A review of the Indo-Australian subgenus Parasinodacus Drew and Romig of 'Bactrocera Macquart' (Diptera: Tephritidae: Dacinae)

A REVIEW OF THE INDO-AUSTRALIAN SUBGENUS *PARASINODACUS* DREW & ROMIG OF *BACTROCERA* MACQUART (DIPTERA: TEPHRITIDAE: DACINAE)

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Abstract

The *Bactrocera* Macquart subgenus *Parasinodacus* Drew & Romig is reviewed and 19 species recognised, including six transferred from other subgenera: *B.* (*P.*) *absoluta* (Walker) and *B.* (*P.*) *atypica* White & Evenhuis (newly transferred from *Asiadacus* Perkins), *B.* (*P.*) *abdopallescens* (Drew) and *B.* (*P.*) *perpusilla* (Drew) (formally transferred from *Sinodacus* Zia), *B.* (*P.*) *hoedi* White and *B.* (*P.*) *pura* White (newly transferred from *Zeugodacus* Hendel). A key to species is included.

Introduction

This paper reviews the largely Southeast Asian subgenus *Parasinodacus* Drew & Romig of *Bactrocera* Macquart, which is considered here to contain 19 described species distributed from India to New Caledonia, with six newly or formally transferred from other subgenera. It appears to be most closely related to the monotypic subgenera *Nesodacus* Perkins from the Philippines and *Aglaodacus* Munro from Madagascar. All three subgenera belong in the *Zeugodacus* group of subgenera as defined by Drew (1989) and are united by the presence of a single pair of scutellar setae plus lack of a medial yellow vitta on the scutum. Similar *Zeugodacus*-group subgenera with 2 pairs of scutellar setae were reviewed by Hancock and Drew (2017).

Genus *Bactrocera* Macquart

Subgenus *Parasinodacus* Drew & Romig

Parasinodacus Drew & Romig, 2013: 14. Type species *Dacus incisus* Walker, 1861, by original designation.

Definition. Abdominal sternite V of male with a shallow posterior emargination; posterior lobe of male surstylus elongate and narrow; pecten of cilia present on abdominal tergite III of male; postpronotal setae absent; supra-alar setae usually present; prescutellar acrostichal setae present or absent; one pair of scutellar setae; scutum with postsutural medial yellow vitta absent.

Response to male lures. Cue lure (9 species) or no response known (10 species) (Drew 1989, Drew and Romig 2013, White and Evenhuis 1999).

Included species. *B. ablepharus* (Bezzi), *B. binoyi* Drew, *B. brevivitta* Drew & Romig, *B. cilifer* (Hendel), *B. citrifusca* Drew & Romig, *B. eurylomata* (Hardy), *B. incisa* (Walker), *B. longicaudata* (Perkins), *B. pahangiae* Drew & Romig, *B. pantabanganiae* Drew & Romig, *B. pseudocucurbitae* White, *B. vinnulus* (Hardy) and *B. waimitaliae* Drew & Romig, plus *B. abdopallescens*

(Drew) and *B. perpusilla* (Drew) (transferred from subgenus *Sinodacus* Zia), *B. absoluta* (Walker) and *B. atypica* White & Evenhuis (transferred from subgenus *Asiadacus* Perkins), *B. hoedi* White and *B. pura* White (transferred from subgenus *Zeugodacus* Hendel).

Host plants. Recorded from the fruit of Lauraceae and Melastomataceae (Drew and Romig 2013). A record from the flowers of Cucurbitaceae (Allwood *et al*. 1999) is uncertain.

Comments. The combination of a shallow emargination to sternite V and long posterior surstylus lobes places this subgenus in the *Zeugodacus* group of subgenera as defined by Drew (1989). It differs from all other subgenera in that group in the combination of only one pair of scutellar setae, pecten present and scutum with medial yellow vitta absent. It most resembles subgenus *Nesodacus* Perkins (containing the sole species *B.* (*N.*) *atrichus* (Bezzi): Drew and Romig 2013) and is possibly synonymous with it. However, although *Nesodacus* similarly has only one pair of scutellar setae and lacks prescutellar acrostichal setae and the medial vitta, it also lacks the pecten and, since these character states are all homoplasious (occurring in numerous unrelated subgenera) and its host plant is unknown, it is kept separate pending further study. It is also possibly related to the Madagascan subgenus *Aglaodacus* Munro (containing the sole species *B.* (*A.*) *nesiotes* (Munro)), with which it shares the absence of a medial yellow vitta, a well developed supernumerary lobe on the male wing and presence of the pecten plus prescutellar acrostichal and only one pair of scutellar setae. However, the male surstylus and sternite V characters have not been recorded for *B. nesiotes* [the surstylus merely noted as 'peculiar' by Munro (1984)], the wing is very broadly infuscated apically and lateral postsutural vittae are absent; hence it also is kept separate pending further study.

In three species where females are known, *B. hoedi*, *B. longicaudata* and *B. pura*, the oviscape is elongate, a little longer than tergites III-V combined.

Included species

For detailed morphological descriptions and illustrations of all but three species see Drew (1989) and Drew and Romig (2013); the remaining species were described and illustrated by White and Evenhuis (1999). Three species-groups are recognisable based on setal configuration, colour of the femora and geographical distribution. Molecular evidence (Krosch *et al*. 2012) suggests a close, monophyletic relationship between *B. cilifera*, *B. longicaudata* and *B. abdopallescens* (the three species tested) and independently supports the inclusion of Groups A, B and C in *Parasinodacus* as recognised by Drew and Romig (2013).

Group A: Prescutellar acrostichal setae present. Femora partly black or entirely fulvous. Southeast Asia to Papua Province, Indonesia. Seven species.

B. (*Parasinodacus*) *brevivitta* Drew & Romig

Bactrocera (*Parasinodacus*) *brevivitta* Drew & Romig, 2013: 226. Type locality Jln Kf Mimaland, West Malaysia.

Distribution. West Malaysia.

Host plant. Melastoma malabathricum (Melastomataceae) (Drew and Romig 2013).

Male lure. None known.

B. (*Parasinodacus*) *cilifer* (Hendel)

Dacus cilifer Hendel, 1912: 15. Type locality Koshun, Taiwan.

Dacus (*Zeugodacus*) *tenuifinis* Hardy, 1983: 42. Type locality Pasaman, Sumatra. Syn: Drew and Romig 2013: 227.

Bactrocera (*Parasinodacus*) *cilifera* (Hendel): Drew and Romig 2013: 227.

Distribution. China, Taiwan, Vietnam, Laos, Thailand, West Malaysia and Indonesia (Sumatra).

Host plant. A single male reared from [a sample of 41] male flowers of *Thladiantha hookeri* (Cucurbitaceae) in Thailand (Allwood *et al.* 1999) requires confirmation.

Male lure. Cue lure.

Comment. The name '*cilifer*' is treated as a noun in apposition (ICZN 1999).

B. (*Parasinodacus*) *citrifusca* Drew & Romig

Bactrocera (*Parasinodacus*) *citrifusca* Drew & Romig, 2013: 228. Type locality Bangkhuntak, Muang Samut Song Khram, Thailand.

Distribution. Central Thailand.

Host plant. None known.

Male lure. None known.

B. (*Parasinodacus*) *hoedi* White

Bactrocera (*Zeugodacus*) *hoedi* White, in White and Evenhuis, 1999: 529. Type locality Hollandia [= Jayapura], Indonesia.

Distribution. Eastern Indonesia (northern Papua Province).

Host plant. None known.

Male lure. None known.

Comments. This species is transferred from subgenus *Zeugodacus*, which differs in the presence of a postsutural medial yellow vitta (Drew and Romig 2013). Known only from the holotype female, it is provisionally included here in *Parasinodacus*. It was illustrated by White and Evenhuis (1999).

B. (*Parasinodacus*) *pahangiae* Drew & Romig

Bactrocera (*Parasinodacus*) *pahangiae* Drew & Romig, 2013: 232. Type locality nr Gap Rest House, Pahang, West Malaysia.

Distribution. West Malaysia.

Host plant. Litsea sp. (Lauraceae) (Drew and Romig 2013).

Male lure. None known.

B. (*Parasinodacus*) *pseudocucurbitae* White

Bactrocera (*Bactrocera*) *pseudocucurbitae* White, in White and Evenhuis 1999: 502. Type locality Danum Valley, Sabah, East Malaysia.

Bactrocera (*Parasinodacus*) *pseudocucurbitae* White: Drew and Romig 2013: 234.

Distribution. Thailand, Malaysia (West, Sarawak, Sabah) and Indonesia (Kalimantan, Lombok, Bali, Flores, Sumbawa).

Host plant. None known.

Male lure. Cue lure.

B. (*Parasinodacus*) *pura* White

Bactrocera (*Zeugodacus*) *pura* White, in White and Evenhuis 1999: 533. Type locality Dojo [? = Dobo, west of Jayapura], Indonesia.

Distribution. Eastern Indonesia (northern Papua Province).

Host plant. None known.

Male lure. None known.

Comments. This species is transferred from subgenus *Zeugodacus*, which differs in the presence of a postsutural medial yellow vitta (Drew and Romig 2013). Known only from the holotype female, it is provisionally included here in *Parasinodacus*. It was illustrated by White and Evenhuis (1999).

Group B: Prescutellar acrostichal setae absent. Femora partly black. South and Southeast Asia, including Philippines. Six species.

B. (*Parasinodacus*) *ablepharus* (Bezzi)

Chaetodacus ablepharus Bezzi, 1919: 422. Type locality Malinao, Tayabas, Luzon, Philippines.

Chaetodacus ablepharus var. *mindanaus* Bezzi, 1919: 422. Type locality Davao, Mindanao, Philippines. Syn: Norrbom *et al*. 1999: 98.

Bactrocera (*Parasinodacus*) *ablepharus* (Bezzi): Drew and Romig 2013: 225.

Distribution. Philippines (Luzon, Mindanao), East Malaysia (Sabah) and Vietnam.

Host plant. None known.

Male lure. None known.

B. (*Parasinodacus*) *binoyi* Drew

Bactrocera (*Sinodacus*) *binoyi* Drew, in Drew and Raghu 2002: 347. Type locality New Ambarambalan Forest, Kerala, India.

Bactrocera (*Parasinodacus*) *binoyi* Drew: Drew and Romig 2013: 226.

Distribution. Southern India.

Host plant. None known.

Male lure. Cue lure.

B. (*Parasinodacus*) *incisa* (Walker)

Dacus incisus Walker, 1861b: 323. Type locality Burma.

Dacus poonensis Kapoor, 1971: 478. Type locality Poona, India. Syn: Norrbom *et al*. 1999: 91.

Bactrocera (*Parasinodacus*) *incisa* (Walker): Drew and Romig 2013: 230.

Distribution. India (including Andaman Is), Burma, China (Yunnan), Vietnam, Thailand, West Malaysia.

Host plant. None known.

Male lure. Cue lure.

B. (*Parasinodacus*) *longicaudata* (Perkins)

Nesodacus longicaudatus Perkins, 1938: 134. Type locality Bettotan, nr Sandakan, Sabah, East Malaysia.

Bactrocera (*Parasinodacus*) *longicaudata* (Perkins): Drew and Romig 2013: 231.

Distribution. East Malaysia (Sarawak, Sabah) and Thailand.

Host plant. None known.

Male lure. Cue lure.

B. (*Parasinodacus*) *pantabanganiae* Drew & Romig

Bactrocera (*Parasinodacus*) *pantabanganiae* Drew & Romig, 2013: 233. Type locality Pantabangan, Nueva Ecija, Luzon, Philippines.

Distribution. Philippines (Luzon).

Host plant. None known.

Male lure. None known.

B. (*Parasinodacus*) *vinnulus* (Hardy)

Dacus (*Pacifodacus*) *vinnulus* Hardy, 1973: 23. Type locality Yala, Thailand.

Dacus (*Pacifodacus*) *drewi* Hardy, 1983: 29. Type locality nr Bohorok, Sumatra. Syn: Drew and Romig 2013: 235.

Bactrocera (Parasinodacus) *vinnulus* (Hardy): Drew and Romig 2013: 235.

Distribution. Southern Thailand, West Malaysia and Indonesia (Sumatra).

Host plant. None known.

Male lure. Cue lure.

Group C: Prescutellar acrostichal setae absent. Femora entirely fulvous. Sulawesi to New Caledonia. Six species.

B. (*Parasinodacus*) *abdopallescens* (Drew)

Dacus (*Asiadacus*) *abdopallescens* Drew, 1971: 31. Type locality Lumi, Sepik district, Papua New Guinea.

Bactrocera (*Sinodacus*) *abdopallescens* (Drew): Drew 1989: 201.

Bactrocera (*Parasinodacus*) *abdopallescens* (Drew): Hancock and Drew 2015: 101.

Distribution. Papua New Guinea (Central, Eastern Highlands, East Sepik, Madang, Morobe and West Sepik Provinces: Clarke *et al*. 2004) and eastern Indonesia (Papua Province: White and Evenhuis 1999).

Host plant. None known.

Male lure. Cue lure.

Comments. This species was provisionally referred to subgenus *Parasinodacus* by Hancock and Drew (2015) and is formally transferred here from subgenus *Sinodacus* Zia, which differs in the presence of a postsutural medial yellow vitta (Drew and Romig 2013).

B. (*Parasinodacus*) *absoluta* (Walker)

Dacus absolutus Walker, 1861a: 22. Type locality Seram, Moluccas, Indonesia.

Bactrocera (*Asiadacus*) *absoluta* (Walker): Norrbom *et al*. 1999: 87; Drew and Romig 2013: 29.

Distribution. Eastern Indonesia (Seram).

Host plant. None known.

Male lure. None known.

Comments. Provisionally retained in subgenus *Asiadacus* Perkins by Drew and Romig (2013, 2016) due to the absence of males for comparison, *B.* (*P*.) *absoluta* is transferred here to subgenus *Parasinodacus*. It differs from all other species currently included in *Asiadacus* in having supra-alar setae present and the postsutural medial yellow vitta absent. It appears to be most closely related to *B.* (*P*.) *eurylomata* from Sulawesi.

B. (*Parasinodacus*) *atypica* White & Evenhuis

Bactrocera (*Asiadacus*) *atypica* White & Evenhuis, 1999: 490. Type locality Wisselmeren, Moanemani, Kamo Valley, [West Papua Province], Indonesia.

Distribution. Eastern Indonesia (Paniai Lakes, West Papua Province).

Host plant. None known.

Male lure. None known.

Comments. This species is transferred from subgenus *Asiadacus*, which differs in the presence of a postsutural medial yellow vitta (Drew and Romig 2013). It differs from all other species in lacking supra-alar setae and in the very pale costal band restricted to cell r_1. It was illustrated by White and Evenhuis (1999).

B. (*Parasinodacus*) *eurylomata* (Hardy)

Dacus eurylomatus Hardy, 1982: 191. Type locality Lindu Valley, Sulawesi.

Bactrocera (*Parasinodacus*) *eurylomata* (Hardy): Drew and Romig 2013: 229.

Distribution. Eastern Indonesia (central Sulawesi).

Host plant. None known.

Male lure. None known.

B. (*Parasinodacus*) *perpusilla* (Drew)

Dacus (*Asiadacus*) *perpusilla* Drew, 1971: 42. Type locality Noumea, New Caledonia.

Bactrocera (*Sinodacus*) *perpusilla* (Drew): Drew 1989: 205.

Bactrocera (*Parasinodacus*) *perpusilla* (Drew): Hancock and Drew 2015: 101.

Distribution. New Caledonia (including Lifou and Maré Islands).

Host plant. None known.

Male lure. Cue lure.

Comments. This species was provisionally referred to subgenus *Parasinodacus* by Hancock and Drew (2015) and is formally transferred here from subgenus *Sinodacus* Zia, which differs in the presence of a postsutural medial yellow vitta (Drew and Romig 2013).

B. (*Parasinodacus*) *waimitaliae* Drew & Romig

Bactrocera (*Parasinodacus*) *waimitaliae* Drew & Romig, 2013: 236. Type locality Waimital, Seram, Moluccas, Indonesia.

Distribution. Eastern Indonesia (Seram and Ambon).

Host plant. None known.

Male lure. Cue lure.

Key to *Parasinodacus* species

For an illustrated key to SE Asian species see Drew and Romig (2016).

1 Scutum red-brown or orange-brown; femora fulvous without apical dark markings 2

– Scutum dark fuscous to black; femora often with dark apical markings .. 5

2 Postpronotal lobes yellow; postsutural lateral yellow vittae present; prescutellar acrostichal setae present; costal band narrow, not crossing vein R_{2+3} except at apex 3

– Postpronotal lobes fuscous or orange-brown; postsutural lateral yellow vittae absent; prescutellar acrostichal setae absent; costal band not as above 4

3 Postsutural lateral yellow vittae not extending anterior of suture; costal band expanded at apex over vein R_{4+5} ..... *B. citrifusca* Drew & Romig

– Postsutural lateral yellow vittae extending anterior of suture as small spots; costal band not expanded at apex over vein R_{4+5} ..... *B. hoedi* White

4 Costal band broad, reaching vein R_{4+5} throughout its length and with a narrow extension over R-M crossvein; anal streak distinct; supra-alar seta present ..... *B. waimitaliae* Drew & Romig

– Costal band vestigial, reduced to a pale tint in cell r_1; anal streak absent; supra-alar seta absent ..... *B. atypica* White & Evenhuis

5 Postsutural lateral yellow vittae absent; presutural lateral yellow vittae triangular and connected with notopleural lobes; prescutellar acrostichal setae absent 6

– Postsutural lateral yellow vittae present; presutural lateral yellow vittae absent or small and connected with postsutural vittae but not connected with notopleural lobes; prescutellar acrostichal setae present or absent ... 7

6 Femora fulvous, without fuscous apical markings .... *B. perpusilla* (Drew)

– Femora fuscous to black over at least apical quarter ..... *B. binoyi* Drew

7 Postsutural lateral yellow vittae short, reaching only about half the distance to postalar setae; prescutellar acrostichal setae present 8

– Postsutural lateral yellow vittae elongate, reaching postalar setae; prescutellar acrostichal setae present or absent 9

8 Femora broadly black apically, at least half distance on fore and mid femora; scutellum apically yellow ..... *B. brevivitta* Drew & Romig

– Femora fulvous with at most slight infuscation at extreme apices; scutellum apically black ..... *B. pahangiae* Drew & Romig

9 Femora fulvous without dark apical markings 10

– Femora with extensive fuscous to black apical markings 14

10 Anepisternal yellow stripe narrow, not reaching line of anterior notopleural seta ..... *B. abdopallescens* (Drew)

– Anepisternal yellow stripe broad, reaching postpronotal lobe 11

11 Wing narrowly infuscated over crossveins R-M and DM-Cu; abdomen with a medial black vitta over tergites I-V ….. *B. pseudocucurbitae* White

– Wing without narrow infuscation over both crossveins R-M and DM-Cu; abdomen with medial black vitta absent or confined to tergite V 12

12 Prescutellar acrostichal setae present; wing narrowly infuscated over DM-Cu crossvein, broadest posteriorly; abdomen without fuscous lateral markings ..... *B. pura* White

– Prescutellar acrostichal setae absent; wing not infuscated over DM-Cu crossvein; abdomen with fuscous lateral markings 13

13 Costal band faint, not crossing vein R_{4+5}; tergite V with a medial black vitta..... *B. absoluta* (Walker)

– Costal band broadly crossing vein R_{4+5} into cells br, r and apex of m; tergite V without a medial black vitta ..... *B. eurylomata* (Hardy)

14 Costal band interrupted beyond apex of vein R_{2+3}, leaving an isolated apical spot; prescutellar acrostichal setae present ..... *B. cilifer* (Hendel)

– Costal band not interrupted between apex of vein R_{2+3} and apical spot; prescutellar acrostichal setae absent 15

15 Presutural yellow spots present and connected to lateral postsutural yellow vittae 16

– Presutural yellow spots absent ..... *B. ablepharus* (Bezzi)

16 Costal band broad, almost reaching vein R_{4+5} throughout its length and only weakly expanded apically; abdomen with distinct medial and lateral black vittae on tergites III-V ..... *B. pantabanganiae* Drew & Romig

– Costal band narrow, not or barely overlapping vein R_{2+3} and often broadly expanded apically; abdomen without distinct medial and lateral black vittae on tergites III-V 17

17 Costal band narrow, not expanded apically and only weakly entering cell r_{4+5} at apex; face with a black band below antennal sockets .... *B. incisa* (Walker)

– Costal band broadly expanded apically into an oval spot that extends well into cell r_{4+5} apically to beyond half way to vein M; face without a black band below antennal sockets 18

[Note: Females of the Philippine species *B.* (*Nesodacus*) *atrichus* (Bezzi) will also run to this subgenus and couplet, differing in having a narrow costal band that almost reaches vein M apically, black transverse bands on abdominal tergites III, IV and often V and black ceromata on tergite V; males further differ in lacking the pecten of cilia on abdominal tergite III]

18 Abdominal tergites III-V fuscous to black with a narrow and short black medial vitta over tergites IV-V; costal band just overlapping vein R_{2+3} ..... *B. vinnulus* (Hardy)

– Abdominal tergites orange-brown to red-brown without a dark medial vitta; costal band not overlapping vein R_{2+3} ..... *B. longicaudata* (Perkins)

Discussion

Parasinodacus is unusual among the *Zeugodacus* group of subgenera in that the few recorded host plants are, with one possible exception (*B. cilifera*: see above), non-cucurbitaceous. In this it resembles the *Melanodacus* and *Bactrocera* groups of subgenera and subgenus *Tetradacus* Miyake, suggesting that it is relatively primitive within the *Zeugodacus* group (as also suggested by Krosch *et al.* (2012) in their molecular cladogram). The lack of a medial yellow vitta on the scutum places it in a complex of subgenera that also includes *Aglaodacus* Munro, *Heminotodacus* Drew, *Nesodacus* Perkins, *Paradacus* Perkins and *Perkinsidacus* Hancock & Drew. No host plants are known for any of these other subgenera but it is likely that they are also non-cucurbitaceaous. Subgenera *Heminotodacus*, *Paradacus* and *Perkinsidacus*, which all have 2 pairs of scutellar setae, were reviewed by Hancock and Drew (2017).

Within *Parasinodacus*, Group A retains prescutellar acrostichal setae and is presumably plesiomorphic. Five of its seven species are distributed largely within Southeast Asia proper, as far west as Thailand and with one species, *B.* (*P.*) *pseudocurcurbitae*, extending eastwards to the Indonesian Lesser Sunda Islands. In the West Malaysian *B.* (*P.*) *brevivitta* and *B.* (*P.*) *pahangiae* the lateral postsutural vittae are short and apically narrowed; these two species likely form a species-pair. Of the remaining species, *B.* (*P.*) *citrifusca* has a pale scutum, abdomen and femora, *B.* (*P.*) *pseudocurcurbitae* has pale femora, a distinct medial vitta on abdominal tergites I-V and infuscated crossveins on the wing, while *B.* (*P.*) *cilifer* is characterised by the entirely black abdomen and interrupted costal band, leaving an isolated apical spot. In the two Papua Province species, *B.* (*P.*) *hoedi* and *B.* (*P.*) *pura*, the lateral postsutural vittae extend anterior of the suture as small spots and these also likely form a species-pair.

Group B, characterised by the loss of prescutellar acrostichal setae and at least partly fuscous or black femora, contains six species distributed from India to the Philippines and East Malaysia (Borneo). In the Indian *B.* (*P.*) *binoyi* lateral postsutural yellow vittae are absent and a triangular marking extends from the notopleural lobe alongside the suture, whereas in the non-Indian *B.* (*P.*) *ablepharus* the lateral postsutural vittae do not extend anterior to the suture; in the remaining species the lateral postsutural vittae do extend anterior of the suture as continuous yellow spots. In *B.* (*P.*) *incisa* the face has a black band below the antennal sockets and the costal band remains narrow throughout. In *B.* (*P.*) *pantabanganiae* abdominal tergites III-V have distinct black lateral margins and medial vitta and the costal band is broad with a weak apical expansion, whereas in *B.* (*P.*) *longicaudata* and *B.* (P.) *vinnulus* the abdominal patterns are different and the costal band is narrow with a broad apical expansion.

Group C, also lacking prescutellar acrostichal setae but with the femora fulvous, is the most easterly of the three groups, with six species recorded from Sulawesi to New Caledonia. The species are variable in appearance but presumably form a related group. In *B.* (*P.*) *absoluta* from Seram and *B.* (*P.*) *eurylomata* from Sulawesi the wings are relatively elongate and the costal band pale and somewhat diffuse, suggesting a species-pair relationship. In *B.* (*P.*) *waimitaliae* from southern Maluku and *B.* (*P.*) *atypica* from West Papua the scutum is pale without lateral postsutural vittae; in the New Caledonian *B.* (*P.*) *perpusilla* lateral postsutural vittae are also absent but a sutural triangle is present, the species thus resembling *B.* (*P.*) *binoyi*; while in *B.* (*P.*) *abdopallescens* from New Guinea the lateral postsutural vittae are present and extend anterior to the suture, thus, with its narrow costal band, somewhat resembling *B.* (*P.) incisa*.

Table 1 shows the distribution and percent endemicity of the 19 described *Parasinodacus* species according to the biogeographic zones recognised by Hancock and Drew (2015).

Table 1. Distribution of species in genus *Bactrocera* and subgenus *Parasinodacus* in each biogeographic zone and percent endemism in *Parasinodacus*. For a map of zones A-F see Hancock and Drew (2015).

Biogeographic Zone	**No. species of *Bactrocera***	**No. species of *Parasinodacus***	**% *Parasinodacus* endemic to Region**
(A) Indian subcontinent	81	2	50
(B) South-East Asia	225	10	80
(C) Wallacea	124	4	75
(D) New Guinea	170	4	100
(E) Australia	76	0	-
(F) South Pacific	59	1	100

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