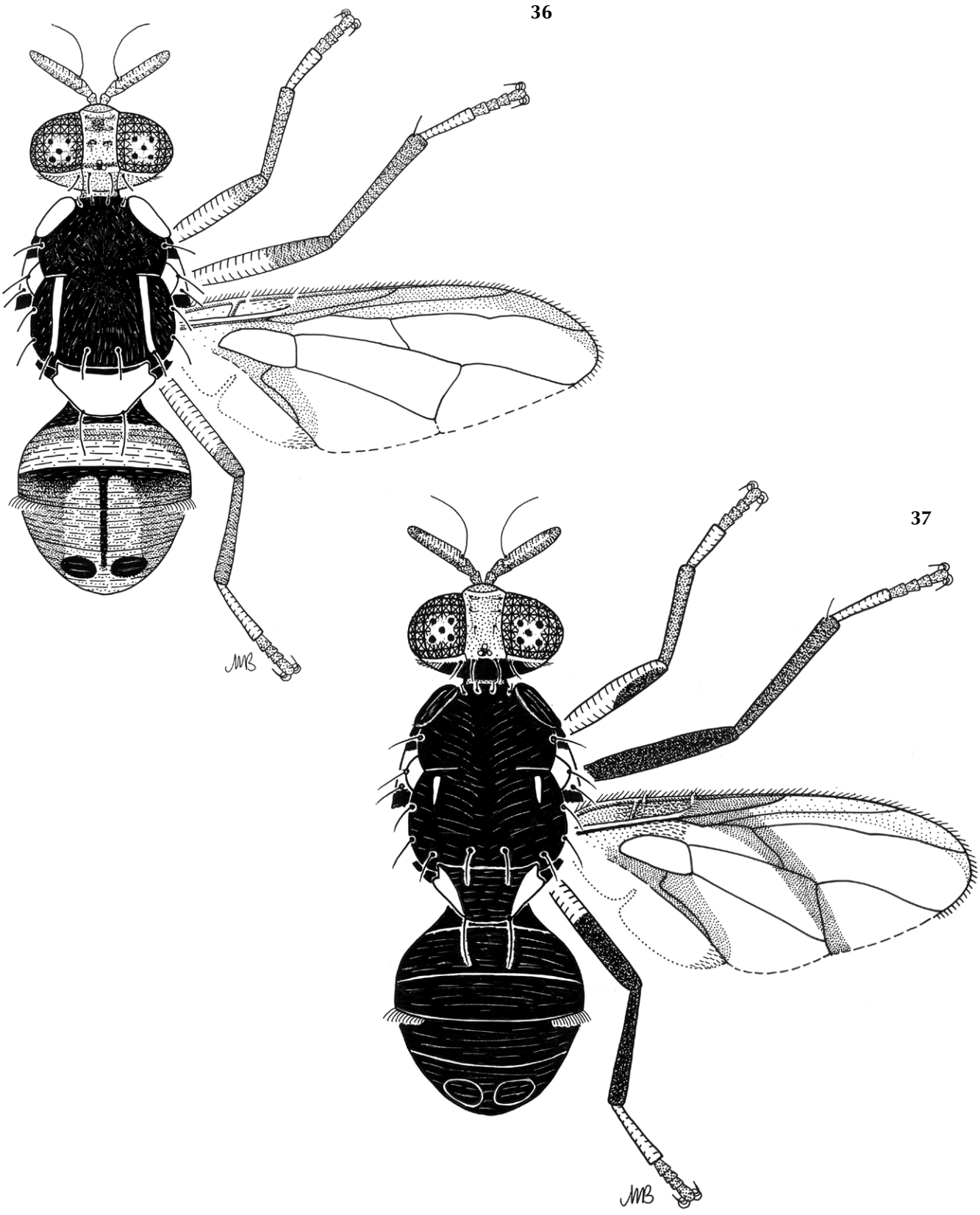
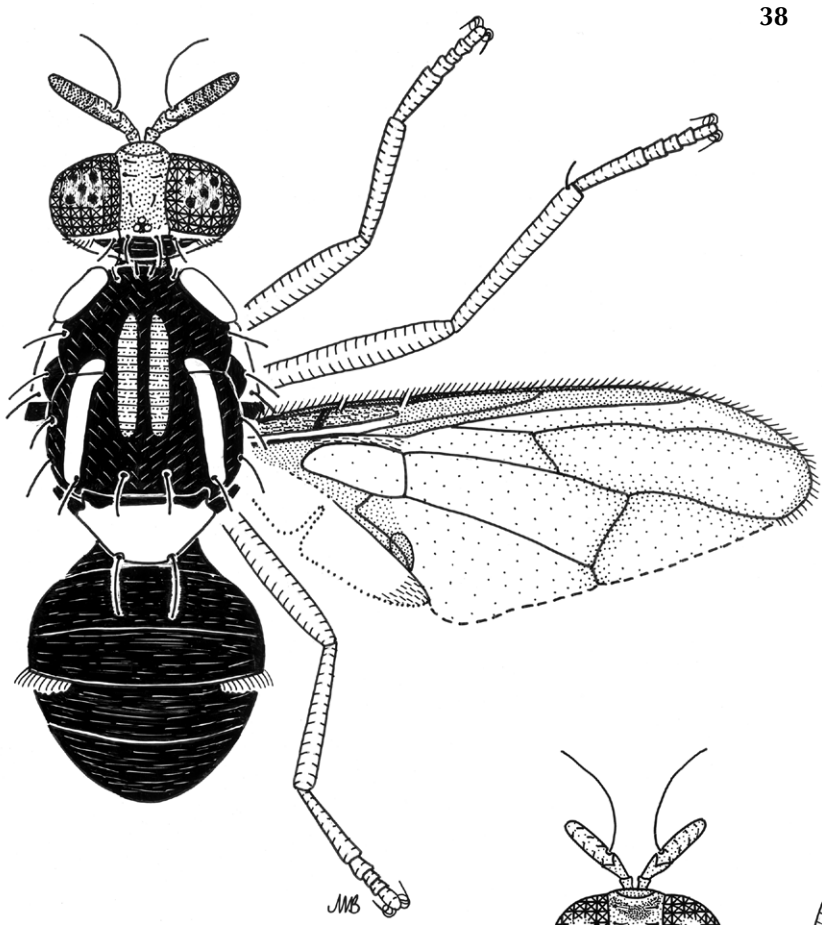


Fig. 36. *Bactrocera (Bactrocera) waidoriae*, new species, holotype male. **Fig. 37.** *Bactrocera (Bactrocera) yayamiae*, new species, holotype male.



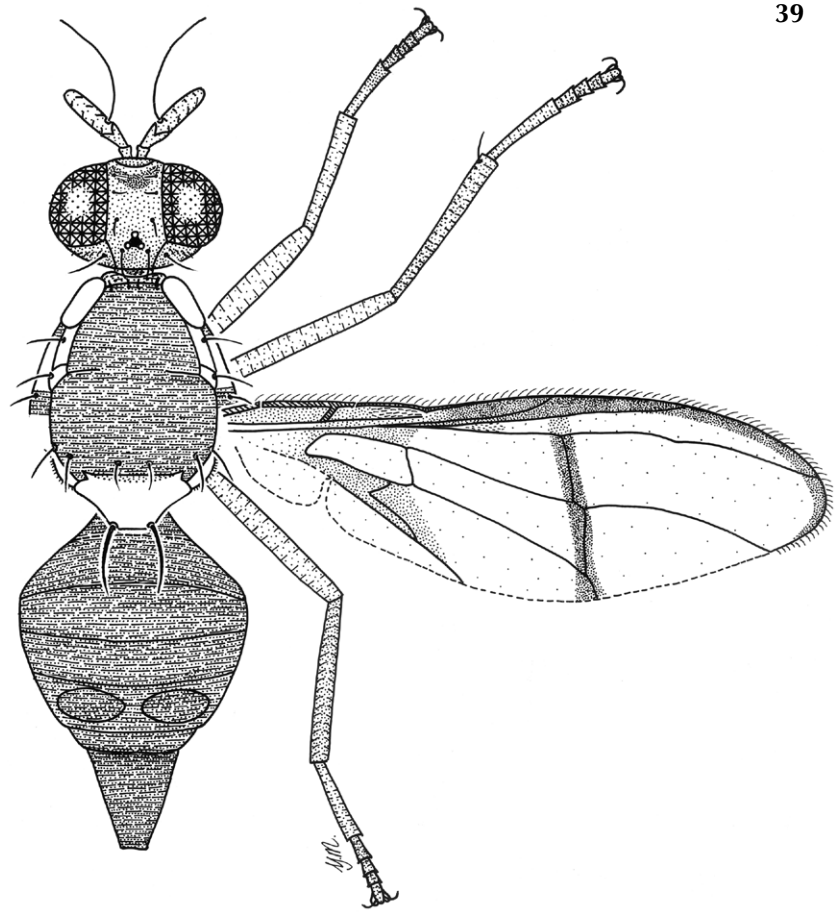


Fig. 38. *Bactrocera (Bulladacus) curiosa*, new species, holotype male. **Fig. 39.** *Bactrocera (Calodacus) insolita*, new species, holotype female.

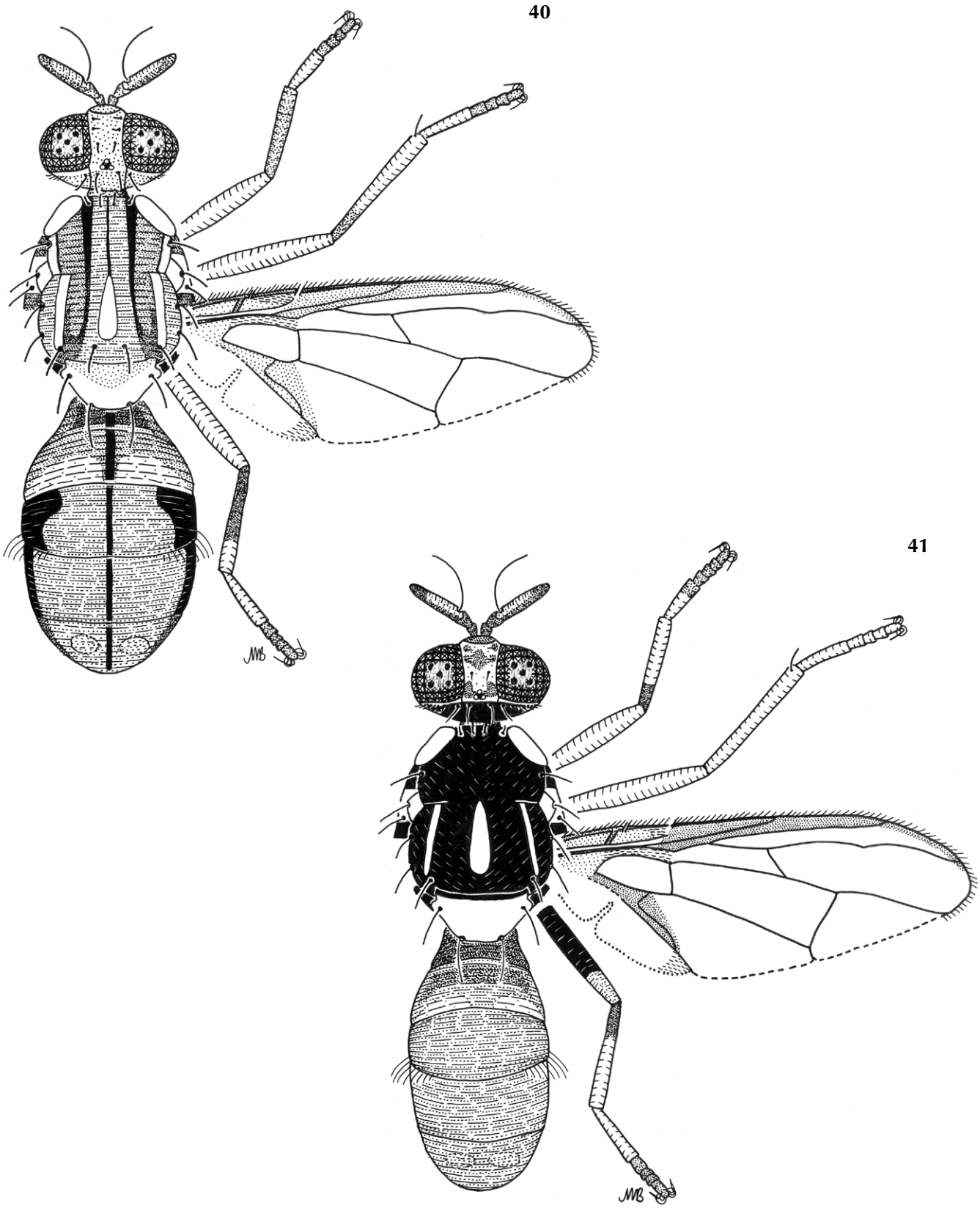
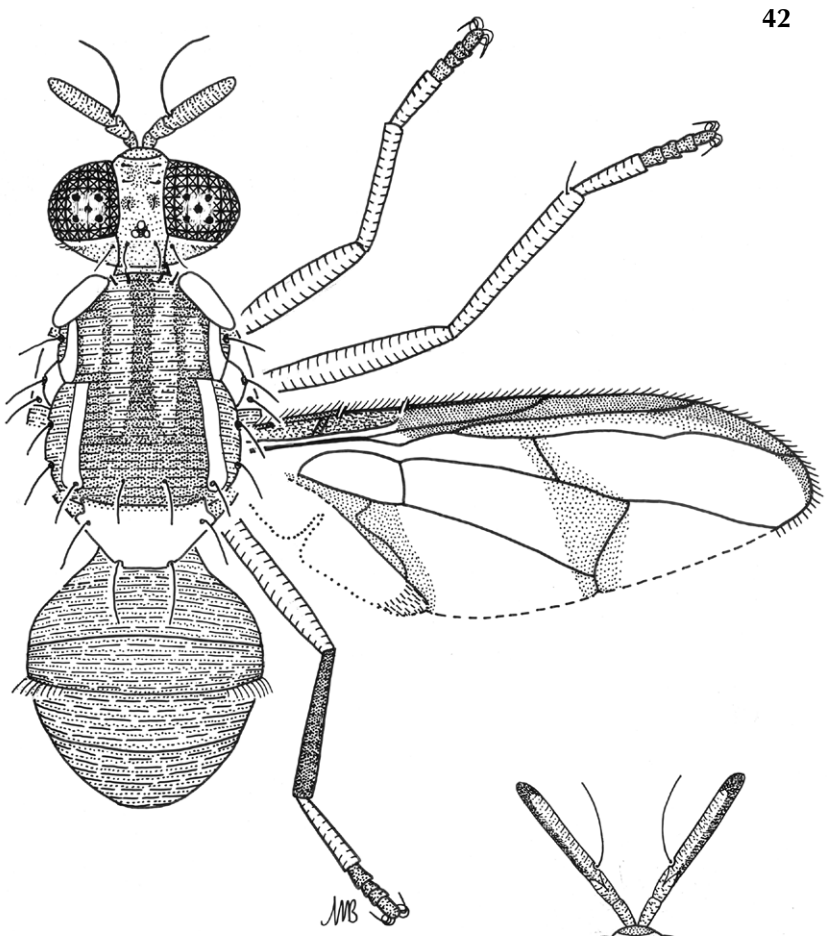


Fig. 40. *Bactrocera (Hemizeugodacus) neoaglaiae*, new species, holotype male. **Fig. 41.** *Bactrocera (Hemizeugodacus) wilhelmiae*, new species, holotype male.



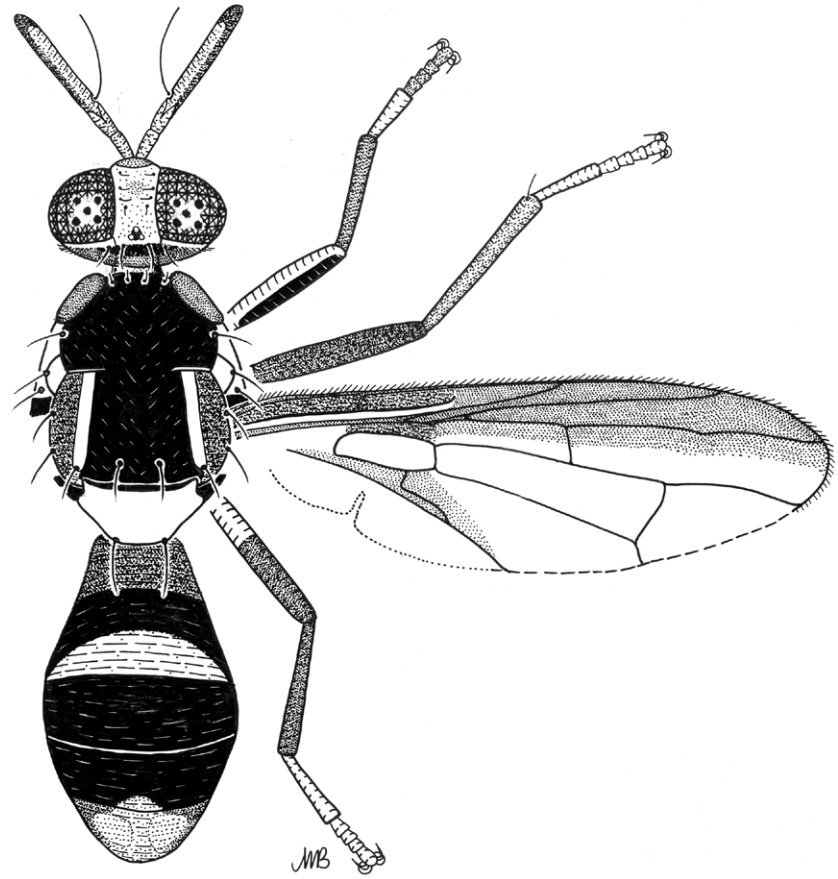
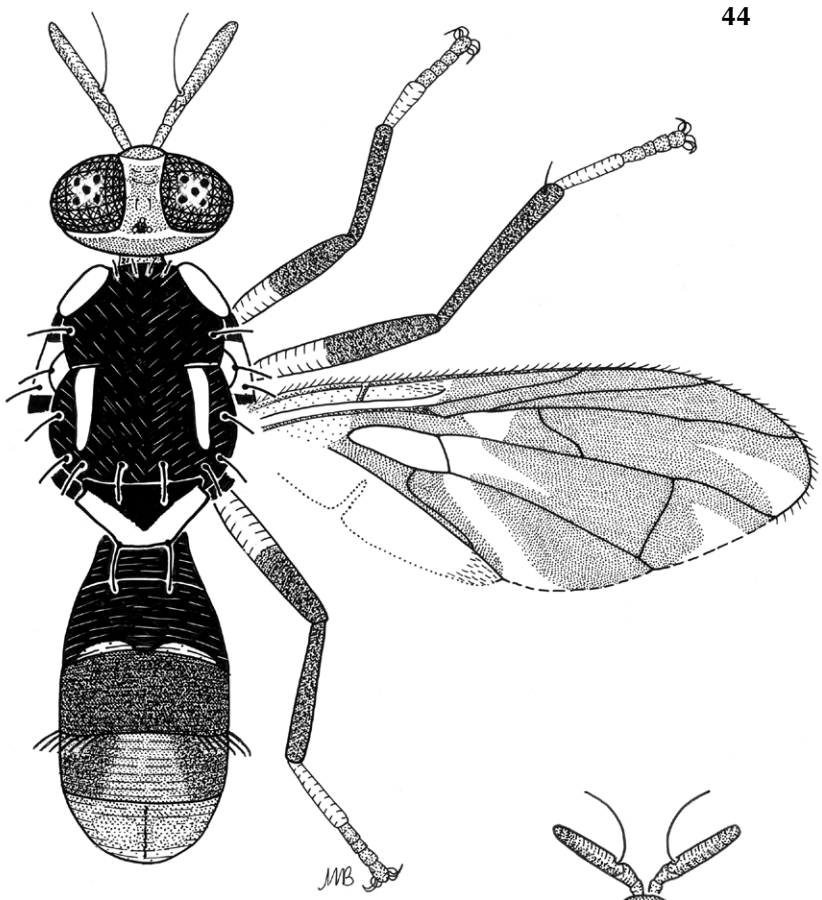


Fig. 42. *Bactrocera (Neozeugodacus) leblanci*, new species, paratype male. **Fig. 43.** *Bactrocera (Semicallantra) cerberae*, new species, holotype male.



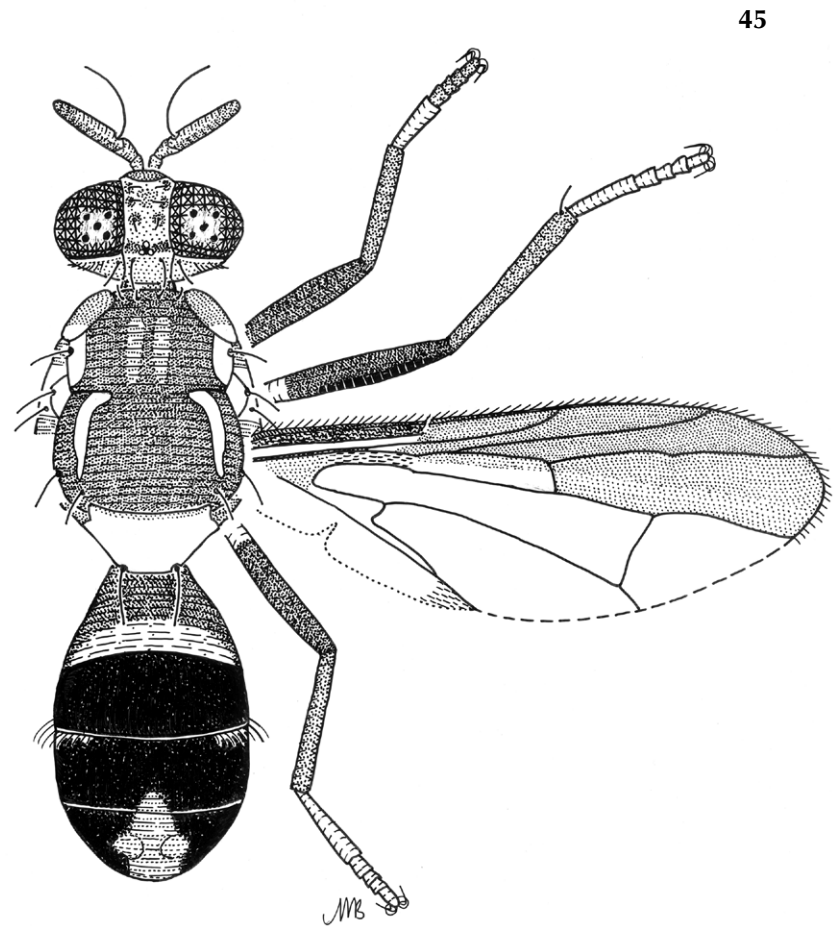
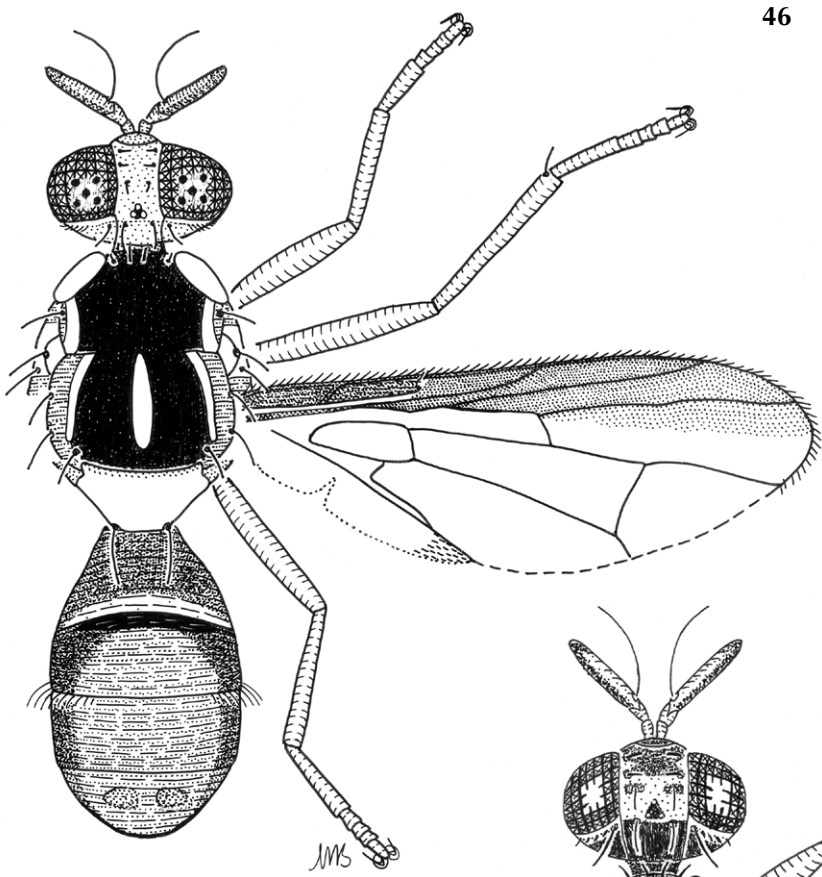


Fig. 44. *Bactrocera (Semicallantra) malasaitiae*, new species, holotype male. **Fig. 45.** *Bactrocera (Tetradacus) arbuscula*, new species, holotype male.



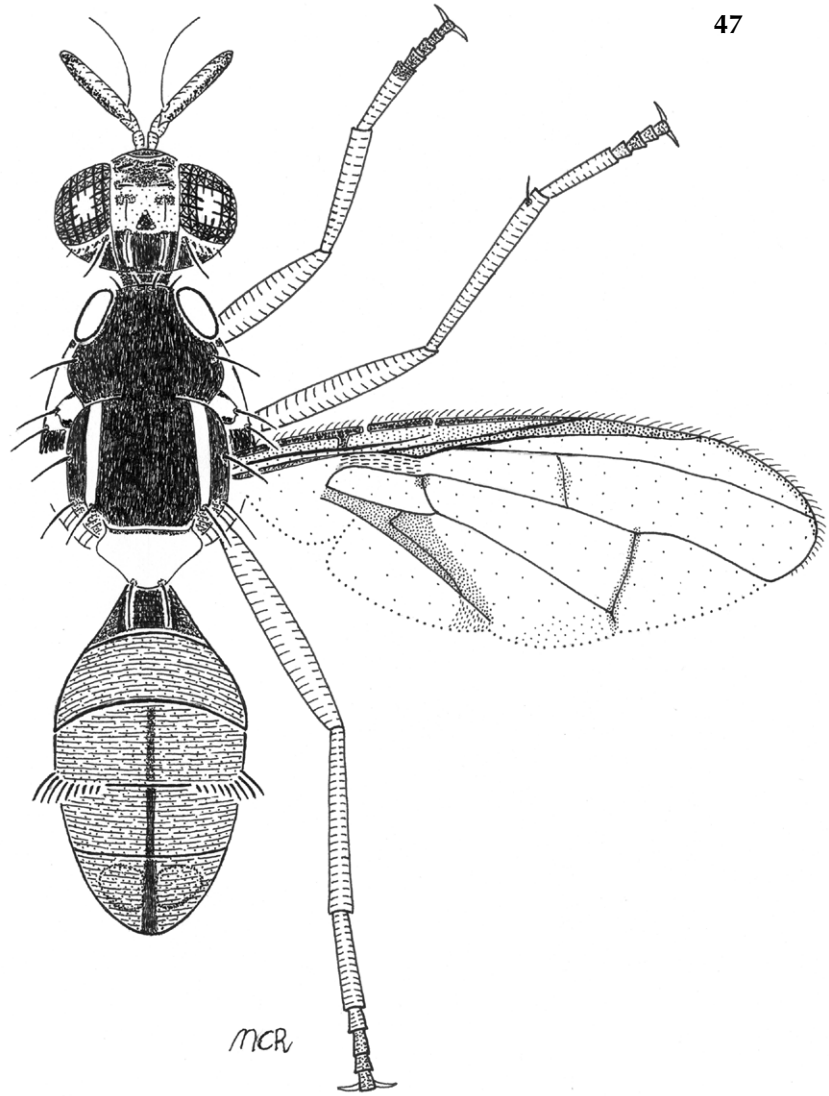
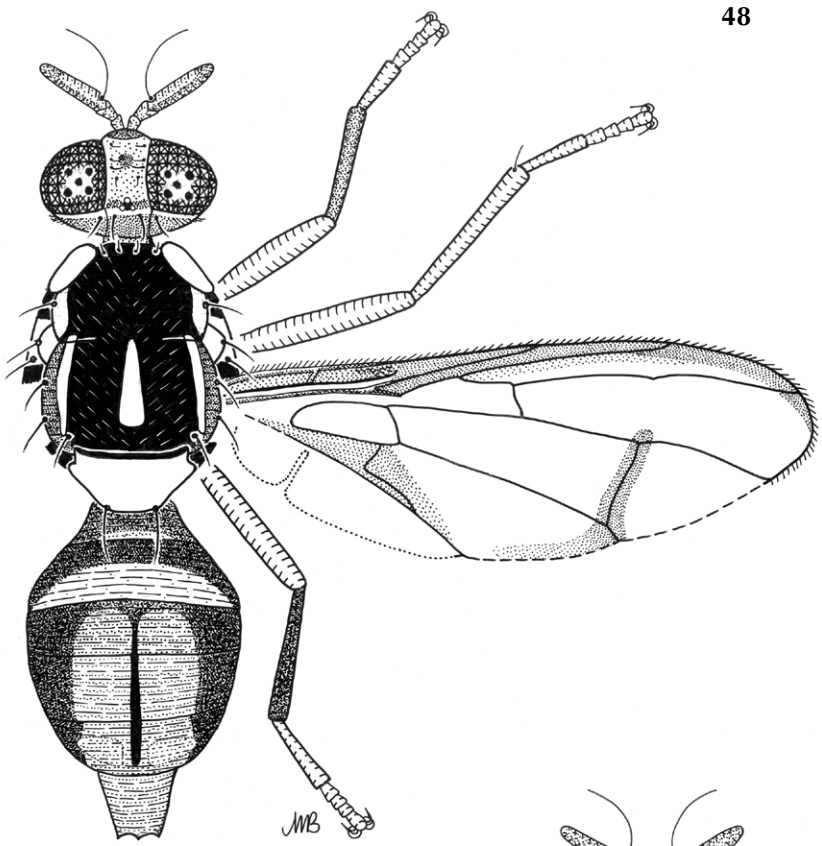


Fig. 46. *Bactrocera (Tetradacus) novotnyi*, new species, holotype male. **Fig. 47.** *Bactrocera (Tetradacus) procera*, new species, holotype male.



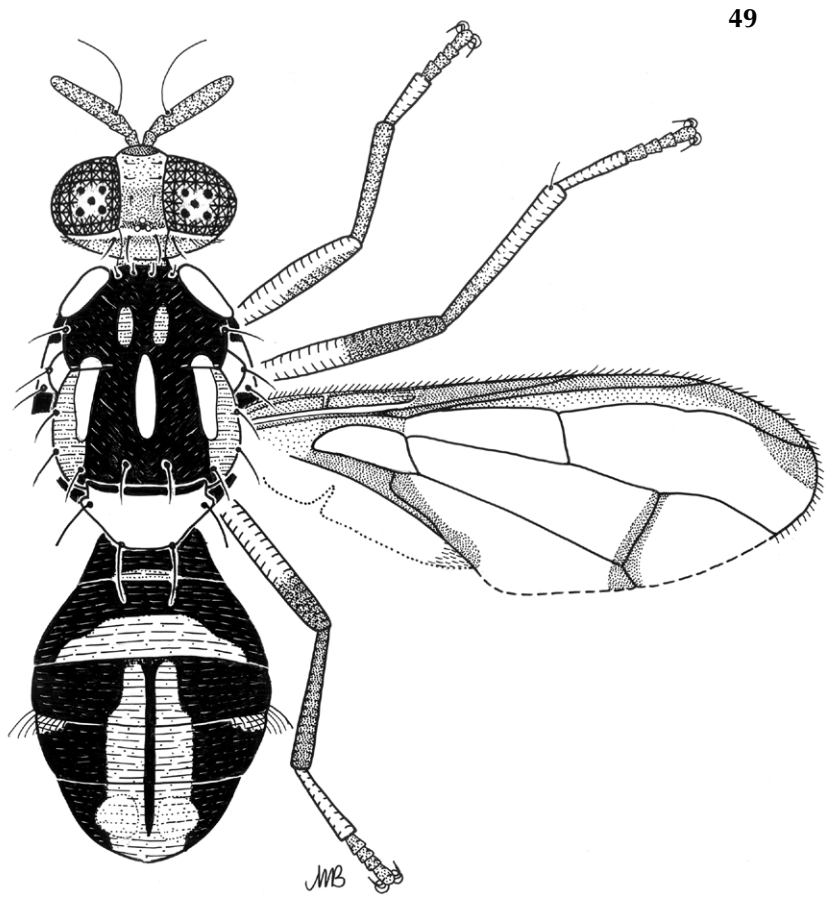
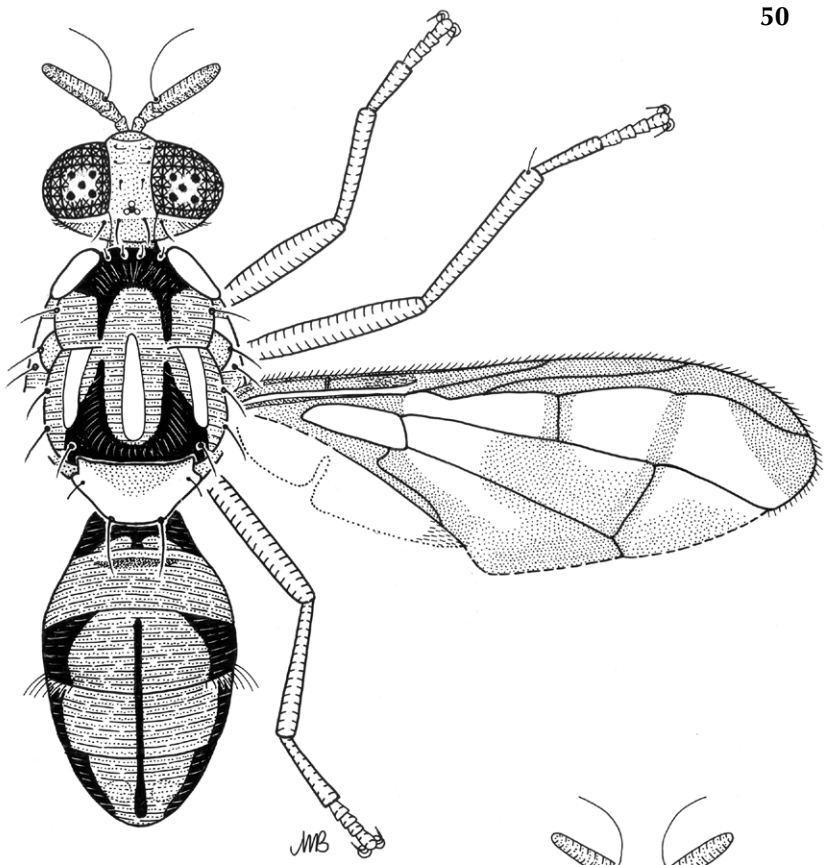


Fig. 48. *Bactrocera (Zeugodacus) aiyurae*, new species, holotype female. **Fig. 49.** *Bactrocera (Zeugodacus) anglimpiae*, new species, holotype male.



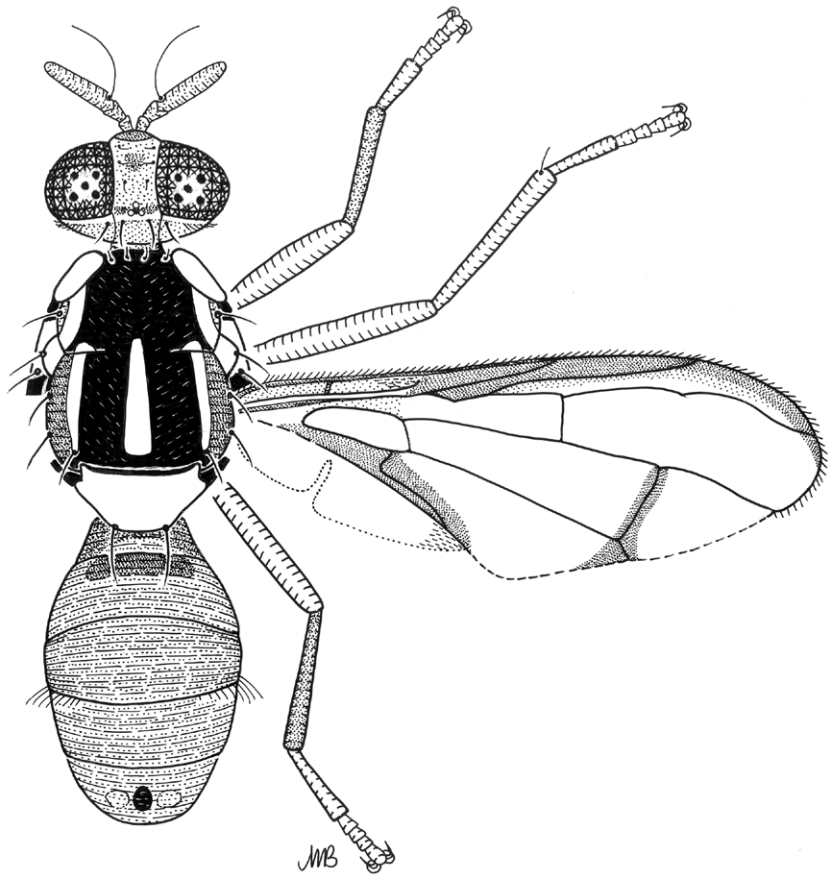


Fig. 50. *Bactrocera (Zeugodacus) bainingsiae*, new species, holotype male. **Fig. 51.** *Bactrocera (Zeugodacus) madangiae*, new species, holotype male.

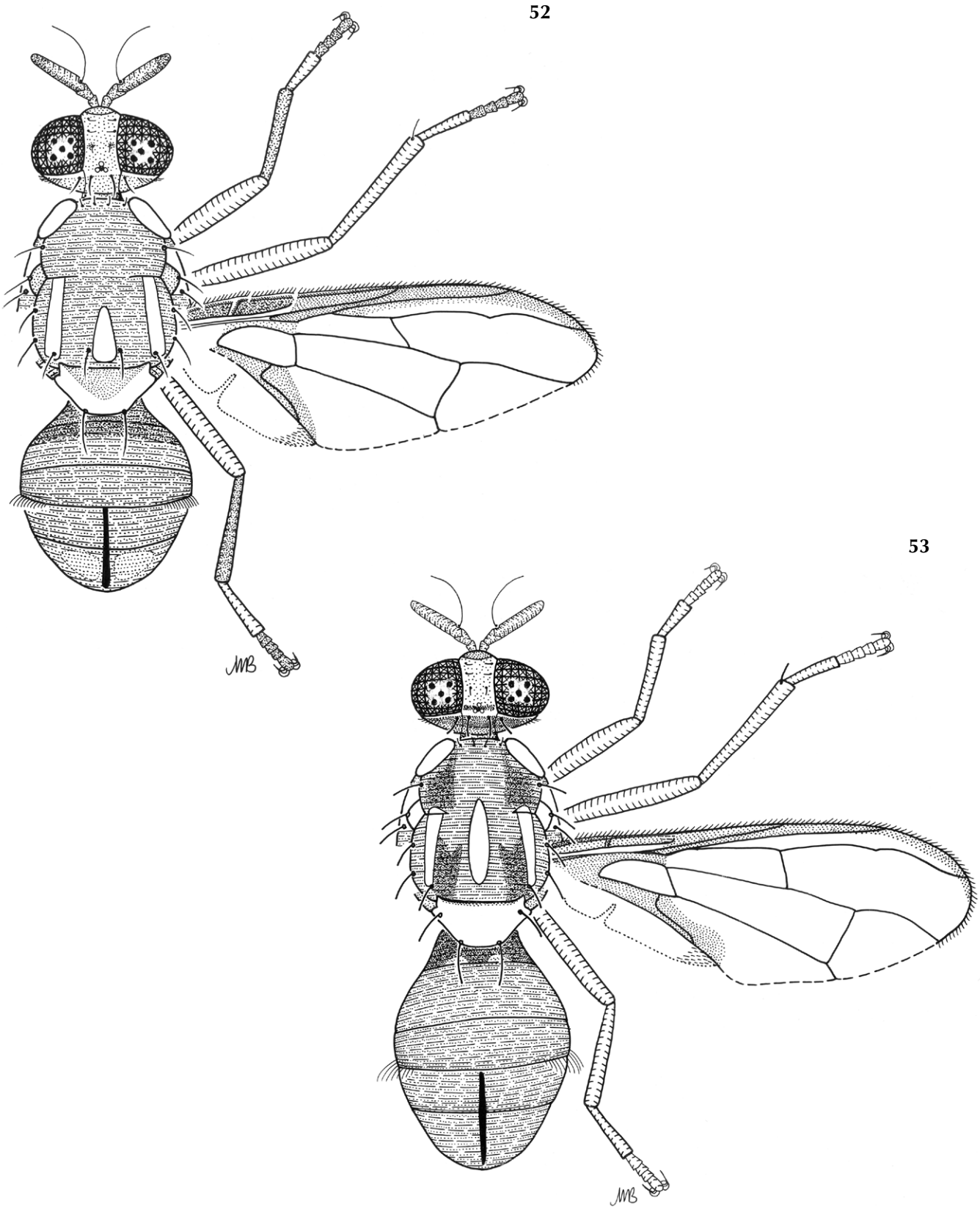
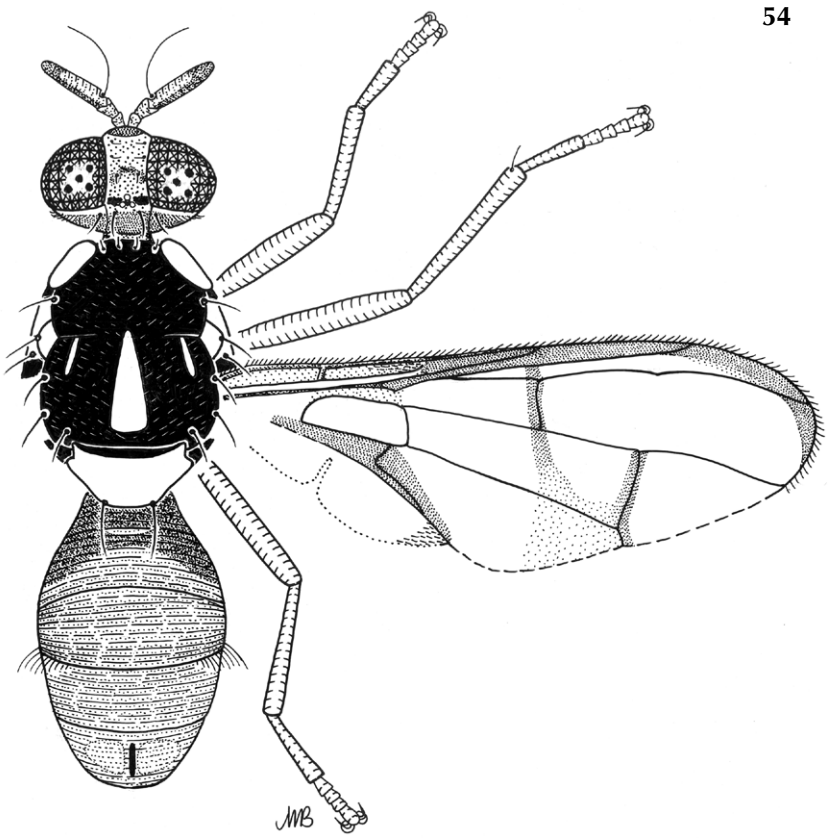


Fig. 52. *Bactrocera (Zeugodacus) magiae*, new species, holotype male. **Fig. 53.** *Bactrocera (Zeugoacus) mitparingii*, new species, holotype male.



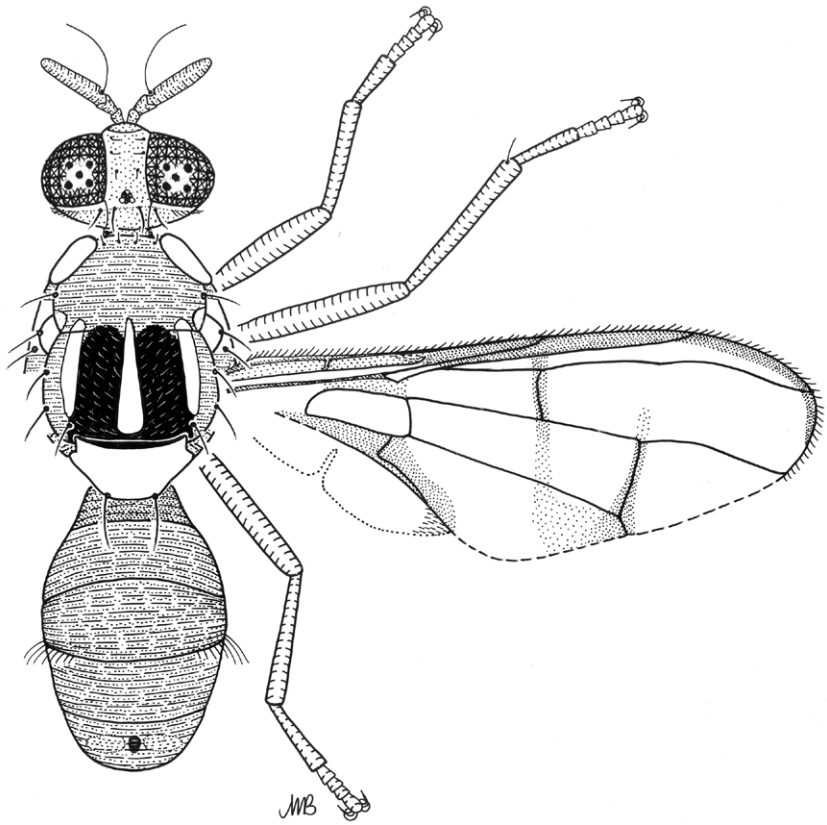
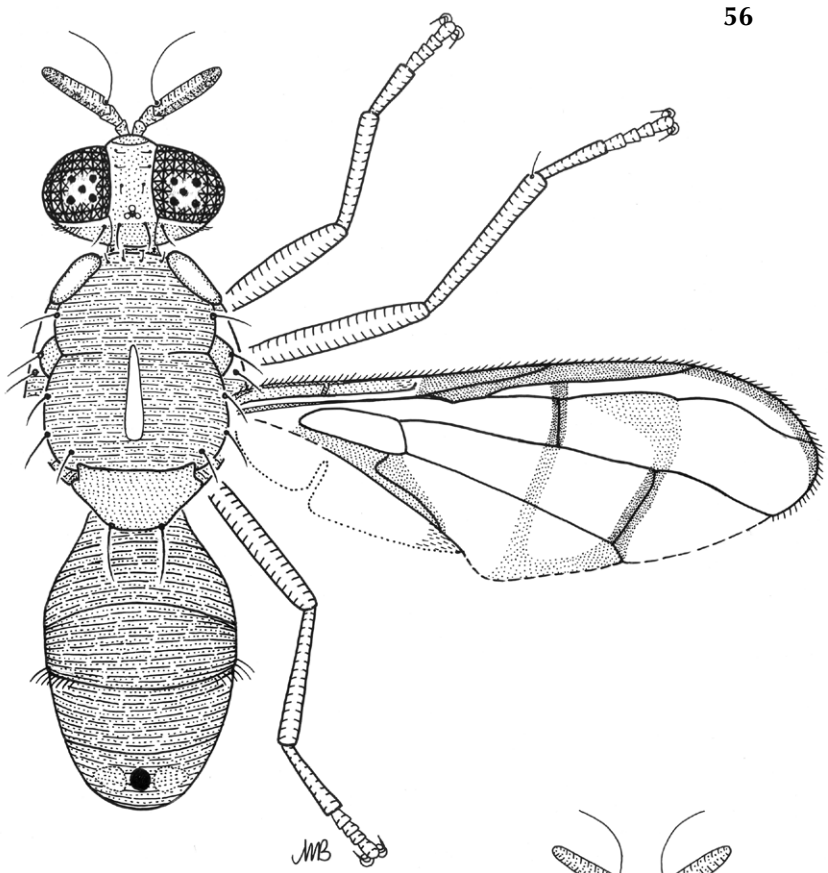


Fig. 54. *Bactrocera (Zeugodacus) oiyaripensis*, new species, holotype male. **Fig. 55.** *Bactrocera (Zeugodacus) parasepikae*, new species, holotype male.



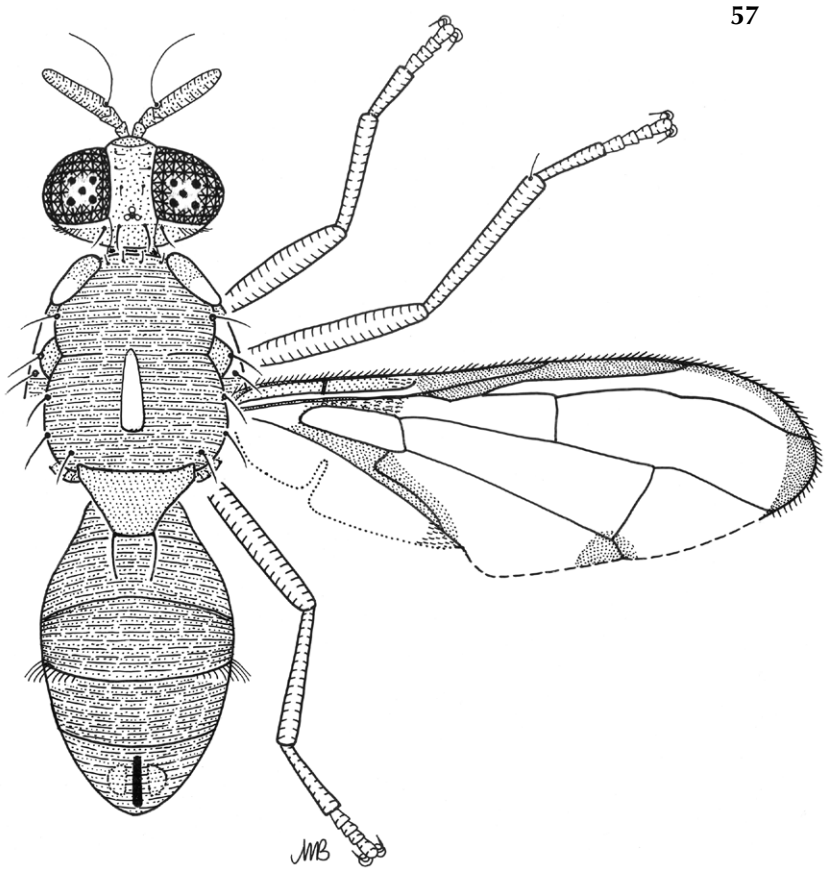


Fig. 56. *Bactrocera (Zeugodacus) rufoscutella*, new species, holotype male. **Fig. 57.** *Bactrocera (Zeugodacus) xanthovelata*, new species, holotype male.

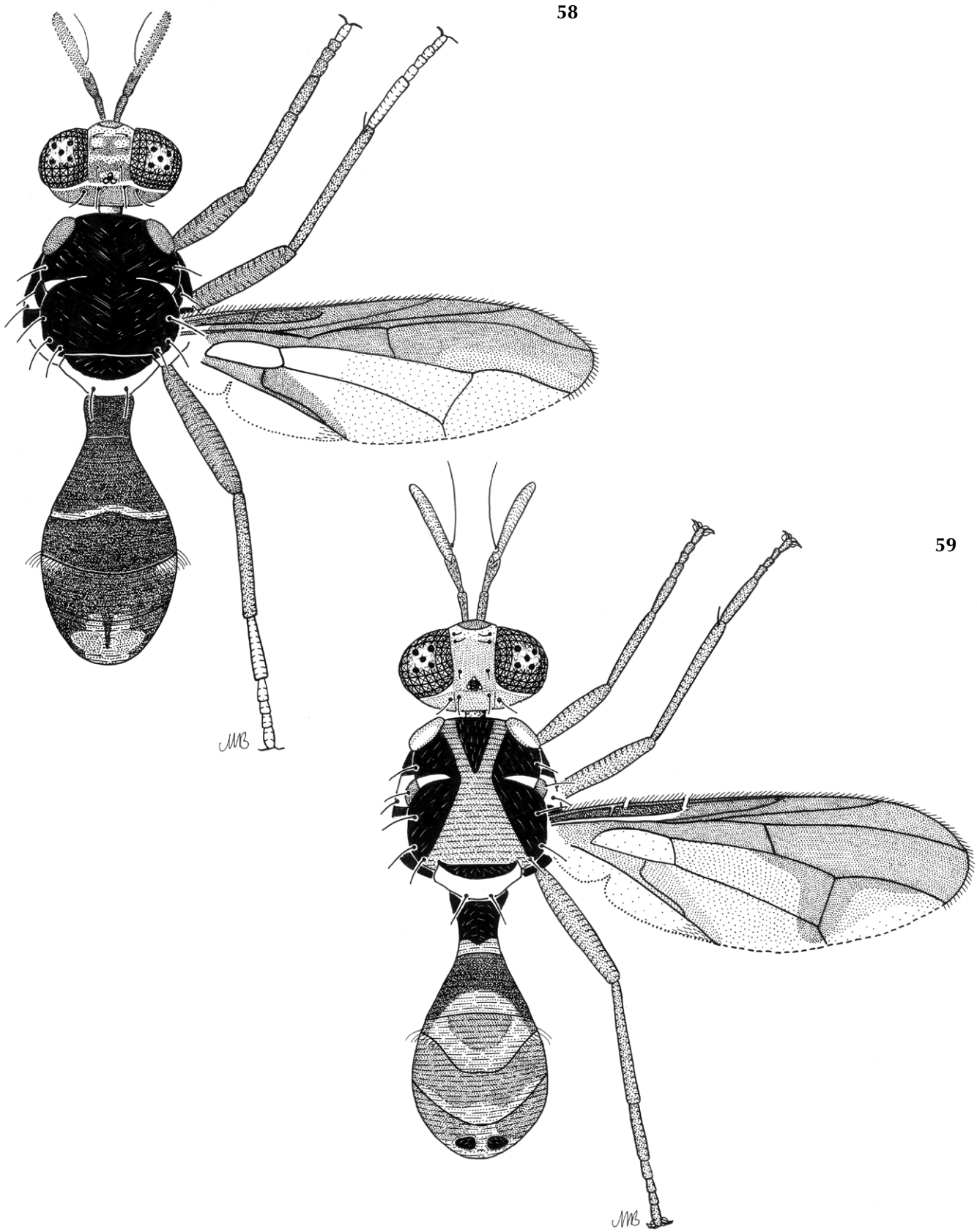


Fig. 58. *Dacus (Callantra) nigrolobus*, new species, holotype male. **Fig. 59.** *Dacus (Mellesis) alatifuscatus*, new species, holotype male.

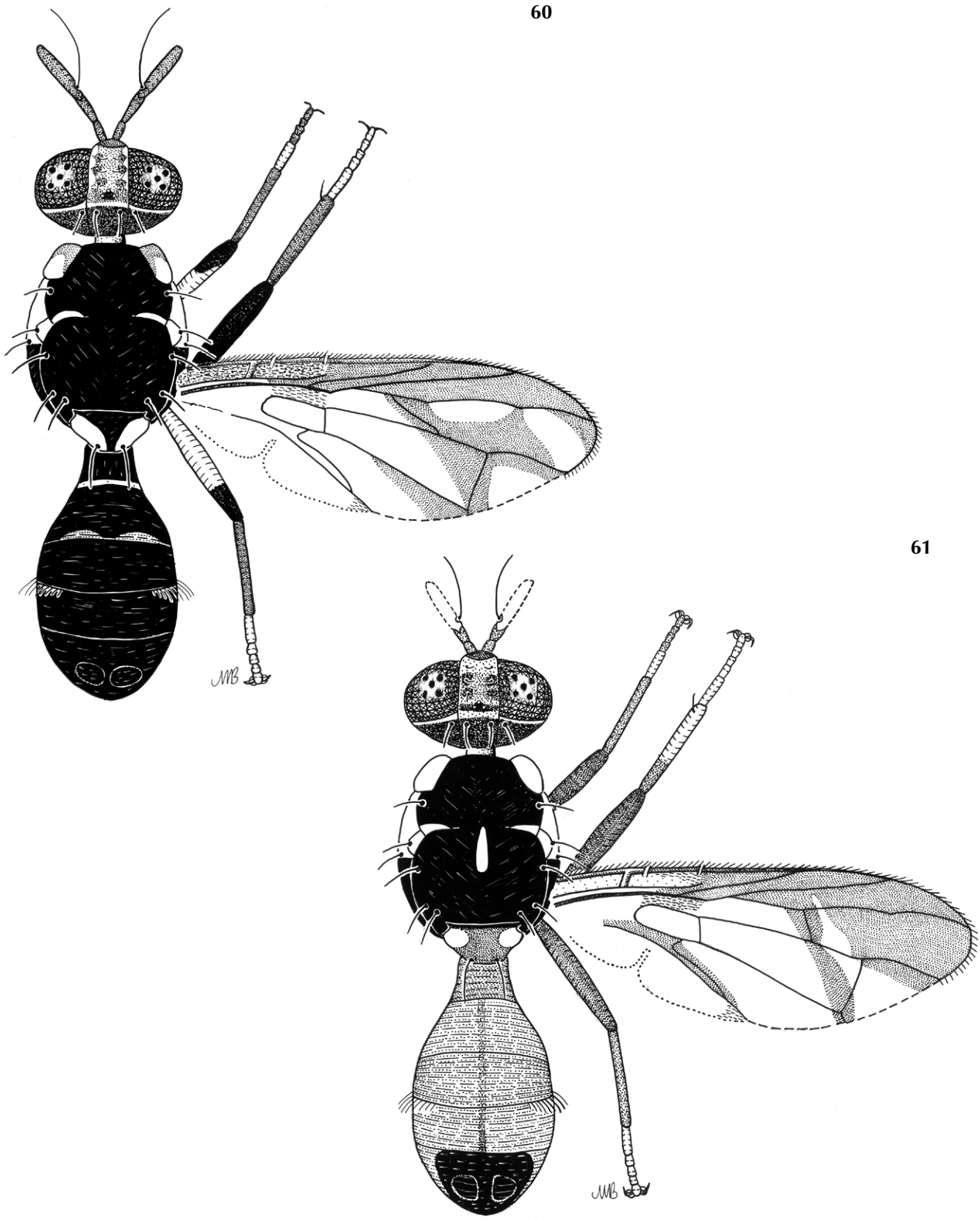


Fig. 60. *Dacus (Neodacus) asteriscus*, new species, holotype male. **Fig. 61.** *Dacus (Neodacus) bimaculosus*, new species, holotype male.

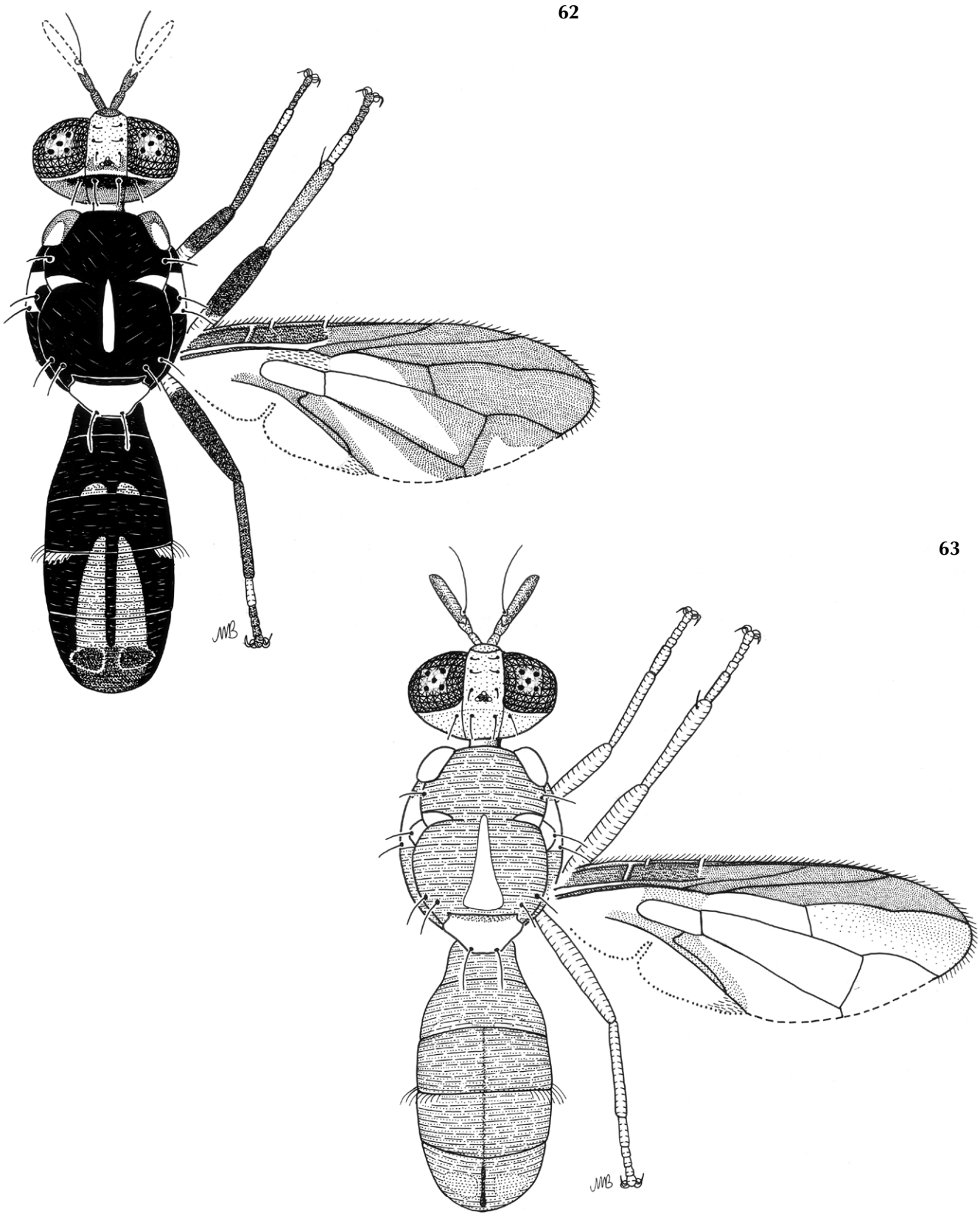


Fig. 62. *Dacus (Neodacus) curvabilis*, new species, holotype male. **Fig. 63.** *Dacus (Neodacus) kreeriae*, new species, holotype male.

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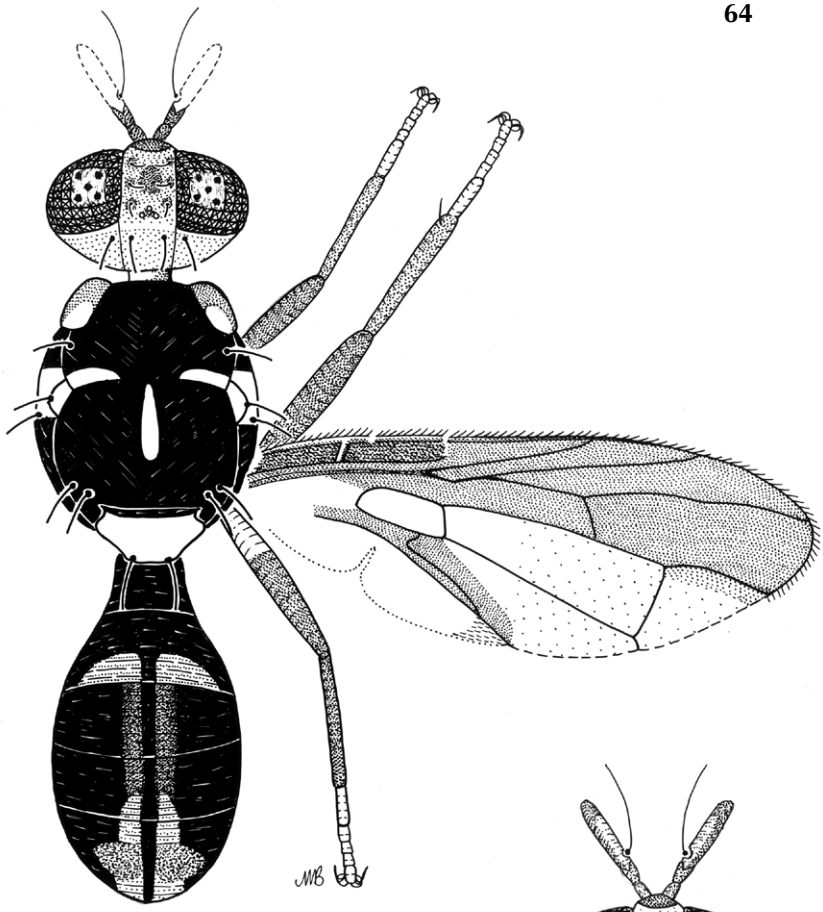

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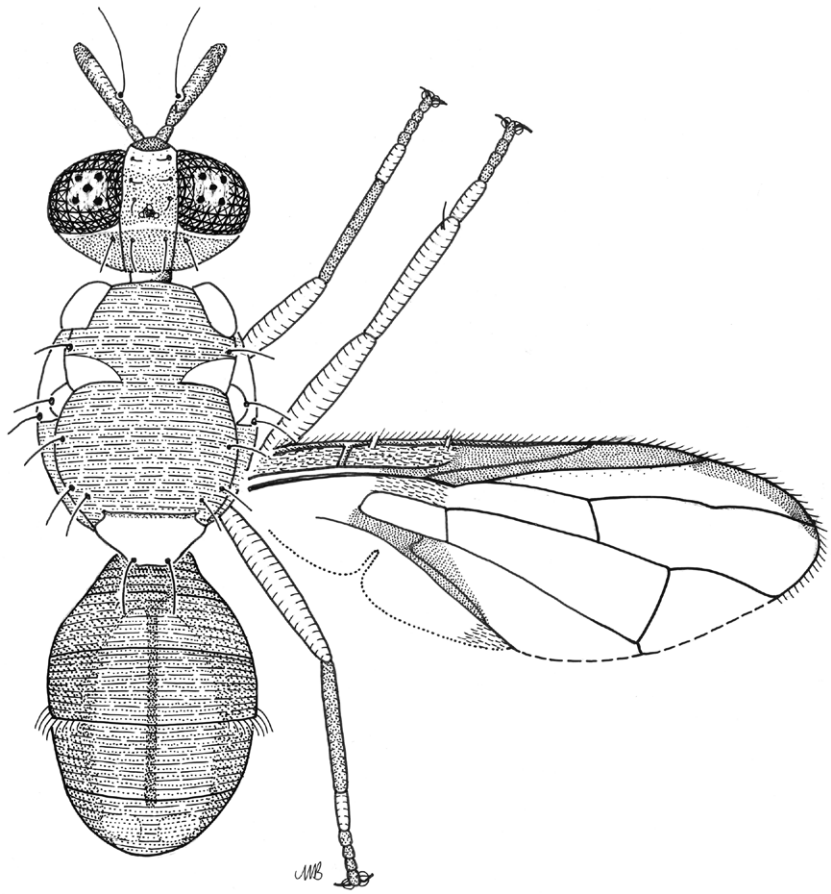

Fig. 64. *Dacus (Neodacus) lalokiae*, new species, holotype male. **Fig. 65.** *Dacus (Neodacus) neosignatifrons*, new species, holotype male.

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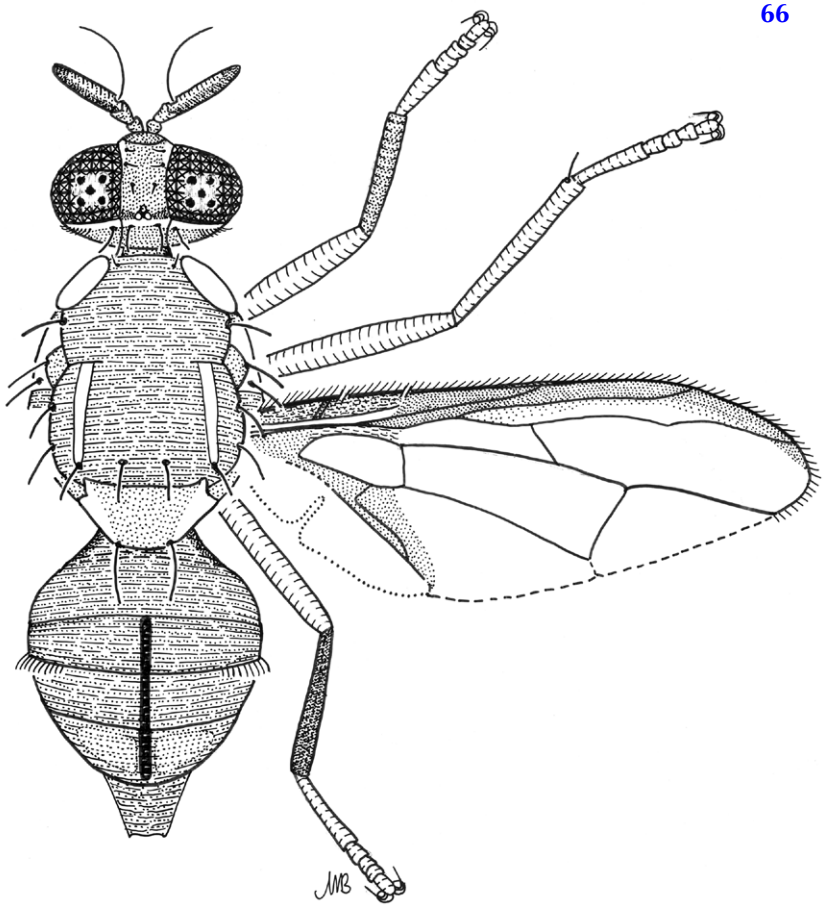

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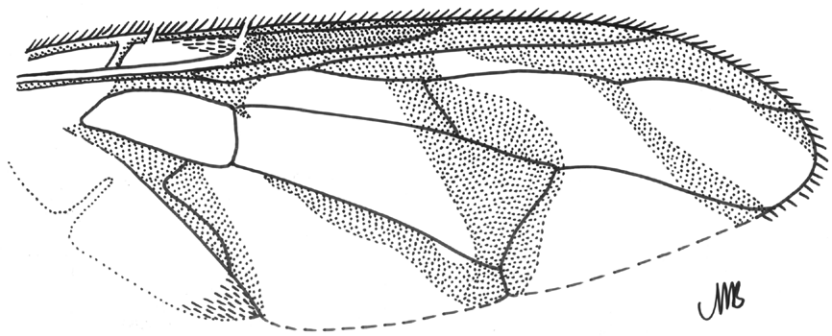


Fig. 66. *Bactrocera (Bactrocera) daruensis* Drew, female. **Fig. 67.** *Bactrocera (Bactrocera) denigrata* (Drew), stat rev, wing of male holotype.

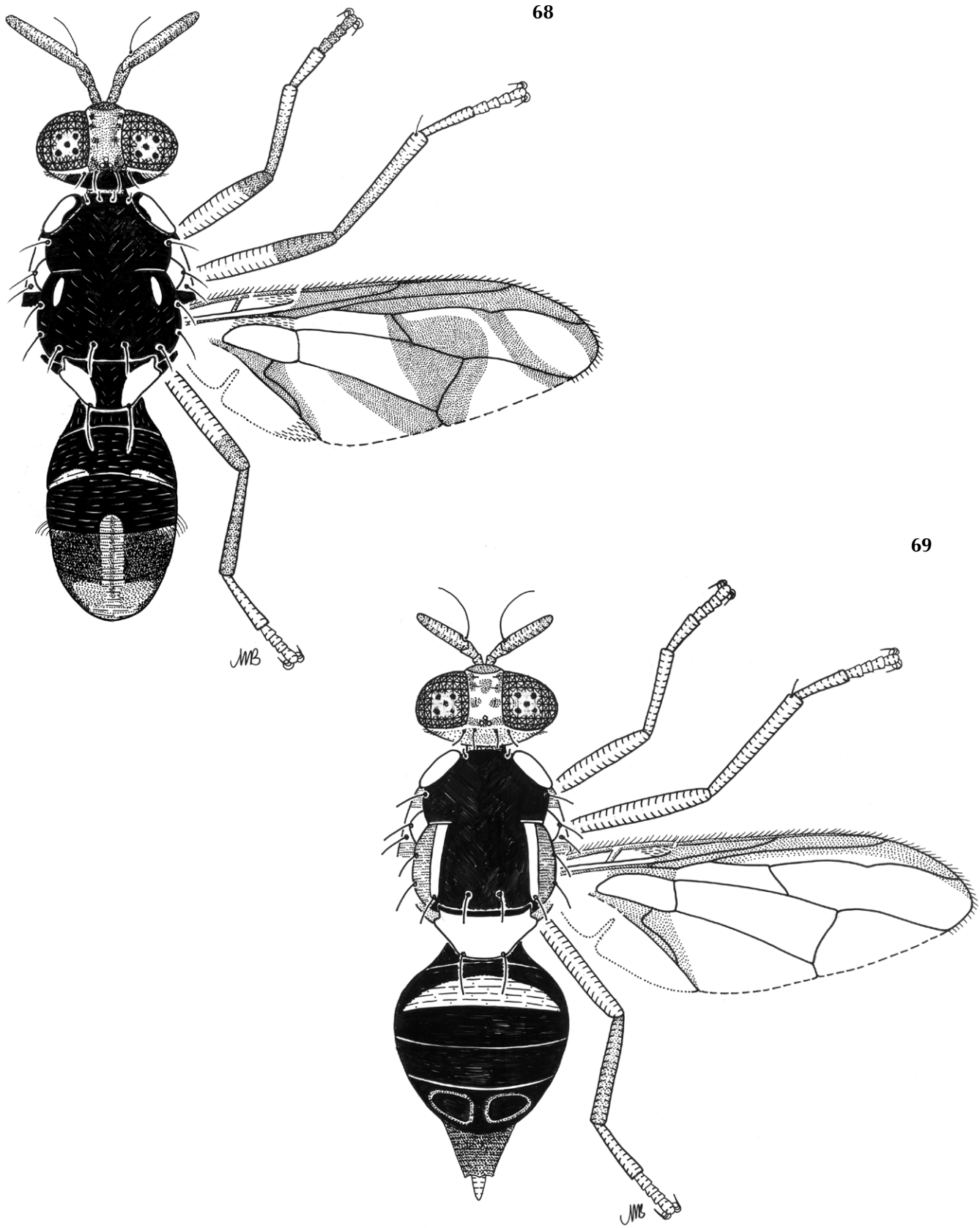
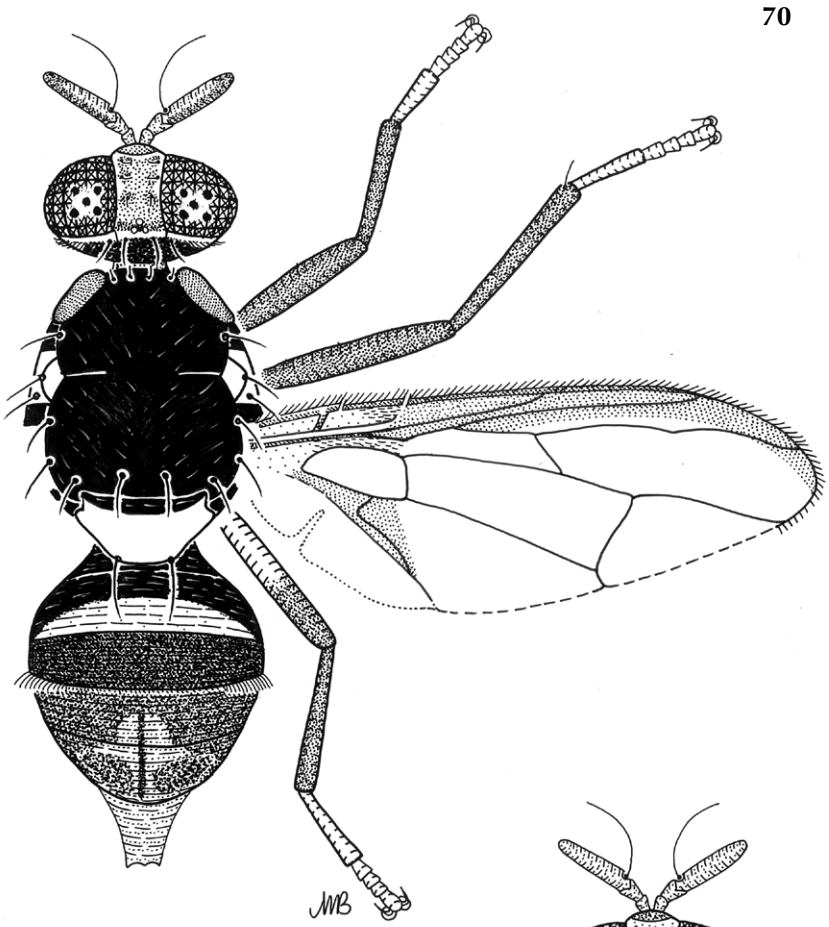


Fig. 68. *Bactrocera (Bactrocera) longicornis* Macquart, male. **Fig. 69.** *Bactrocera (Bactrocera) nigella* (Drew), female.



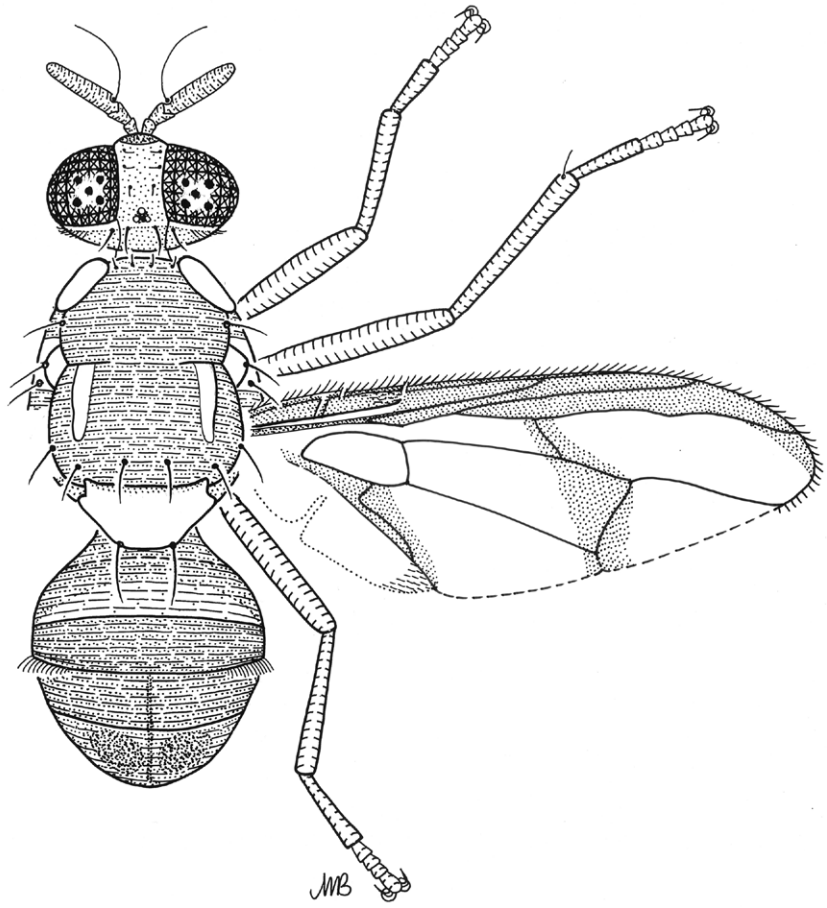


Fig. 70. *Bactrocera (Bactrocera) thistletoni* Drew, female. **Fig. 71.** *Bactrocera (Bactrocera) torresiae* Huxham & Hancock, male

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Index

This index is restricted to species that appear in discussions throughout the publication, including those mentioned in new analyses and records.

The fruit fly fauna (Diptera : Tephritidae : Dacinae) of Papua New Guinea, Indonesian Papua, associated islands and Bougainville

Richard A. I. Drew and Meredith C. Romig

The book is a taxonomic treatise of the tropical fruit flies of Papua New Guinea, Indonesian Papua, associated islands and Bougainville, the region of the world where speciation in the sub-family Dacinae has been most prolific. The book aims to provide readers with an updated record of all known species of Dacinae that occur in this geographic area including descriptions of 65 new species out of an entire list of 296 known species covered. It provides a discussion on the evolutionary origins of the Dacinae and a key to the genera and sub-genera recorded in the Australian-Pacific Region. Further, the major pest species and their biosecurity risks to other countries are discussed. Extensive field research by the authors and colleagues over many years has resulted in the accumulation of advanced knowledge of the tropical fruit flies in this region.

- Records 296 known species.
- Descriptions and artwork of 65 new species.
- Discusses the evolutionary origins of the Dacinae.
- Provides a key to the genera and sub-genera in the Australian-Pacific.

A key reference for researchers of taxonomy, ecology and pest management in the family Tephritidae worldwide. Useful for biosecurity and horticulture workers in Agriculture Departments within government administration and universities around the world.

Bactrocera procera illustration by Meredith Romig