
**Agaonidae (Hymenoptera Chalcidoidea) and *Ficus* (Moraceae):
fig wasps and their figs, xii (Indo-Australian *Kradibia*)**

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Communicated at the meeting of March 29, 1993**ABSTRACT**

Revision of the genus *Kradibia* Saunders in the Indo-Australian region with description of new species *K. calorai* (Philippines: Negros, ex *Ficus fiskei* Elm), *K. clarae* (Philippines: Luzon, ex *F. guyeri* Elm.), *K. corneri* (Melanesia: Solomon Is., ex *F. pseudowassa* Corner), *K. commuta* (Philippines: Luzon, Mindanao and Mindoro, ex *F. irisana* Elm. and *F. heteropoda* Miq.), *K. ordinata* (Melanesia: Solomon Is., ex *F. chrysochaete* Corner), *K. panchoi* (Philippines: Luzon, Palawan, Negros, ex *F. cumingii* Miq.), *K. tetamba* (Melanesia: Solomon Is., ex *Ficus gryllus* Corner), *K. wakefieldi* (Australia: New South Wales, ex *F. coronata* Spin.), *K. williamsi* (Philippines: Negros, Mindanao, ex *F. odorata* (Blanco) Merr.). *K. nigricorpus* (Girault) is redescribed from new material (Australia: Queensland, ex *Ficus opposita* Miq.).

INTRODUCTION

Kradibia Saunders (1883: 23–24) was erected for the reception of a fig wasp from Madagascar, i.e., *K. cowani* Saunders (for the African and Malagasy species of *Kradibia*, see Berg & Wiebes, 1992: 203–207). As more species became known, it proved difficult to differentiate the group from *Blastophaga* Gravenhorst, *Liporrhopalum* Waterston and some species of *Ceratosolen* Mayr (Wiebes, 1978: 165–169), and Bouček (1988: 196) expressed his doubt as to the recognition of *Kradibia*. The pollinators of figs of series *Scabrae* [but also those of *Ficus heteropoda* (series *Copiosae*), which I cannot differentiate from those of *F. irisana* (*Scabrae*), and *F. exasperata* (series *Exasperatae*), see table 1] fit in a narrow concept of *Kradibia* (see also the key in Bouček, 1988: 161, 163). On my advice, Bouček (1988: 196–197) took *Blastophaga copiosae*, *B. jacobsi* and *B. wassae* in

Table 1. The *Ficus*-subsections *Sycidium* and *Varinga* (numbers according to Corner, 1965 and 1967) and their pollinators [for *Palaeomorpha* and *Liporrhopalum*, see Hill (1969: 34–35)].

section <i>Sycidium</i> Miq.	
subsection <i>Sycidium</i>	<i>Ceratosolen</i> (C.), or <i>Kradibia</i> (K.):
series <i>Prostratae</i> Corner	
283. <i>F. semicordata</i> B. Ham. ex J.E.Sm.	<i>C. gravelyi</i> Grandi
series <i>Pungentes</i> Corner	
286. <i>F. pungens</i> Reinw. ex Bl.	<i>C. nanus</i> Wiebes
287. <i>F. minahassae</i> (Teysm. ex Vr.) Miq.	<i>C. pygmaeus</i> Grandi
series <i>Phaeopilosae</i> Corner	
289. <i>F. conocephalifolia</i> Ridley	<i>K. jacobsi</i> (Wiebes)
290. <i>F. complexa</i> Corner	<i>C. gressitti</i> Wiebes
series <i>Copiosae</i> Corner	
296. <i>F. montana</i> Burm.f.	<i>C. tentacularis</i> (Grandi)
300. <i>F. heteropoda</i> Miq.	<i>K. commuta</i> Wiebes
301. <i>F. copiosa</i> Steud.	<i>K. copiosae</i> (Wiebes)
302. <i>F. wassa</i> Roxb.	<i>K. wassae</i> (Wiebes)
[306. <i>F. primaria</i> Corner	<i>Wiebesia partita</i> Bouček]
series <i>Scabrae</i> Miq.	
307. <i>F. cumingii</i> Miq.	<i>K. panchoi</i> Wiebes
309. <i>F. ulmifolia</i> Lam.	<i>K. brownii</i> Ashmead
310. <i>F. fiskei</i> Elm.	<i>K. calorai</i> Wiebes
312. <i>F. ampelas</i> Burm.f.	<i>K. sumatrana</i> (Grandi)
313. <i>F. guyeri</i> Elm.	<i>K. clarae</i> Wiebes
323. <i>F. irisana</i> Elm.	<i>K. commuta</i> Wiebes
326. <i>F. odorata</i> (Blanco) Merr.	<i>K. williamsi</i> Wiebes
329. <i>F. chrysochaete</i> Corner	<i>K. ordinata</i> Wiebes
330a. <i>F. pseudowassa</i> Corner	<i>K. corneri</i> Wiebes
331. <i>F. gryllus</i> Corner	<i>K. tetamba</i> Wiebes
334. <i>F. opposita</i> Miq.	<i>K. nigricorpus</i> (Girault)
336. <i>F. fraseri</i> Miq.	<i>K. ghigii</i> (Grandi)
338. <i>F. coronata</i> Spin.	<i>K. wakefieldi</i> Wiebes
subsection <i>Varinga</i> (Miq.) Corner	
series <i>Cyrtophylleae</i> Corner	
352. <i>F. asperiuscula</i> Kunth & Bouch.	<i>C. internatus</i> Wiebes
354. <i>F. leptogramma</i> Corner	<i>K. setigera</i> Wiebes
series <i>Exasperatae</i> Corner	
356. <i>F. exasperata</i> Vahl	<i>K. gestroi</i> (Grandi)
[subsection <i>Palaeomorpha</i> (King) Corner	<i>Liporrhopalum</i> Waterston]

Kradibia, as also did Ware & Compton (1992: 288), who, moreover, combined *B. tentacularis* Grandi with *Ceratosolen*. In my opinion, Hill (1969), in his revision of *Liporrhopalum*, could have included *B. tentacularis* in the group of *L. midotis* Hill. To me, typical *Kradibia* is clear enough, but for the species mentioned there are border-line problems with the other genera.

For some species that were later combined with *Kradibia*, Girault (1915: 312, 313) coined two new names, viz., *Paraceratosolen* and *Kradibiella*. One of these, i.e. *P. latipennis*, I do not know and I cannot recognize it from the description: it had better been forgotten, as also have *Blastophaga insularis* Girault (1915: 310; later renamed *B. queenslandica* Hoffmeyer, 1928: 334, because of *B. insularis* Ashmead, 1900: 250–251) and *Blastophaga semiauriceps* Girault (1927: 338), both listed by Bouček (1988: 197) as species of *Kradibia*. *K. (formerly Kradibiella) nigricorpus* (Girault) is redescribed below.

Many of the samples treated in this paper were collected by myself in the Philippines in 1964–1965 (see Wiebes, 1974, fig. 1 for a map showing collecting localities; Prof. J.V. Pancho's collection numbers are mentioned with the host plants), or by Corner in the Solomon Islands in 1965 (RSS- and BSIP-collection numbers are mentioned with the host plants; see Corner, 1967). Almost all specimens of *Ficus* recorded were identified by Prof. Corner.

A few samples in the collection consisting of males or females only, remain undescribed until also the other sex has become known. The two species named already (viz., *K. ghigii* and *K. setigera*), I have tried to fit into the key.

Kradibia Saunders

Kradibia Saunders, 1883, Trans. ent. Soc. London for 1883: 20–25; Wiebes, 1978, Zool. Meded. Leiden 53: 165–180; Wiebes & Compton, 1990, Proc. Kon. Ned. Akad. Wet. 93: 206–209; Berg & Wiebes, 1992, Verh. Kon. Ned. Akad. Wet., afd. Nat. (2) 89: 203–207.

In order to restrict the description to typical *Kradibia*, in some places the 'border-line species' (viz., *K. copiosae*, *K. jacobsi* and *K. wassae* and, to some extent, also *K. setigera*) are especially mentioned in the general description.

The female head in most species is a bit shorter than wide across the compound eyes, which are 2–2½ (exceptionally 3 to more than 4) times as long as the cheek. There are three large ocelli. The antenna has ten or eleven segments, with one or two (to three in the border-line species), or three to five rows of sensilla. The mandible has two teeth, two glands, and the appendage bears four to six ventral lamellae (seven or eight in some border-line species); the maxillae are simple (one border-line species has a bacilliform process).

There are large pollen pockets. The veins of the fore wing are distinct; the disk is full of microtrichiae. The fore tibia has a dorso-apical comb consisting of four or five subequal, or six alternately long and short, teeth. The hind tibia has a mostly bicuspidate antiaxial tooth and a simple axial. All tarsi are pentamerous.

The hypopygium has an acute spine, with a row of (six or seven) hyaline setae approximately at half length. The spiracles of the eighth urotergite are small and circular, but in one border-line species they are large and oval.

The length of the ovipositor is half as long as the gaster or shorter (one-third or one-quarter). The colour is dark brown.

The male head is about as long as wide, in a few species a bit shorter, but in others a bit longer. The eye is one to two times as long as the cheek. There is a median groove, reaching to at most half the length of the head. The antennae are borne in a common groove (in separate pockets in two border-line species) and consist of a scape, a pedicel, an anellus or none, and two funicular segments.

The thorax has the terga free, but the dorso-lateral plates representing the metanotum may be fully or almost fused in the middle (indicated in the key as 'contiguous'), or the two plates are distinct and widely spaced, or they are not fully separate from the propodeum ('open'); the spiracular peritremata, mostly lateral in position, in most species occupy the full (lateral) length of the propodeum. The fore tibia bears a dorso-apical comb of seven or more teeth, but the border-line species have only four or five; the tarsus is bimerous. The mid leg is atrophied, but complete (although slender, with an oligomeric tarsus) in a few species (one of which is a border-line species). The hind tibia has an armature consisting of ventral and antiaxial, and some dorsal teeth; the tarsus is pentamerous in most species, but tetramerous in some (among which two border-line species).

The genitalia bear claspers (not in the border-line species), with two to five claws. The colour is yellowish.

I now know 18 (Indo-Australian) species of *Kradibia*. Their host *Ficus* are all classified with section *Sycidium* Miq., subsections *Sycidium* and *Varinga* (Miq.) Corner, but not all species of these groups have a species of *Kradibia* as pollinator: see table 1. Not included is *Ficus scabra* Forst.f. (no. 341 in Corner's list), which was given by Prof. Corner as the name for plant W.G. 244, host of *K. browni* sensu Grandi (1931: 8) – I did not see the insect material. Grandi's (1927: 326) record of *K. browni* from Philippine *Ficus heterophylla* Linn.f. cannot be correct: according to Corner (in litt.) all Philippine specimens identified with *F. heterophylla* actually belong to *F. ulmifolia* Lam. (see Wiebes, 1978: 166, note 3).

KEY TO THE INDO-AUSTRALIAN SPECIES of *Kradibia*

1. Females (not known for *K. ghigii*) 2
 - Males (not known for *K. setigera*) 18
2. The mandibular appendage bears eight ventral lamellae. The head, body and legs have long setae.
 - Ficus leptogramma* Corner (Malaysia: Sabah) *K. setigera* Wiebes
 - The mandibular appendage bears at most six ventral lamellae. There are no such long setae ... 3
3. The antennal segments, from the sixth onwards, bear one or two rows of long sensilla (if in doubt, take this alternative) 4
 - The antennal segments bear a larger number of rows of small sensilla 14
4. There is only one row of sensilla (fig. 7) 5
 - There are two rows of sensilla (fig. 8) 6
5. The antennal sensilla are relatively short and occupy only the apical half of their segment; the antenna has ten segments. *Ficus coronata* Spin. (Australia: New South Wales and Victoria)
 - *K. wakefieldi* Wiebes

- The antennal sensilla are longer and occupy the whole length of the segment: they even project beyond the apical rim; mostly there are eleven segments. *Ficus ampelas* Burm.f. (Indonesia: Sumatra, Java) *K. sumatrana* (Grandi)
- 6. The apical sensilla distinctly project beyond the rim of their segment (fig. 5); the antenna has eleven segments. *Ficus guyeri* Elm. (Philippines: Luzon) *K. clarae* Wiebes
 - The sensilla do not or scarcely project; the antenna has ten segments 7
- 7. The fore tibia bears six, alternately long and short, dorso-apical teeth (as in fig. 4) 8
 - The fore tibia bears four or five teeth, most of which are subequal (as in fig. 6, but mostly narrower) 9
- 8. The mandibular appendage bears six ventral lamellae. The pedicel has ca. twenty axial spines. *Ficus irisana* Elm. (Philippines: Luzon) and *Ficus heteropoda* Miq. (Philippines: Luzon, Mindanao and Mindoro) *K. commuta* Wiebes
 - The mandibular appendage bears four ventral lamellae. The pedicel has ca. thirty axial spines. *Ficus opposita* Miq. (Australia: Queensland) *K. nigricorpus* (Girault)
- 9. The dorso-apical teeth of the fore tibia are rather wide (fig. 6) and the spiracula of the eighth urotergite are relatively large. *Ficus gryllus* Corner (Melanesia: Solomon Is.) *K. tetamba* Wiebes
 - The dorso-apical teeth of the fore tibia are more slender (as in fig. 4) 10
- 10. The maxilla has a bacilliform process. The spiracular peritremata of the eighth urotergite are distinct and large. *Ficus conocephalifolia* Ridley (Melanesia: Papua New Guinea) *K. jacobsi* (Wiebes)
 - The maxilla does not have a bacilliform process. The spiracular peritremata of the eighth urotergite are less distinct, and smaller 11
- 11. The mandibular appendage bears six ventral lamellae. The compound eye is only two times as long as the cheek. *Ficus odorata* (Blanco) Merr. (Philippines: Negros, Mindanao) *K. williamsi* Wiebes
 - The mandibular appendage bears four ventral lamellae 12
- 12. The sixth to eighth antennal segments really have only two rows of sensilla. The compound eye is 2.4 times as long as the cheek. *Ficus exasperata* Vahl (Ceylon, and India: Pulneys and Travancore) *K. gestroi* (Grandi)
 - The sixth to eighth antennal segments have two to three, or even fully three rows of sensilla .. 13
- 13. The compound eye is two times as long as the cheek. The epistomal margin does not have a distinct median prominence. *Ficus copiosa* Steud. (Melanesia: Papua New Guinea, Solomon Is.) *K. copiosae* (Wiebes)
 - The compound eye is 2.3 times as long as the cheek. The epistomal margin has a distinct median prominence. *Ficus wassae* Roxb. (Melanesia: Papua New Guinea, Solomon Is.) *K. wassae* (Wiebes)
- 14. The compound eye is 3½ to more than four times as long as the cheek 15
 - The compound eye is 2–2½ times as long as the cheek 16
- 15. The compound eye is 3½ times as long as the cheek. The pedicel bears ca. 35 axial spines and the appendage of the third antennal segment reaches up to half-way the fifth. The valves of the ovipositor are two-fifths of the length of the gaster. *Ficus pseudowassae* Corner (Melanesia: Solomon Is.) *K. corneri* Wiebes
 - The compound eye is 4.3 times as long as the cheek. The pedicel bears ca. 25 axial spines and the appendage of the third segment reaches the basal quarter of the fifth. The valves of the ovipositor are one-quarter of the length of the gaster. *Ficus fiskei* Elm. (Philippines: Negros) *K. calorai* Wiebes
- 16. The mandibular appendage bears four ventral lamellae. The sixth antennal segment has four to five rows of sensilla (this is mentioned for comparison with *K. copiosae* and *K. wassae*, which have at most three rows – see couplet 13). *Ficus chrysochaete* Corner (Melanesia: Solomon Is.) *K. ordinata* Wiebes
 - The mandibular appendage bears six ventral lamellae 17
- 17. The antenna has ten segments. The ovipositor valves are two-thirds of the length of the gaster. *Ficus ulmifolia* Lam. (Philippines: Luzon) *K. brownii* Ashmead

- The antenna has eleven segments. The ovipositor valves are one-third of the length of the gaster
Ficus cumingii Miq. (Philippines: Luzon, Negros, Palawan) *K. panchoi* Wiebes 19
- 18. The fore tibia bears four or five dorso-apical teeth 19
 - The fore tibia bears seven or more dorso-apical teeth 21
- 19. The antennae are situated in a common groove. The mid leg is slender, but complete (♀ couplet 10) *K. jacobsi* (Wiebes)
 - The antennae are situated in separate pockets. The mid leg is atrophied 20
- 20. The antenna has a short ring-segment. The fore tibia has four dorsal teeth (♀ couplet 13) *K. copiosae* (Wiebes)
 - The antenna does not have a ring-segment. The fore tibia has five dorsal teeth (♀ couplet 13) *K. wassae* (Wiebes)
- 21. The hind tarsus is tetramerous 22
 - The hind tarsus is pentamerous 23
- 22. The fore tibia has eight dorso-apical teeth (♀ couplet 6) *K. clarae* Wiebes
 - The fore tibia has ten dorso-apical teeth (♀ couplet 5) *K. sumatrana* (Grandi)
- 23. The mid leg is slender, but complete 24
 - The mid leg is atrophied 25
- 24. The antennal anellus is rather large: half as long as wide (♀ couplet 17) *K. panchoi* Wiebes
 - The antennal anellus is disk-line (♀ couplet 12) *K. gestroi* (Grandi)
- 25. The fore tibia has twelve dorso-apical teeth (fig. 10). The antenna has no anellus (♀ couplet 5) ... *K. wakefieldi* Wiebes
 - The fore tibia has seven to ten dorso-apical teeth 26
- 26. The antenna has no anellus. The fore tibia has eight to ten dorso-apical teeth. *Ficus fraseri* Miq. (Australia: New South Wales) *K. ghigii* (Grandi)
 - The antenna has a distinct, disk-like anellus (fig. 11) 27
- 27. The metanotal plates are fully contiguous (as in fig. 13), or almost so 28
 - The metanotal plates are not contiguous 32
- 28. The metanotal plates are almost contiguous (♀ couplet 11) *K. williamsi* Wiebes
 - The metanotal plates are fully contiguous 29
- 29. The fore tibia has nine subequal dorso-apical teeth (♀ couplet 16) *K. ordinata* Wiebes
 - The fore tibia has seven or eight unequal dorso-apical teeth. 30
- 30. The male is slender (fig. 14): the pronotum is longer than wide posteriorly (♀ couplet 15) *K. calorai* Wiebes
 - The male is more robust (fig. 13): the pronotum is shorter than wide posteriorly 31
- 31. The median metanotal band is relatively long: one-fifth of the length of the pronotum (♀ couplet 15) *K. corneri* Wiebes
 - The median metanotal band is shorter: one-tenth of the length of the pronotum. Two species that I cannot very well differentiate in the male sex *K. brownii* Ashmead (♀ couplet 17) and *K. tetamba* Wiebes (♀ couplet 9)
- 32. The metanotal plates are well-defined, and they are spaced over a distance equal to their width (♀ couplet 8) *K. commuta* Wiebes
 - The metanotal plates are open in the middle, and they are spaced over a distance 1½ times their width (♀ couplet 8) *K. nigricorpus* (Girault)

Kradibia setigera Wiebes

Kradibia setigera Wiebes, 1978, Zool. Meded. Leiden 53: 179–180.

Only the female was described. It has eight ventral lamellae on the mandibular appendage, four subequal dorsal teeth on the fore tibia, and the head, body and legs bear long setae.

The host is *Ficus leptogramma* Corner (Malaysia: Sabah).

Kradibia jacobsi (Wiebes)

Blastophaga jacobsi Wiebes, 1964, Nova Guinea, Zool. 27: 75–79.
Kradibia jacobsi Bouček, 1988, Australasian Chalc.: 196.

The female is recognized by the relatively large spiracular peritremata of the eighth urotergite, and the bacilliform process of the maxillae; the male has a well-developed mid leg.

The host is *Ficus conocephalifolia* Ridley (Melanesia: Papua New Guinea).

Kradibia copiosae (Wiebes)

Blastophaga copiosae Wiebes, 1980, Proc. Kon. Ned. Akad. Wet. (C) 83: 90–92.
Kradibia copiosae Bouček, 1988, Australasian Chalc.: 196.

New material. Series ♂, Solomon Isl.: Kolombangara, ex *Ficus copiosa* Steud., leg. E.J.H. Corner, 28.viii.1965, coll. RMNH no. 1085.

6♀ 1♂, Solomon Isl.: Ysabel, Tetamba, ex *Ficus copiosa* Steud., leg. E.J.H. Corner, 1.x.1965, coll. RMNH no. 1089.

Series ♀♂, Solomon Isl.: San Cristobal, Warahito river, ex *Ficus copiosa* Steud., leg. E.J.H. Corner, 20.vii.1965, coll. RMNH no. 1092.

Series ♀♂, Australia: Queensland, Atherton, Gadgarra Forest Reserve, ex *Ficus copiosa* Steud., leg. D.I. Nicholson, 22.iii.1967, coll. RMNH no. 1117.

The sixth to eighth antennal segments of the female bear two to three rows of sensilla; the male fore tibia has four dorso-apical teeth.

The host is *Ficus copiosa* Steud. (Melanesia: Papua New Guinea, Solomon Is.).

Kradibia wassae (Wiebes)

Blastophaga wassae Wiebes, 1980, Proc. Kon. Ned. Akad. Wet. (C) 83: 92–94.
Kradibia wassae Bouček, 1988, Australasian Chalc.: 197.

New material 45♀ 3♂, Solomon Isl.: Guadalcanal, Popomanasiu ca. 1000 m alt., ex *Ficus wassa* Roxb.*, leg. E.J.H. Corner, 30.x.1965, coll. RMNH no. 1093.

Series ♂, Solomon Isl.: San Christobal, Warahito, ex *Ficus wassa* Roxb., leg. E.J.H. Corner, 27. & 29.vii.1965, coll. RMNH nos. 1095 and 1097.

As is evident from the key, the species is much like *K. copiosae*. The female compound eyes are larger and the male fore tibia has five dorso-apical teeth (vs. four), but I do not find the two well-differentiated.

The host is *Ficus wassae* Roxb. (Melanesia: Papua New Guinea, Solomon Is.).

* Corner (16.xi.1967) wrote to me with this name: 'but, compare the Popomanasiu collection with *F. pseudowassa*': the identity of the wasps point to *F. wassa*.

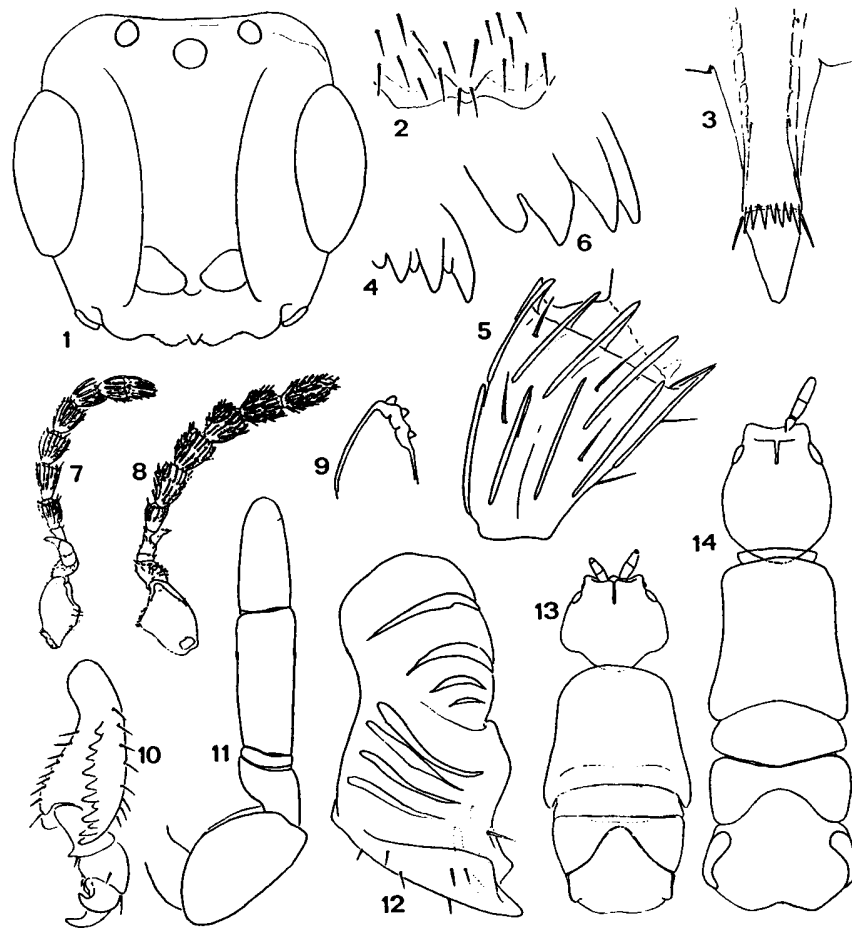


Fig. 1. *Kradibia panchoi* spec. nov., outline of female head.

Figs. 2–3. *Kradibia nigricorpus* (Girault), female: 2, epistomal margin; 3, outline of hypopygium, ventral aspect.

Figs. 4–5. *Kradibia clarae* spec. nov., female: 4, dorso-apical comb of the fore tibia, antiaxial aspect; 5, eighth antennal segment, antiaxial aspect.

Fig. 6. *Kradibia tetamba* spec. nov.: 6, dorso-apical comb of female fore tibia, antiaxial aspect.

Fig. 7. *Kradibia sumatrana* (Grandi), female antenna, antiaxial aspect, from Grandi (1928, fig. xvii, 2).

Fig. 8. *Kradibia gestroi* (Grandi), female antenna, antiaxial aspect, from Grandi (1916c, fig. i, 2).

Fig. 9. *Kradibia williamsi* spec. nov., clasper of male genitalia, dorsal aspect.

Fig. 10. *Kradibia wakefieldi* spec. nov., male fore tibia and tarsus, antiaxial aspect.

Fig. 11. *Kradibia corneri* spec. nov., male antenna, dorsal aspect.

Fig. 12. *Kradibia nigricorpus* (Girault), female mandible, ventral aspect.

Fig. 13. *Kradibia brownii* Ashmead, dorsal outline of male body, from Wiebes (1978, fig. 1).

Fig. 14. *Kradibia calorai* spec. nov., dorsal outline of male body.

Figs 1, 10, $\times 105$, 2–3, 11, $\times 215$, 4–6, 9, $\times 425$, 13–14, $\times 40$.

Kradibia clarae spec. nov.

(figs. 4–5)

Material. 3♀ 40♂, Philippines: Luzon, Sorsogon, lake Bulusan, ex *F. guyeri* Elm. (J.V. Pancho no. 4249), leg. J.T. Wiebes, 4.i.1965, coll. RMNH no. 1645 (type-lot; type ♀).

The female head is much shorter than wide across the compound eyes (0.8), which are 2.75 times as long as the cheek. The antenna has eleven free segments; the pedicel bears ca. 25 axial spines, the appendage of the third segment reaches to the fifth; the funicular segments from the fifth onwards, have (not always fully) two rows of long sensilla, the distal of which extend beyond the apical rim of the segment (fig. 5); the sixth to tenth are subequal in length, the eleventh is three-quarters of the tenth. The epistomal margin is gently lobed and the median prominence is blunt. The mandibular appendage bears six ventral lamellae.

The fore wing (2:1) is ca. 1.1 mm long; the submarginal, marginal, stigmal, and postmarginal veins are approximately in ratio 25:5:5:7; the hind wing (4:1) is ca. 0.6 mm long. The fore tibia has a dorso-apical comb of six, alternately long and short, teeth (fig. 4).

The hypopygial spine is ca. three times as long as wide at the base; the transverse row of hyaline setae is situated at three-fifths of the length. The total length (head, thorax and gaster) is ca. 1.1 mm; the valves of the ovipositor are ca. half as long as the gaster.

The male head is distinctly longer than wide (1.1); the eyes are mainly lateral in position, two times as long as the cheek. The median groove is half as long as the head and it widens anteriorly. The antenna has two funicular segments (in ratio 6:7); there is no distinct anellus.

The pronotum is (medially) distinctly longer than wide anteriorly (1.2) and shorter than wide posteriorly (0.9); the length of the mesonotum is two-fifths of its width and also two-fifths of the length of the pronotum; the metanotal plates are rather wide, indistinctly defined in the middle, where they do not meet; the propodeum has a straight posterior border. The fore tibia has a dorso-apical comb consisting of ten unequal teeth; the two tarsal segments are subequal in length. The mid leg is atrophied. The hind tibia is as figured for *K. sumatrana* by Grandi (1928, fig. xviii, 5); there are four tarsal segments.

The claspers of the genitalia bear two claws. The total length (head and thorax) is ca. 0.9 mm.

The female of *K. clarae* has two rows of characteristic antennal sensilla, the apical of which extend beyond their segment. The male has a tetramerous hind tarsus, as has *Kradibia sumatrana*, which it also otherwise resembles, but the fore tibia has a dorso-apical comb of ten teeth (vs. eight).

The species is named after Dra. Clare R. Baltazar, Entomologist of the Bureau of Plant Industry at Manila, who gave her kind attention and help during my stay in the Philippines.

Kradibia sumatrana (Grandi)

(fig. 7)

Blastophaga sumatrana Grandi, 1926, *Treubia* 8: 352–353; Grandi, 1928, *Boll. Lab. Ent. Bologna* 1: 146–150.

Kradibia sumatrana Wiebes, 1978, *Zool. Meded. Leiden* 53: 173.

Some females that I have studied from Java have ten-segmented antennae, as the penultimate and ultimate antennal segments are fused; other specimens have more distinctly eleven-segmented antennae. There are four subequal teeth in the dorso-apical comb of the fore tibia. The hypopygium has a transverse row of hyaline setae, approximately at half length of the spine, which is gradually tapering towards the apex. The claspers of the male genitalia are very small and bear two hyaline claws.

This species can be recognized by the female antenna, which has one row of long sensilla, stretching over almost the whole length of the segment; the male by the tetramerous hind tarsi and the eight teeth in the dorso-apical comb of the fore tibia.

The host is *Ficus ampelas* Burm.f. (Indonesia: Sumatra, Java).

Kradibia wakefieldi spec. nov.

(fig. 10)

Kradibiella spec. Wakefield, 1960, *Vict. Nat.* 76: 257–259.

Material. Series ♀♂, Australia: New South Wales, Sydney, ex *Ficus stephanocarpa* [= *F. coronata* Spin.], leg. C.E. Pemberton, ii.1921, coll. HSPA (type-lot; type: ♀).

The female head is distinctly shorter than wide across the compound eyes (0.9), which are more than 2½ times as long as the cheek (2.7). The antenna consists of ten free segments, the fifth to ninth of which are subequal in length, one-quarter longer than the fourth and three-fifths of the tenth; the pedicel bears ca. 35 axial spines; the appendage of the third segment reaches up to the basis of the fifth; the fifth to ninth segments bear one apical row of a few, oblong sensilla, the tenth two. The lateral lobes of the epistomal margin are rather angular in shape, the median prominence is sharp. The mandibular appendage bears five ventral lamellae; the maxillae are not well visible in the dry material, but they seem to bear a row of small lateral setae.

The fore wing (9:4) is ca. 1.8 mm long; the submarginal, marginal, stigmal (not very distinct), and postmarginal veins are approximately in ratio 17:5:4:8; the hind wing (9:2) is ca. 1 mm long. The fore tibia bears a dorso-apical row of four subequal teeth.

The spine of the hypopygium is ca. 2½ times as long as wide at the base; it has a transverse row of hyaline setae at half length. The total length (head, thorax

and gaster) is ca. 1.4 mm; the valves of the ovipositor are two-fifths of the length of the gaster.

The male is much like *Kradibia ghigii* (Grandi), with the head as long as wide, but the eye is longer: two times as long as the cheek (*vs.* not quite as long) and one-fifth of the length of the head (*vs.* one-sixth). The median groove reaches to about one-quarter of the length of the head. The antennae are conform: rather robust, with the penultimate and ultimate segments approximately in ratio 3:5.

The dorso-apical comb of the fore tibia (fig. 10) bears twelve teeth (*vs.* eight to ten for *K. ghigii*).

The claspers of the genitalia bear three claws (not recorded for *K. ghigii*). The total length (head and thorax) is ca. 1.2 mm.

Wakefield sent the pollinators that were collected from *Ficus stephanocarpa* (at Mallacoota Inlet, in the far east of Victoria, Australia), to Dr. E.F. Riek, who at first took them for a species of *Pleistodontes*, but later identified them with a species of *Kradibiella*. In the Williams-collection of the Hawaiian Sugar Planters' Association, which I have in loan, I find a short series of males and females, collected in Sydney from *F. stephanocarpa*, which, according to Corner (1960: 472), is a synonym of *Ficus coronata* Spin. Wakefield's record of *F. coronata* seems quite probable, as this is the only species of *Ficus* occurring so far south (Chew, 1989: 179, no. 69). Differential characters are the one, apical row of few sensilla on the female antennal segments, and the large eye and large number of teeth in the fore tibial comb of the male.

***Kradibia commuta* spec. nov.**

Material. Series ♀♂, Philippines: Luzon, Laguna, Mt. Makiling 175 m alt., ex *Ficus irisana* Elm. (J.V. Pancho no. 4162), leg. J.T. Wiebes, 27.x.1964, coll. RMNH no. 1458 (type-lot; type: ♀).

Series ♀♂, Philippines: Luzon, Sorsogon, San Ignacio 2 km from Gubat, ex *Ficus heteropoda* Miq. (J.V. Pancho no. 4252), leg. J.T. Wiebes, 3.xii.1964, coll. RMNH no. 1605.

5♀ series ♂, Philippines: Mindoro, Mansalay, Mt. Umlat, ex *Ficus heteropoda* Miq. (Philipp. Nat. Herb. no. 17516), coll. RMNH no. 451.

25♀ 25♂, Philippines: Mindanao, Davao, Calinan, ex *Ficus heteropoda* Miq. (J.V. Pancho no. 4184), leg. J.T. Wiebes, 27.xi.1964, coll. RMNH no. 1437.

The female head is much shorter than wide across the compound eyes (0.85), which are 2½ times as long as the cheek. The antenna consists of ten free segments; the pedicel bears ca. twenty axial spines, the appendage of the third segment reaches up to the base of the fifth; the fifth, eighth and ninth segments are subequal in length, the seventh is one-eighth longer, the sixth one-half longer, and all bear two rows of long sensilla, the distal of which are extending beyond their segment for at most one-third of their length; the tenth segment is almost two times as long as the fifth (1.85) and bears three rows of sensilla. The epistomal margin has gentle lateral lobes and an acute median prominence. The mandibular appendage bears six ventral lamellae.

The fore wing (9:4) is ca. 1.3 mm long; the submarginal, marginal, stigmal, and postmarginal veins are approximately in ratio 17:3:4:7; the hind wing (4:1) is ca. 0.9 mm long. The fore tibia bears a dorso-apical comb of six, alternately long and short teeth.

The hypopygial spine is three times as long as it is wide at the base; the hyaline setae are situated at three-fifths of the length. The total length (head, thorax and gaster) is ca. 1.4 mm; the valves of the ovipositor are three-fifths of the length of the gaster.

The male head is about as long as wide; the eye is two times as long as the cheek. The narrow median groove is one-third of the length of the head. There is a disk-line antennal anellus; the two funicular segments are subequal in length.

The pronotum is but a bit longer than the anterior width (1.05) and shorter than the posterior width (0.85); the length of the mesonotum is one-third of that of the pronotum; the pronotum, measured dorsally, is two times as long as the mesonotum; the metanotal plates are well-defined and they are spaced over a distance approximately equal to their width; the propodeum has an almost straight posterior border. The fore tibia has seven teeth in the dorso-apical comb.

The genital claspers bear three claws. The total length (head and thorax) is ca. 0.9 mm.

This species is much like *Kradibia nigricorpus*, but for the six ventral lamellae of the female mandibular appendage (*vs.* four); the metanotal plates of the male are well-defined (*vs.* open).

K. commuta is recorded from two species of fig, *viz.*, *Ficus irisana* Elm. and *F. heteropoda* Miq., which Corner classified in two different series: *F. heteropoda* in series *Copiosae* and *F. irisana* in series *Scabrae*. The botanical material, collected by Prof. Pancho, was sent to Prof. Corner, who checked their identification. The wasps, from the four samples studied, are exactly similar.

***Kradibia nigricorpus* (Girault)**

(figs. 2–3, 12)

Kradibiella nigricorpus Girault, 1915, Mem. Qld. Mus 4: 313.

Kradibia nigricorpus Bouček, 1988, Australasian Chalc.: 197.

Blastophaga spec., Henderson, Proc. Roy. Soc. Qld. 93: 21–29.

Material. Series ♀, 24♂, Australia: Queensland, 2–3 km from Tinaroo Dam on Tinaroo Dam Rd., NE of Atherton, ex *Ficus opposita* Miq., leg. J.F. Addicott, 11-xi.1986, coll. RMNH no. 5076.

Series ♀ 15♂, Australia: Queensland, Heron Island, NE of Gladstone, ex *Ficus opposita* Miq., leg. J.F. Addicott, 24-xi.1986, coll. RMNH no. 5085.

The female head is much shorter than wide across the compound eyes (0.85), which are three times as long as the cheek and approximately half as long as the head. The antenna has ten free segments; the pedicel bears ca. thirty axial spines, the appendage of the third segment reaches up to the basal fifth of the fifth seg-

ment; the fifth to ninth segments bear two rows of long sensilla, the tenth, which is $1\frac{1}{2}$ times as long as the fifth to ninth, three. The epistomal margin (fig. 2) is gently lobed, the lateral lobes appear seamed. The mandibular appendage (fig. 12) has four ventral lamellae.

The fore wing (2:1) is ca. 1.8 mm long; the submarginal, marginal, stigmal, and postmarginal veins are approximately in ratio 20:4:5:8; the hind wing (5:1) is ca. 1.1 mm long. The fore tibia has a dorso-apical comb of three large teeth and two smaller in between.

The hypopygial spine (fig. 3) is $2\frac{1}{2}$ times as long as wide basally and the row of (seven) hyaline setae is situated at three-fifths of the length. The total length (head, thorax and gaster) is ca. 1.8 mm; the valves of the ovipositor are one-third of the length of the gaster. The colour is shiny black, the ventral surface and the extremities are whitish.

The male head is about as long as wide posteriorly, and not quite two times as long as wide anteriorly (1.75); the eyes are as long as the cheek. The median groove is narrow and short: one-third of the length of the head. The antenna has a disk-like anellus, and the two, rather wide funicular segments are in ratio 1:2.

The thorax is robust, the pronotum (with a narrow pronotal collar) is as long medially as it is wide anteriorly and this length is three-quarters of the posterior width; the mesonotum, almost $2\frac{1}{2}$ times as wide as long, is half as long as the pronotum; the metanotal plates are open in the middle, where by far they do not meet: the distance is $1\frac{1}{2}$ times as long as their width, the length of the propodeum is less than that of the pronotum (0.8), and two-thirds of its posterior width (the posterior margin is straight). The legs are much as in *K. brownii*, with eight teeth in the fore tibial comb and pentamerous hind tarsi, but no mid legs.

The claspers of the genitalia bear two very small claws, which are scarcely visible. The total length (head and thorax) is ca. 1.2 mm.

Girault described the species from 'one female captured in jungle' in a few lines, mentioning the colour, and the length of antennal segments. The female now described is characterized by the combination of ten antennal segments and two rows of long sensilla; the male by its robust thorax, with the widely spaced, open metanotal plates, the antennal anellus, and the eight dorso-apical fore tibial teeth.

Dr. L.J. Henderson did research on Silvereyes (*Zosterops*), *Ficus opposita*, and its wasps, on Heron Island (Henderson, 1977, 1982). He described the pollen transfer by the female wasps: they spread the pollen in the receptive young fig-syconium by alternate flicking movements of the fore legs, with which they had taken the pollen out of the thoracal pockets.

***Kradibia tetamba* spec. nov.**

(fig. 6)

Material. Series ♀♂, Solomon Isl.: Ysabel, Tetamba, ex *Ficus gryllus* Corner (RSS no. 2868), leg. E.J.H. Corner, 3.x.1965, coll. RMNH no. 1063 (type-lot; type: ♀).

The female head is as long as wide across the compound eyes, which are two times as long as the cheek. The antenna has ten free segments: the pedicel bears ca. 45 axial spines, the appendage of the third segment reaches to half-way the fifth segment, which has one row of long sensilla; the sixth segment is almost two times as long as the fifth (1.85), the seventh to ninth are subequal, shorter than the sixth (0.85), and the tenth is much larger: almost 2½ times as long as the fifth (2.45); the sixth to ninth segments bear two irregular rows of long sensilla, the tenth three. The epistomal margin has a blunt median prominence, which is shorter than the lateral lobes. The mandibular appendage bears five ventral lamellae.

The fore wing (2:1) is ca. 1.7 mm long; the submarginal, marginal, stigmal, and postmarginal veins are approximately in ratio 21:4:5:8; the disk is full of microtrichiae, giving the wing a dark hue; the hind wing (4:1) is ca. 0.9 mm long. The fore tibia has a dorso-apical comb of four, rather wide teeth (fig. 6).

The hypopygial spine is almost 2½ times as long as it is wide at the base, and the row of hyaline setae is situated at three-quarters of the length. The spiracular peritremata of the eighth urotergite are of moderate size, ovoid in shape: the long axis is ca. 0.1 mm, the short axis ca. 0.08 mm. The total length (head, thorax and gaster) is ca. 1.75 mm; the valves of the ovipositor are one-third of the length of the gaster.

The male head is a bit longer than wide (1.05); the eye is a quarter longer than the cheek. The median groove is one-third of the length of the head. The antenna has a distinct anellus; the funicular segments are approximately in ratio 6:5.

The pronotum is distinctly longer than wide anteriorly (1.2) and shorter than wide posteriorly (0.9); the mesonotum is almost one-third of the length of the pronotum (0.3), the metanotum (measured dorsally, in the middle) one quarter, and the propodeum more than one-half (0.6). The dorso-apical comb of the fore tibia has seven, alternately long and short teeth. The mid leg is atrophied.

The claspers of the genitalia bear four small claws. The total length (head and thorax) is ca. 1.2 mm. The colour is yellowish.

The female of *Kradibia tetamba* is much like that of *K. gestroi*, but it is at once recognized by the wider teeth in the dorso-apical comb of the fore tibia, and by the larger, ovoid spiracular peritremata of the eighth urotergite (*vs.* small and circular, ca. 0.03 mm, in *K. gestroi*). The male is similar to that of *K. brownii*.

***Kradibia williamsi* spec. nov.**

(fig. 9)

Material. 20♀ series ♂, Philippines: Mindanao, Davao, Panabo, Cacao 300 m alt., ex *Ficus odorata* (Blanco) Merr. (J.V. Pancho no. 4194), leg. J.T. Wiebes, 28.xi.1964, coll. RMNH no. 1477.

10♀ series ♂, Philippines: Negros occ., La Granja, ex *Ficus odorata* (Blanco) Merr. (J.V. Pancho no. 4201), leg. J.T. Wiebes, 3.xii.1964, coll. RMNH no. 1479 (type-lot; type: ♀).

The female head is shorter than wide across the compound eyes (0.9), which are two times as long as the cheek. The antenna has ten free segments; the pedicel bears ca. forty axial spines, the appendage of the third segment reaches up to the base of the fifth, which has a row of long sensilla; the sixth segment is $1\frac{1}{2}$ times as long as the fifth and $1\frac{1}{3}$ times as long as the seventh to ninth, which are subequal in length and bear two irregular rows of long sensilla; the tenth segment is two times as long as the fifth and bears three irregular rows of sensilla. The lateral lobes of the epistomal margin are rather angular, the median prominence is blunt. The mandibular appendage bears six ventral lamellae.

The fore wing (2:1) is ca. 1.5 mm long; the submarginal, marginal, stigmal, and postmarginal veins are approximately in ratio 13:4:6:7; the hind wing (5:1) is ca. 1 mm long. The fore tibia bears four large dorso-apical teeth.

The hypopygial spine is almost three times as long as wide at the base (2.9), and the row of hyaline setae is situated at three-fifths of the length. The total length (head, thorax and gaster) is ca. 1.8 mm; the valves of the ovipositor are two-fifths of the length of the gaster.

The male head is distinctly longer than wide (1.1); the eyes are longer than the cheek (1.4). The median groove is two-fifths of the length of the head. The antenna has a short, disk-like anellus; the funicular segments are subequal in length.

The length of the pronotum is 1.7 times its anterior, and 0.9 times its posterior width; the dorsal length of the mesonotum is two-fifths of that of the pronotum and half that of the mesonotum and propodeum; the metanotal plates are almost contiguous.

The claspers (fig. 9) of the genitalia bear three claws. The total length (head and thorax) is ca. 1.1 mm.

The female of *K. williamsi* resembles that of *K. commuta*, described above, but it has four dorsal teeth on the fore tibia (vs. six); the head is a bit longer (0.9 of the width, vs. 0.85) and also the eye is shorter, relative to the length of the cheek (two times, vs. $2\frac{1}{2}$). The male is much like *K. brownii*, but the metanotal plates are almost contiguous (vs. totally) and the segments of the antennal funicle are subequal in length (vs. 2:3).

The species is named after F.X. Williams, who collected many Philippine figs and fig wasps (Williams, 1921, 1928).

***Kradibia gestroi* (Grandi)**

Blastophaga gestroi Grandi, 1916a, Boll. Lab. Zool. Portici 10: 126–128; Grandi, 1916c, Ibid. 11: 184–193.

Kradibia gestroi Wiebes, 1978, Zool. Meded. Leiden 53: 176–177 (and references cited); Berg & Wiebes, 1992, Verh. Kon. Ned. Akad. Wet., afd. Nat. (2) 89: 205–206.

K. gestroi can be recognized by the two sensillar rows in the ten-segmented

female antenna, and five subequal dorsal teeth on the fore tibia; the male has a well-developed mid leg, and the antennal anellus is disk-like.

The host is *Ficus exasperata* Vahl (Ceylon; India: Pulneys, Travancore). Another subspecies is known from Africa (Berg & Wiebes, 1992: 205–206).

***Kradibia corneri* spec. nov.**

(fig. 11)

Material. 20♀ 45♂, Solomon Isl.: Ysabel, San Jorge Isl., Talisi, ex *Ficus pseudowassa* Corner (RSNB no. 2726), leg. E.J.H. Corner, 24.ix.1965, coll. RMNH no. 1069 (type-lot; type: ♀).

1♀ series ♂, Solomon Isl.: Kolombangara 800 m alt., ex *Ficus pseudowassa* Corner (RSS no. 1170), coll. RMNH no. 1071.

The female head is a bit shorter than wide across the compound eyes (0.95), which are 3½ times as long as the cheek. The antenna has ten free segments: the pedicel bears ca. 35 axial spines, the appendage of the third segment reaches up to half-way the fifth segment, which bears one row of oblong sensilla; the sixth segment is 2½ times as long as the fifth and it bears three to four irregular rows of oblong sensilla; the seventh to ninth segments are a bit shorter than the sixth (0.9) and bear three rows of sensilla, the tenth is longer than the sixth (1.25) and bears four to five rows. The epistomal margin has a distinct, but blunt median prominence in between the two lateral lobes. The mandibular appendage bears five ventral lamellae.

The fore wing (2:1) is ca. 1.5 mm long; the submarginal, marginal, stigmal, and postmarginal veins are approximately in ratio 13:4:5:9; the hind wing (9:2) is ca. 0.9 mm long. The fore tibia bears a dorso-apical row of six, alternately long and short teeth.

The hypopygial spine is 3½ times as long as it is wide at the base, and the row of hyaline setae is situated at two-thirds of the length. The total length (head, thorax and gaster) is ca. 1.4 mm; the valves of the ovipositor are two-fifths of the length of the gaster.

The male head is as long as wide; the eye is longer than the cheek (1.7). The median groove is almost half as long as the head (0.4). The antennal anellus is disk-like (fig. 11); the two funicular segments are approximately in ratio 5:4.

The pronotum is longer than wide anteriorly (1.2) and almost as long as wide posteriorly (0.95); the mesonotum is ca. one-third of the length of the pronotum; in the middle, where the lateral parts are widely fused, the metanotum is one-fifth of the length of the pronotum; the propodeum is half as long as the pronotum. The fore tibia has a dorso-apical comb of seven, alternately long and short teeth.

The claspers of the genitalia bear four claws. The total length (head and thorax) is ca. 1.1 mm.

The female of *Kradibia corneri* is recognized by the larger compound eye (3½ times as long as the cheek, only the eye in *K. calorai* is larger still). The male re-

sembles *K. brownii* most, but the metanotum is longer (dorsally, in the middle): one-fifth of the length of the pronotum (vs. one-ninth) and a bit over one-third of that of the propodeum (vs. only a short band: 1/15 of the length of the propodeum in *K. brownii*).

The species is named to Prof. E.J.H. Corner, who for three decades gave his kind attention to my work and identified the host figs of the wasps that, like *K. corneri*, he often had expertly collected himself.

***Kradibia calorai* spec. nov.**

(fig. 14)

Material. 11♀ 1♂, Philippines: Negros occ., Hacienda Maria Paz, La Castellana 1800 m. alt., ex *Ficus fiskei* Elm. (J.V. Pancho no. 4205), leg. J.T. Wiebes, 4.xii.1964, coll. RMNH no. 772.

Series ♀♂, Philippines: Negros occ., along Nat. Rd. Bacolod-Silay, ex *Ficus fiskei* Elm. (J.V. Pancho no. 4212), leg. J.T. Wiebes, 5.xii.1964, coll. RMNH no. 773 (type-lot; type: ♀).

The female head is distinctly shorter than wide across the compound eyes (0.9), which are more than four times as long as the cheek (4.3). The antenna consists of ten free segments: the pedicel bears ca. 25 axial spines, the appendage of the third segment reaches to the basal quarter of the fifth segment, which has two to three rows of sensilla (much as depicted for *K. brownii* by Wiebes, 1978, figs. 11–12), the seventh to ninth segments are subequal in length and they bear four to five irregular rows of rather short sensilla, the sixth is approximately one-eighth longer and has five to six rows; the ultimate, tenth segment is ca. 1½ times as long as the seventh to ninth and it has seven to eight irregular rows of sensilla. The edge of the lateral lobes of the epistomal margin is smooth, the median prominence is sharp. The mandibular appendage bears six ventral lamellae; the maxillae have two subapical setae.

The fore wing (2:1) is ca. 1.6 mm long; the submarginal, marginal, stigmal, and postmarginal veins are approximately in ratio 20:5:8:10; the hind wing (4:1) is ca. 1 mm long. The fore tibia has five teeth in the dorso-apical comb, which are subequal, but the second is smaller.

The hypopygial spine is two times as long as it is wide at the base and the transverse row of six hyaline setae is situated at two-fifths of the length. The total length (head, thorax and gaster) is ca. 1.8 mm; the valves of the ovipositor are one-quarter of the length of the gaster.

The dorsal outline of the male is depicted in fig. 14. The head is distinctly longer than wide (1.1); the eyes are a bit longer than the cheek (1.15). The median groove reaches to about one-fifth of the length of the head (level with the posterior rim of the eyes). The antenna has a short, disk-line anellus; the two funicular segments are subequal in length.

The pronotum is longer than wide posteriorly (1.15); the mesonotum is one-third of the length of the pronotum, the metanotum three-sevenths (laterally), or one-seventh (medially); the propodeum is little wider than long medially (1.2)

and two times as long as the spiracular peritremata, which occupy five-eighths of the lateral length. The fore tibia bears a dorso-apical comb of eight unequal teeth.

The claspers of the genitalia bear three claws. The total length (head and thorax) is ca. 1.5 mm. The colour is yellowish.

The female of *K. calorai* is recognized by the compound eye, which is more than four times as long as the cheek. The male is rather slender, especially the pronotum, which is longer than wide, vs. usually shorter than wide.

The species is named after Dr. F.B. Calora, at the time of my visit my host in the Dept. of Entomology at Los Baños in the Philippines.

Kradibia ordinata spec. nov.

Material. 40♀ 7♂, Solomon Isl.: Kolombangara, ex *Ficus chrysochaete* Corner (RSS no. 239), leg. E.J.H. Corner, viii.1965, coll. RMNH no. 1074 (type-lot; type: ♀).

The female head is slightly shorter than wide across the compound eyes (0.95), which are $2\frac{1}{4}$ times as long as the cheek. The antenna consists of ten free segments; the pedicel bears ca. forty axial spines, the appendage of the third segment reaches up to half the fifth segment; the seventh to ninth segments are subequal in length and they bear three to four irregular rows of oblong sensilla, the sixth segment is a sixth longer and there are four to five rows; the tenth segment is $1\frac{1}{2}$ times as long as the seventh and bears five to six irregular rows of sensilla. The epistomal margin has gentle lateral lobes and a blunt median, which is not very prominent. The mandibular appendage bears four ventral lamellae.

The fore wing (2:1) is ca. 1.3 mm long; the submarginal, marginal, stigmal, and postmarginal veins are approximately in ratio 18:4:5:6; the hind wing (4:1) is ca. 0.8 mm long. The dorso-apical comb of the fore tibia consists of four teeth.

The spine of the hypopygium is $3\frac{1}{2}$ times as long as it is wide at the base; the row of hyaline setae is situated at approximately half length. The total length (head, thorax and gaster) is ca. 1.4 mm; the valves of the ovipositor are one-third of the length of the gaster.

The male head is as long as wide; the eye is two times as long as the cheek. The median groove is not quite half as long as the head (0.4). The antenna has a disk-like anellus; the two funicular segments are approximately in ratio 9:8.

The pronotum is a bit longer than wide anteriorly (1.1) and much shorter than wide posteriorly (0.75); the length of the mesonotum is 0.3 of its width and one-third of the length of the pronotum; the metanotal plates are (narrowly) contiguous in the middle. The fore tibia has dorso-apical comb of nine subequal teeth in a rather regular row.

The claspers of the genitalia bear three claws. The total length (head and thorax) is ca. 1 mm.

K. ordinata is much like *K. brownii*, but the female mandibular appendage has only four ventral lamellae (vs. six); the ovipositor valves are one-third of the gaster (vs. two-thirds). The male has a regular row of nine subequal teeth in the dorso-apical comb of the fore tibia, while *K. brownii* has eight, alternately large and small, teeth.

Kradibia brownii Ashmead

(fig. 13)

Kradibia brownii Ashmead, 1904, Ent. News Philad. 15: 342; Grandi, 1927, Philipp. J. Sci. 33: 326; Wiebes, 1978, Zool. Meded. Leiden 53: 170–173.

The female compound eye is 2½ times as long as the cheek, not 1½ times as noted by Wiebes (1978: 171). The male is figured in fig. 13, as an example of the robust type.

The host is *Ficus ulmifolia* Lam. (Philippines: Luzon).

Kradibia ghigii (Grandi)

Blastophaga ghigii Grandi, 1916a, Boll. Lab. Zool. Portici 10: 128; Grandi, 1916b, Ibid. 11: 145–149. *Kradibia ghigii* Wiebes, 1978, Zool. Meded. Leiden 53: 173.

Only the male was described. It has no anellus in the antenna. The host is *Ficus fraseri* Miq. (Australia: New South Wales).

Kradibia panchoi spec. nov.

(fig. 1)

Material. Series ♀♂, Philippines: Luzon, Mt. Province, Campus Mainit 1500 m alt., ex *Ficus cumingii* Miq. var. *terminalifolia* (Elm.) Sata (J.V. Pancho no. 4216), leg. J.T. Wiebes, 11.xii.1964, coll. RMNH no. 768 (type-lot; type: ♀).

25♀ 25♂, Philippines: Luzon, Mt. Province, Mt. Sto. Thomas 1800 m alt., ex *Ficus cumingii* Miq. var. *terminalifolia* (Elm.) Sata (J.V. Pancho no. 4217), leg. J.T. Wiebes, 12.xii.1964, coll. RMNH no. 769.

Serie ♂, Philippines: Palawan, Bacongan nr. Pto. Princesa, ex *Ficus cumingii* Miq. var. *terminalifolia* (Elm.) Sata (J.V. Pancho no. 4258), leg. J.T. Wiebes, 8.i.1965, coll. RMNH no. 770.

10♀ series ♂, Philippines: Negros occ., La Granja, ex *Ficus cumingii* Miq. var. *terminalifolia* (Elm.) Sata (J.V. Pancho no. 4202), leg. J.T. Wiebes, 3.xii.1964, coll. RMNH no. 766.

Series ♂, Philippines, Negros occ., along Nat. Rd. Bacolod-Silay, ex *Ficus cumingii* Miq. var. *terminalifolia* (Elm.) Sata (J.V. Pancho no. 4213), leg. J.T. Wiebes, 5.xii.1964, coll. RMNH no. 767.

The female head (fig. 1) is slightly shorter than wide across the compound eyes (0.95), which are 2½ times as long as the cheek. The antenna consists of eleven free segments: the pedicel bears ca. thirty axial spines, the appendage of the third segment reaches to the basal fifth of the fifth segment, which has two rows of sensilla; the seventh to tenth segments are subequal in length and they bear two to three rows of sensilla, the sixth and eleventh are approximately one-sixth

longer and have three to four rows. The edge of the lateral lobes of the epistomal margin is notched, the median prominence is sharp. The mandibular appendage bears six ventral lamellae; the maxillae have two subapical setae.

The fore wing (2:1) is ca. 1.9 mm long; the submarginal, marginal, stigmal, and postmarginal veins are approximately in ratio 18:4:5:11; the hind wing (4:1) is ca. 1.1 mm long. The fore tibia has a dorso-apical comb of five subequal teeth.

The hypopygium has a distinct spine, which is a bit over two times as long as it is wide at the base (9:4), and the transverse row of (six) hyaline setae is situated at five-ninths of the length. The total length (head, thorax and gaster) is ca. 1.6 mm; the valves of the ovipositor are one-third of the length of the gaster.

The shape of the male head and thorax is rather robust, much as in *K. brownii*: the length-width ratio of the head is 0.95; the eye is 1½ times as long as the cheek; the median groove is one-quarter of the length of the head. The antennal anellus is half as long as wide; the two funicular segments are subequal in length, approximately three-fifths as wide as long.

The pronotum is shorter than wide posteriorly (0.85). The length of the spiracular peritremata is one-third of the length of the propodeum, half as long as the lateral length; the posterior margin is almost straight. The dorso-apical comb of the fore tibia bears seven subequal teeth. The mid leg is slender, but well-developed; the tarsus is tetramerous.

The claspers of the genitalia bear three claws. The total length (head and thorax) is ca. 1 mm.

Compared with *K. brownii*, the female of *K. panchoi* is at once recognized by the eleven-segmented antenna, with less, but longer sensilla; otherwise it is rather similar. Also the male resembles *K. brownii*, but it has well-developed mid legs, and a relatively large antennal anellus.

The species is named after Prof. J.V. Pancho, botanist of the Botany Dept. at Los Baños in the Philippines, who accompanied me on my trips and collected the figs.

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