



## Revision of the Caraphiini, New Tribe (Coleoptera, Cerambycidae, Lepturinae)

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### Abstract

Caraphiini N. Ohbayashi, Lin & Yamasako, trib. nov. of the subfamily Lepturinae is erected for the genus *Caraphia* Gahan, 1906. The Central American genus *Noctileptura* Chemsak & Linsley, 1984 is synonymized with the southeast Asian genus *Caraphia*. *Caraphia huai* N. Ohbayashi & Lin, **sp. nov.**, from Hainan and Guangdong, China, *Caraphia paulastoni* N. Ohbayashi & Lin, **sp. nov.** from Hong Kong, China and *Caraphia lingafelteri* N. Ohbayashi & Yamasako, **sp. nov.** from Matagalpa, Nicaragua are described. All the known sixteen species of the newly defined genus *Caraphia* are revised with a key and their habitus.

**Key words:** taxonomy, *Caraphia*, *Noctileptura*, new species, new synonym, Southeast Asia, Central America

### Introduction

The genus *Caraphia* Gahan, 1906 currently contains eleven species (one with two subspecies) described from Myanmar (*C. cribrata* Gahan, 1906 and *C. minor* Gahan, 1906), Thailand (*C. thailandica* Hayashi & Villiers, 1987), Laos (*C. laosica* Gressitt & Rondon, 1970), Vietnam (*C. ebenina* Holzschuh, 1989), Nepal (*C. granulifera* Holzschuh, 1984), Malaysia (*C. depressa* Holzschuh, 2003 and *C. borneana* Vives, 2005), China (*C. laticeps* (Pic, 1922) and *C. taiwana* Chou & N. Ohbayashi, 2008), and Japan (*C. lepturoides lepturoides* (Matsushita, 1933) and *C. lepturoides babai* Makihara, 1982).

Recently, we had an opportunity to revise the Chinese specimens of *Caraphia* through the courtesy of our friends. Three species (*C. laticeps*, *C. thailandica* and *C. laosica*) have been listed so far for the Chinese fauna (Löbl & Smetana 2010). Additionally Lin & Aston (2014) recorded an undetermined species of *Caraphia* from Hong Kong. After examination of these specimens, it is concluded that *Caraphia laosica* recorded from Hainan by Hua *et al.* (1993) was a misidentification of *C. taiwana*. *C. ebenina* is newly recorded from China, and two species are new to science.

Taking this opportunity, we revise all the species of the genus *Caraphia*. It was suggested by P. Švácha to examine also the Central American genus *Noctileptura* Chemsak & Linsley, 1984 (*N. squamosa* Chemsak & Linsley, 1984 from Mexico and *N. seriata* Chemsak & Linsley, 1984 from Guatemala) which may be related with *Caraphia*. Finally we concluded that *Noctileptura* should be synonymized with *Caraphia*, and a new tribe Caraphiini of Lepturinae is established for this group.

### Historical review

The genus *Caraphia* was erected in the subfamily Lepturinae by Gahan (1906) for two newly described species, *Caraphia cribrata* (the type species) and *C. minor*, both from Karen Mts, Myanmar.

Matsushita (1933) erected the genus *Neosalpinia* based on *Neosalpinia lepturoides* Matsushita, 1933 from Okinawa Is., Japan. He placed the genus under the tribe Callidiopini of the subfamily Cerambycinae, but Mitono (1938) suggested that the species should not be placed near the *Salpinia* Pascoe, 1869 of "Callidiopsini" (=Callidiopini) but near the Gahan's *Caraphia* of Lepturinae. Hayashi (1950) transferred *Neosalpinia* to Lepturinae in accordance with Mitono's opinion, and also based on his observation of hind wing venation.

K. Ohbayashi (1963) downgraded the genus *Neosalpinia* to a subgenus of *Caraphia* based on the photograph and measurement of antennal segments of the type specimen of *Caraphia cribrata* by Dr. E. B. Britton (BMNH).

After almost four decades, Gressitt & Rondon (1970) described a fourth species, *Caraphia laosica* from Laos and synonymized *Neosalpinia* with *Caraphia*. Villiers & Chûjô (1970) transferred *Microrhabdium laticeps* Pic, 1922 to the genus *Neosalpinia*. Subsequently *C. babai* Makihara, 1982 (later downgraded to a subspecies of *C. lepturoides* by N. Ohbayashi (1992)) and *C. granulifera* Holzschuh, 1984 were added to the genus. Hayashi & Villiers (1985) were the first to revise the genus *Caraphia* and recognized seven species of which *C. laticeps* (Pic, 1922) was transferred from the genus *Neosalpinia*?

Following five species were added to the genus since that revision: *C. thailandica* Hayashi and Villiers, 1987; *C. ebenina* Holzschuh, 1989; *C. depressa* Holzschuh, 2003; *C. borneana* Vives, 2005; *C. taiwana* Chou & N. Ohbayashi, 2008.

As mentioned above, the genus *Neosalpinia* was moved to Lepturinae, downgraded to the subgenus of *Caraphia*, and then synonymized with *Caraphia*. However, the tribal placement of *Caraphia* within the Lepturinae has been variable: Aurivillius (1912) placed *Caraphia* in Lepturini (sensu lato); Boppe (1922) classified it in his Group 6 (=Toxotini, sensu lato); Gressitt & Rondon (1970) placed the genus *Caraphia* under Xylosteini based on its coarsely faceted eyes and anteriorly abbreviated head; N. Ohbayashi *et al.* (1992) placed it under Lepturini based on the eye shape, tarsal and antennal structure, and also on personal information on larval structure by P. Švácha.

Another important remark was made by Hayashi & Villiers (1985): "This genus [= *Caraphia*] has a Neotropical counterpart, *Noctileptura* Chemsak & Linsley, 1984 from Mexico". The genus *Noctileptura* has until now contained two species, *N. squamosa* Chemsak & Linsley, 1984 from Mexico and *N. seriata* Chemsak & Linsley, 1984 from Guatemala.

## Material and methods

This study was conducted based on the dried specimens preserved in the following public and private collections.

BMNH	The Natural History Museum, London, UK
BPBM	Bernice P. Bishop Museum, Honolulu, Hawaii, USA
CMIC	Natural History Museum and Institute, Chiba, Japan
CNCI	Canadian Museum of Nature, Ottawa, Canada
EUMJ	Ehime University Museum, Matsuyama, Japan
IZAS	National Zoological Museum of China, Institute of Zoology, Chinese Academy of Sciences, Beijing China
MNHN	Muséum national d'Histoire naturelle, Paris, France
PCBL	Private collection of Bin Liu, Beijing, China
PCCH	Private collection of Carolus Holzschuh, Villach, Austria
PCST	Private collection of Shigeo Tsuyuki, Zushi, Japan
PCMT	Private collection of Minoru Tao, Kawasaki, Japan
PCYK	Private collection of Yoshiyasu Kusakabe, Yokohama, Japan
SYSU	Sun Yatsen University, Guangzhou, China
USNM	National Museum of Natural History, Washington DC, USA
ZSM	Zoologische Staatssammlung München, Munich, Germany.

The abbreviations used in the descriptions are as follows: BL = body length from the tip of mandible to elytral apex; EW = humeral width of elytra. The relative lengths of antennomeres are percentages of the pronotal length of

each specimen. The abbreviations in the Table 1 is as follows: RF = row number of foveae near middle of elytron; RS = row number of scales near middle of elytron; IOC/HW = ratio of inter-ocular distance to head width; PL/PW = ratio of pronotal length to basal width of pronotum; EL/EW = ratio of elytral length to elytral width at humeri = AL/BL: ratio of antennal length to body length;  $A_1L/A_1W$  = ratio of length to width of scape;  $A_1L/A_3L$  = ratio of scape length to 3rd antennomere;  $A_5L/A_3L$  = ratio of length of 5th antennomere to 3rd antennomere.

The surface structures of pronotum and elytra with fovea and scales are observed by a SEM (Hitachi High-Technology TM 3030 Plus) without coating.

The observational method, terminology and abbreviations of the male genitalia with endophallus in fully inflated condition without eversion follow Yamasako & Ohbayashi (2011), except for using petroleum jelly for inflating the endophallus.

## Systematics

### Tribe Caraphiini N. Ohbayashi, Lin & Yamasako, nov.

Type genus: *Caraphia* Gahan, 1906.

**Diagnosis.** Eyes coarsely faceted, distinctly emarginate above to surround antennal insertions and expanded towards the ventral surface. Mandibles provided with mola and prostheca (Figs 1, 2). Mesoscutum provided with an internal median carina, but the transversely striate mesosternal stridulatory plate is not divided medially (Fig 3). Antennae inserted near anterior third of eyes, with apical 6 or 7 segments angularly ridged longitudinally and quadrangular in cross-section.

Pronotum varying in shape, sometimes inflated laterally; disk densely punctured with reticulate sculpture and provided with scales (Figs 50–65).

Elytra densely sculptured by regularly or irregularly arranged deep foveae; the shape of each fovea usually quadrate with 2 or 3 small inner swellings along margin; slightly curved scales arise from anterior border of foveae and are usually directed backward (Figs 82–97); the scales seem to be deciduous and are apparently easily rubbed off, but the distribution of scales (Figs 98–113) varies among species: they may arise from most of foveae, from alternative rows of foveae, or rather randomly.

Hind wing shows typical Lepturinae venation shown in Fig. 5 (terminology of Kukalová-Peck & Lawrence 1993, 2004): radial cell well-developed and more or less elongate; cross-vein  $r_3$  strongly oblique;  $r_4$  with spur; RP long;  $MP_{3+4}$  is branched into  $M_3$  and  $M_4$  at apical third;  $CuA_1$  present and  $CuA_2$  connecting to  $MP_{3+4}$ ; wedge cell usually absent (Figs 5, 44, 45, 46, 47), but sometimes present (Figs 43, 48, 49).

Legs with first tarsomere usually shorter than (occasionally as long as) second and third tarsomeres combined.

Male genitalia: Tegmen (terminology in Fig 4) with parameres relatively short, usually less than 1/4 of the total length, not fused at base; parameral piece apart from parameres by incision, not roofed and forming triangular lobes from side to side in dorsal view; tegminal struts slender and elongate. Median lobe gently curved in lateral view, with basal struts usually less than half length of median lobe, with dorsal plate sometimes shorter than ventral plate. Endophallus usually simple in structure, usually strongly curved or bent in right angle dorsally, but sometimes nearly straight, provided with crescent-shaped sclerites on the base of BPH, and usually with a pair of sclerites, hair-like spicules and a rod-like sclerite on MPH and APH, but sometimes lack a part of these adjunct substances.

**Notes.** As already indicated by N. Ohbayashi (1992), the genus *Caraphia* has a closer relationship to Lepturini than Xylosteyni in spite of its coarsely faceted eyes. However, the genus can be separated not only from Lepturini, but also from other tribes of Lepturinae by the combination of the above mentioned diagnostic characters, of which ridged or carinate antennomeres from 4th or 5th onwards, ventrally expanded lower eye lobes, and elytral foveae and scales, are unique characteristics of the new tribe Caraphiini.

### Genus *Caraphia* Gahan, 1906

*Caraphia* Gahan, 1906: 75 (Type species: *Caraphia cribrata* Gahan, 1906, by original designation); Aurivillius, 1912: 177

(Lepturini); Boppe, 1921: 18, 51 (Toxotini); Gressitt & Rondon, 1970: 26, 30 (Xylosteini); Hayashi & Villiers, 1985: 23, fig. 1 (Xylosteini); N. Ohbayashi, 1992: 5 (Lepturini); N. Ohbayashi *et al.*, 1992: 90, 445 (Lepturini); Hua *et al.*, 1993: 184 (Xylosteini); N. Ohbayashi, 2007: 389 (Lepturini); Chou & N. Ohbayashi, 2008: 139 (Lepturini).  
*Neosalpinia* Matsushita, 1933: 303 (Callidiopsini) (Type species: *Neosalpinia lepturoides* Matsushita, 1933, by monotypy); Mitono, 1938: 50; Hayashi, 1950: 62 (Lepturinae). (Synonymized with *Caraphia* by Gressitt & Rondon (1970)).  
*Caraphia* (*Neosalpinia*): Ohbayashi, 1963: 8.  
*Noctileptura* Chemsak & Linsley, 1984: 281 (Type species: *Noctileptura squamosa* Chemsak & Linsley, 1984 (by original designation)); Monné, 1995: 116. **Syn. nov.**

**Original description of the genus by Gahan (1906).** "Head gradually narrowed behind the eyes, broadly concave between the antennal supports, which are widely separated; front large, oblique, not marked off from the clypeus; the latter produced in front, smooth and membranous near its front border; labrum short, transverse; maxillary palpi a little longer than the labial, last joint fusiform cylindrical; eyes of moderate size, coarsely faceted, emarginate, the lower lobe a little dilated towards both the front and the ventral surface; genae as long as the lower lobe of the eye; gula produced in a short mentigerous process.

Antennae contiguous to the eyes, a little longer or shorter than the body in the female; first joint subcylindrical, scarcely reaching past the head; third and fourth subequal, each slightly longer than the first, but shorter than the fifth or sixth; seventh to eleventh successively shorter; fourth to eleventh slightly compressed, more or less distinctly canaliculated above and below.

Prothorax widest at base, narrowed in front, slightly constricted near base and apex and slightly rounded in the middle at each side. Mesonotum with undivided stridulatory area.

Elytra wider at base than base of prothorax, slightly and gradually narrowed for about three-fourths of their length, then more strongly so to the apex, where each is truncate.

Legs moderately long; femora sublinear; the hind pair much shorter than the abdomen; tibial spurs short; first joint of hind tarsus as long as the second and third united; third joint deeply cleft, the claw joint long, the claws not very widely divergent. Front coxae moderately exerted, angulate outwards, their acetabula closed posteriorly by the approximation of the epimera to the slightly dilated hind end of the rather narrow intercoxal process.

Wings with the first cubital vein bifurcate posteriorly, the second cubital joined by an oblique vein with the first cubital, and by another vein with the first anal, the latter sometimes having a narrow elliptical cell in its course."

**Remarks.** K. Ohbayashi (1963) retained *Neosalpinia* as a subgenus of *Caraphia* distinguished by having 3rd and 4th antennomeres each shorter than the first. However the ratio of antennomeres varies among the species and cannot be used for separating the subgenera. Meanwhile Chemsak and Linsley (1984) established the genus *Noctileptura* for two Central American species, but there are no important differences from the Asian genus *Caraphia* supporting a separate genus. Therefore we hereby synonymize *Noctileptura* with *Caraphia*.

The original description of the genus *Caraphia* by Gahan (1906) is restrictive due to being based on just two species described in the same paper, and it is here expanded as a diagnosis of the new tribe Caraphiini containing single genus *Caraphia*.

### 1. *Caraphia cribrata* Gahan, 1906

(Figs 6, 7, 8, 43, 50, 66, 82, 98, 114, 128)

*Caraphia cribrata* Gahan, 1906: 75, fig. 29 (Type locality: "Karen Mts., Burma (current Myanmar)"); Boppe, 1921: 52; Aurivillius, 1912: 177; Hayashi & Villiers, 1985: 24, 25; Chou & N. Ohbayashi, 2008: 139.

*Caraphia* (*Caraphia*) *cribrata*: K. Ohbayashi, 1963: 8.

**Diagnosis.** Male: BL=13.4 mm; EW=3.5 mm. Body mostly dark brown, rather stout. Antennae exceeding elytral apex at the middle of 8th segment; scape short and thick, 2.25 times as long as wide, relative lengths of segments from base to apex: 56 : 14 : 51 : 74 : 101 : 103 : 100 : 94 : 90 : 86 : 103.

Pronotum wider than long with sides inflated laterally near middle; disk reticulately sculptured, provided with a pair of protuberance near apical third.

Elytra with disk longitudinally depressed between side and suture from basal third to apical sixth, and forming a weak ridge on apical half; foveae denser on basal sixth, then arranged in rather irregular rows; scales grayish



yellow, nearly alternating on rows of foveae, suberect and barely curved with pointed apex, 2.5–2.7 times as long as the diameter of foveae.

Genitalia (Fig. 114) with paramere of tegmen very narrow, 4.17 times as long as basal width, and converging apically with outer side slightly curved, 0.18 times as long as tegmen. Median lobe with dorsal plate almost reaching the apex of ventral plate; basal struts slightly shorter than a half of median lobe. Endophallus (Fig. 128) rather simple and elongate, MPH roundly inflated and with inverted V shaped sclerite near base; APH claviform with a pair of small dorsal projections near base, without rod-like sclerite.

Female: BL=11.7–14.7 mm. Similar to male in body color, foveae and scales. Antennae not reaching elytral apex, with scape 0.40 times as wide as long, relative lengths of segments from base to apex: 51 : 13 : 58 : 61 : 72 : 67 : 67 : 61 : 60 : 52 : 61. Elytra widened apically from humeri to apical fourth (1.15 times as wide as humeral width), then rounded to truncate apices.

**Type material examined. Holotype:** ♀, Karen Mts., Birmah (current Myanmar), Doherty leg. (Fry Coll. 1905. 100) (BMNH).

**Other specimens examined.** 1♂, Dauna Range, Kayin Sta. (Karen), Myanmar, IV-1992, Local collector leg. (PCYK); 1♀, Doi Pha Hom Pok, Chiang Mai, N. Thailand, 20°05'N, 99°15'E, 14–23-III-2004, T. Ihle leg. (PCCH).

**Distribution.** Myanmar, Thailand.

**Remarks.** This species can be distinguished from the other species by irregularly arranged foveae of elytra, longitudinally depressed elytral disk with a carina, or slender and pointed elytral scales.

The original Gahan (1906) description of this species was possibly based on a single specimen, or at least just females ("Antennae of female do not quite reach to the apex of the elytra"; male antennae were not described).

Fortunately we could examine a male specimen collected at the type locality through the courtesy of Y. Kusakabe, and we identified it as the male of *C. cribrata* because of its similar appearance. However the head is narrower than in female, third antennal segment shorter than (longer than scape in female), and also basal width of pronotum is equal to its length (pronotum distinctly wider than long in female).

In addition, one female specimen collected in Thailand was recently received from Carolus Holzschuh which he identified as *C. cribrata*. However the elytra do not widen apically as in the type specimen though the other structures are very similar. At the moment we cannot decide if the difference is infraspecific variation or not, and further material will be needed.

## 2. *Caraphia granulifera* Holzschuh, 1984

(Figs 9, 10, 11, 44, 51, 67, 83, 99, 115, 129)

*Caraphia granulifera* Holzschuh, 1984: 141, fig. 1 (Type locality: Dhunche, Trisuli Khola, Nawakot, C-Nepal); Weigei, 2006: 497; Chou & N. Ohbayashi, 2008: 141.

**Diagnosis.** Male: BL=13.0–14.3 mm; EW=3.6–3.8 mm. Body mostly reddish brown. Head, pronotum and scape with dense yellowish scales. Head with inter-ocular distance very wide, nearly half of head width; antennae slightly exceeding elytral apex; relative lengths of segments from base to apex: 50 : 15 : 54 : 54 : 80 : 78 : 74 : 71 : 75 : 69 : 80.

Pronotum distinctly wider than long, constricted at apical and basal fourth; sides triangularly inflated laterally; disk with a pair of small protuberant behind anterior constriction.

Elytra narrowed from base to apex, foveate in regular rows except for along suture and apical area which are irregularly arranged; scales pale yellow, relatively long and thin, suberect and barely curved, 2.0 times as long as the diameter of foveae, mostly alternating on rows of foveae.

Genitalia (Fig. 115) with paramere of tegmen wide and short, 2.44 times as long as basal width, slightly attenuate toward rounded apices, 0.17 times as long as tegmen. Median lobe with dorsal plate almost reaching the apex of ventral plate; basal struts slightly shorter than a half of median lobe. Endophallus (Fig. 129) rather simple and elongate, MPH roundly inflated and with indistinct sclerites near base; APH claviform with a pair of small dorsal projections near base, without rod-like sclerite.

Female: BL=14.1 mm; EW=3.8 mm. Similar to male in body color, foveae and scales, but antennae distinctly short, reaching apical fifth of elytra; relative lengths of segments from base to apex: 47 : 14 : 49 : 46 : 65 : 58 : 55 : 51 : 51 : 49 : 60. Elytra slightly widened from humeri to apical fourth.

**Type materials examined. Holotype:** ♂, C-Nepal, Nawakot, Trisuli Khola, 2,200 m, Dhunche, 15–21-X-1982, C. Holzschuh leg., Geschlüpft aus Dürren Ästen: *Quercus* Imago in Puppenwiege (PCCH). **Paratype:** 1♀, same data as holotype, Geschlüpft aus Dürren Ästen: IX. 1982 (PCCH).

**Other material examined.** 1♂, same data as holotype, Geschlüpft aus Dürren Ästen: *Rhododendron*, 6-II-1986 (PCCH).

**Distribution.** Nepal.

**Remarks.** This species is most similar to *C. cribrata*, but easily distinguishable by its short antennae, wide inter-ocular distance, and indistinct elytral carinae. According to the original description, the adults were reared from *Quercus* sp. and *Rhododendron* sp.

### 3. *Caraphia minor* Gahan, 1906

(Figs 12, 13, 52, 68, 84, 100)

*Caraphia minor* Gahan, 1906: 76 (Type locality: "Karen Mts., Burma (current Myanmar)"); Aurivillius, 1912: 177; Boppe, 1921: 52; Hayashi & Villiers, 1985: 24, 25; Chou & N. Ohbayashi, 2008: 139.

**Diagnosis.** Female: BL=9.9 mm; EW=2.6 mm. Body brownish. Head, pronotum and scape with dense pale yellowish hairs which are relatively long and thin, suberect with bent down tip. Antennae with scape short and thick, 1.80 times as long as wide; relative length of segments from 1st to 6th: 58 : 15 : 53 : 56 : 84 : 84 (the type specimen lacking left apical 5 segments and right 10 segments). Elytra with foveae arranged in regular rows but more or less irregular beside suture and apical area; scales relatively long and thin, suberect and curved, 2.3 times as long as the diameter of each fovea, alternating on rows of foveae.

Male: Unknown to us.

**Type material examined. Lectotype** (designated herein): ♀, Karen Mts., Birmah (current Myanmar), Doherty leg. (Fry Coll. 1905. 100) (BMNH).

**Distribution.** Myanmar.

**Remarks.** This rather small species is similar to *C. huai* sp. nov., but is easy to distinguish by its differently shaped pronotum, apically convergent elytra, and long and slender scales of the elytra.

Only a female syntype specimen was available for study. According to the original description of Gahan (1906), this species was described from two specimens but mainly on a female specimen with the antennae "extending by about the last two joints past the apex of elytra" (several apical segments are lost now). The second specimen (7.5 mm) was considered to be a male ("the male of this species, if I am right in considering as such the smaller of the only two specimens I have seen, differs but little from the female — the antennae are little longer, extending by nearly three joints past the apex of elytra; ....."). We could not locate this second small specimen, but the female syntype preserved in BMNH fits well the original description, and we designate it as the lectotype in order to stabilize the taxon.

### 4. *Caraphia depressa* Holzschuh, 2003

(Figs 14, 15, 16, 45, 53, 69, 85, 101, 116, 130)

*Caraphia depressa* Holzschuh, 2003: 147, fig. 1 (Type locality: Pahang, Cameron Highlands, Malaysia); Chou & N. Ohbayashi, 2008: 142.

**Diagnosis.** Male: BL=11.3–11.5 mm. Body dark reddish brown, rather stout; antennae brown; scales of elytra orange-yellow, suberect and barely curved, 2.0 times as long as the diameter of each fovea. Antennae with apical two segments exceeding the elytral apex; scape short and thick, 1.92 times as long as wide, relative lengths of segments from base to apex: 54 : 15 : 61 : 61 : 89 : 86 : 84 : 81 : 81 : 77 : 88.

Pronotum same as long as wide, provided with lateral triangular tubercles, deeply constricted near apical third and moderately so at basal fourth; disk between constriction with a pair of protuberant.

Elytra with disk swollen basally, then widely depressed behind the swellings; foveae denser on basal sixth, then moderately but rather irregularly arranged in rows; scales orange yellow, semi-circularly curved, alternating on rows of foveae except for inner 4–5 rows.

Genitalia (Fig. 116) with paramere of tegmen 3.45 times as long as basal width, straightly attenuate apically, 0.17 times as long as tegmen. Median lobe with dorsal plate slightly shorter than ventral plate; basal struts distinctly short, 1/3 length of median lobe. Endophallus (Fig. 130) rather simple and elongate; MPH inflated basally, with a pair of indistinct sclerites, and bent dorsally at a right angle; APH roundly swollen basally; ejaculatory duct thick.

Female: BL=11.7–12.3 mm. Similar to male in body color, foveae and scales. Antennae with last segment exceeding the elytral apex; scape short and thick, 0.48 times as wide as length, relative lengths of segments from base to apex: 51 : 15 : 62 : 56 : 79 : 74 : 73 : 68 : 67 : 64 : 74.

**Type material examined.** **Holotype:** ♂, Cameron Highland, 1,600 m, Tanah Rata, Malaysia, 11–27-II-2000, J. Horák leg. (PCCH). **Paratype:** 1♀, Pahan, Cameron Highland, 1,600 m, Tanah Rata, Malaysia, 11–27-II-2000, P. Pacholátko leg. (PCCH).

**Other material examined.** 1♂, Tanah Rata, Cameron Highland, Pahang, Malaysia, 8-III-2013, R. Okano leg. (EUMJ); 1♀, Cameron Highland, 4°28'05.5"N 101°23'21.9"E, alt. 1,438 m, Pahang, Malaysia, 5-III-2015, H. Ikeda leg. (EUMJ).

**Distribution.** Malaysia (Pahang).

**Remarks.** This species is easy to distinguish from the other members of the genus by the distinct lateral tubercles of pronotum, orange colored scales and pubescence, and the broadly depressed elytral disk.

## 5. *Caraphia ebenina* Holzschuh, 1989

(Figs 17, 18, 46, 54, , 70, 86, 102, 117, 131)

*Caraphia ebenina* Holzschuh, 1989: 361, figs. 1, 10 (Type locality: Tam Dao, N. Vietnam); Chou & N. Ohbayashi, 2008: 142, fig. 4.

**Diagnosis.** Male: BL=13.2–14.5 mm; EW=4.1–4.5 mm. Body mostly black. Antennae long, 1.46 times as long as body length with apical three and a half segments exceed the apex of elytra; 3rd longer than 4th; relative lengths of segments from base to apex: 67 : 13 : 75 : 68 : 88 : 78 : 76 : 69 : 67 : 63 : 73. Pronotum slightly longer than wide, constricted at apical fourth, then expanded laterally near middle; disk strongly convex, densely punctured and reticulately sculptured, provided with a pair of protuberant at apical fourth and a median callus at basal third in front of basal depression. Elytra densely and rather irregularly foveate in rows; scales whitish, short and barely curved, 1.0 times as long as the diameter of each fovea, alternating on rows of foveae.

Genitalia (Fig. 117) with paramere of tegmen 3.45 times as long as basal width, slightly emarginate on basal half of outside, then narrowed apically, 0.24 times as long as tegmen. Median lobe with dorsal plate not reaching the apex of ventral plate; basal struts one-third length of median lobe. Endophallus (Fig. 131) with MPH gently curved dorsally, with dense hair-like fine spicules and a pair of sclerites near base; APH narrowed, with a rod-like sclerite.

Female: BL=15.3 mm; EW=4.7 mm. Very similar to male in body color, foveae and scales. Relative lengths of segments from base to apex: 71 : 13 : 82 : 73 : 90 : 83 : 81 : 74 : 70 : 69 : 80.

**Material examined.** **Vietnam:** 2♂♂, Tam Dao, 1,230 m, Vinh Phu Prov., N. Vietnam, 20-V-1995, A. Saito leg. (CMIC); 1♂, same locality, VI–VII-1992, Native leg. (CMIC); 1♀, Montes Mauson, IV–V, 2-3000, H. Fruhstorfer leg., (Muséum Paris 1952 Coll. R. Oberthür) (MNHN). **China:** 1♂, Mt. Luoyinchong, Pingbantun, Daojiangcun, 1,126m, 110.17966°E, 24.10710°N, Changdongxiang, Jinxiu County, Laibin City, Guangxi, 10-V-2015, Jin-Teng Zhao leg. (IZAS ex PCBL, IOZ(E) 1904818); 1♀, Mt. Luoyinchong, Pingbantun, Daojiangcun, 1,325 m, 110.18398°E, 24.11024°N, Changdongxiang, Jinxiu County, Laibin City, Guangxi, 13-V-2015, Jin-Teng Zhao leg. (IZAS ex PCBL, IOZ(E) 1904817); 2♂♂, 1♀, same data but 1,235 m, 110.18220°E, 24.11018°N, 12–13-V-2015 (PCBL); 2♂♂, same data but 1,233 m, 110.18168°E, 24.10835°N, 13-V-2015 (PCBL); 5♂♂, Banxiancun to Pingbancun 16 km, 1,283 m, 110.22970°E, 24.14737°N, Jinxiu County, Laibin City, Guangxi, 2-VI-2015, Jin-Teng Zhao leg. (PCBL).

**Distribution.** North Vietnam; China (Guangxi).

**Remarks.** This species is characterized by its uniquely black body and the very short, white scales of the elytra. It is recorded from China for the first time.

## 6. *Caraphia laosica* Gressitt & Rondon, 1970

(Figs 19, 20, 55, 71, 87, 103, 118, 132)

*Caraphia laosica* Gressitt & Rondon, 1970: 30, fig. 7d (Type locality: "Khongxedon, Wapikhamthong District, Laos" (current Saravane Prov., Laos)); Hayashi & Villiers, 1985: 24, 26; Chou & N. Ohbayashi, 2008: 141.

**Diagnosis.** Male: BL=11.9–12.2 mm; EW=3.1 mm. Body mostly blackish brown. Antennae brown, exceeding elytral apex at the middle of 9th segment; scape 3.2 times as long as wide; relative lengths of segments from base to apex: 63 : 14 : 51 : 50 : 86 : 86 : 74 : 74 : 74 : 72 : 80. Pronotum 1.2 times as long as basal width, basal half nearly parallel-sided then slightly convergent apically; sub-recumbent scales becoming short and thin besides median area and the scales showing obscure three longitudinal vittae. Elytra densely and rather regularly foveate in rows; scales pale yellow, suberect and barely curved, truncate at the apex, 1.5 times as long as the diameter of each fovea, alternating on rows of foveae.

Genitalia (Fig. 118) with paramere of tegmen gently narrowed apically, 4.35 times as long as basal width, 0.21 times as long as tegmen. Median lobe with dorsal plate same length as ventral plate; basal struts distinctly shorter than one-third of median lobe. Endophallus (Fig. 132) with MPH turned up dorsally at the middle, with dense hair-like fine spicules and a pair of sclerites near base; APH narrowed, with a rod-like sclerite.

Female: Unknown.

**Type material examined. Holotype:** ♂, Khong Sedone, Wapikhamthong Prov., Laos, 18-IV-1965 (J. A. Rondon Collection, BPBM). **Paratype:** 1♂, same locality, 16-V-1965 (J. A. Rondon Collection, BPBM).

**Distribution.** Laos.

**Remarks.** Only the two type specimens are known. This species can be distinguished from the other congeners by its dark brown body color, pronotum with vague longitudinal vittae of scales, and the structure of tegmen of male genitalia. The record of this species from Hainan, China by Hua *et al.* (1993) was a misidentification of *C. taiwana*.

## 7. *Caraphia thailandica* Hayashi & Villiers, 1987

(Figs 21, 22, 56, 72, 88, 104, 119, 133)

*Caraphia thailandica* Hayashi & Villiers, 1987: 2 (Type locality: Doi Pui, Chiang Mai, N. Thailand); Chou & N. Ohbayashi, 2008: 141; Weigel *et al.*, 2013: 66, pl. 2, fig. d.

**Diagnosis.** Male: BL=8.2–9.4 mm; EW=2.0–2.3 mm. Body reddish to dark brown. Antennae with apical three segments exceeding elytral apex; scape 3.7 times as long as wide; relative lengths of segments from base to apex: 76 : 13 : 60 : 63 : 100 : 92 : 84 : 81 : 81 : 79 : 87. Pronotum 1.2 times as long as basal width, nearly straightly convergent from base to apex; sub-recumbent scales becoming slightly denser laterally. Elytra elongate, ca 2.7 times as long as basal width, densely and rather regularly foveate in rows; scales pale yellow, suberect and barely curved, 1.3 times as long as the diameter of foveae, alternating on rows of foveae.

Genitalia (Fig. 119) with paramere of tegmen elongate, 5.00 times as long as basal width, gently narrowed apically, 0.30 times as long as tegmen. Median lobe with dorsal plate distinctly shorter than ventral plate; basal struts short, less than one third of median lobe. Endophallus (Fig. 133) similar in shape with *C. laosica* but MPH curved in S-shape together with APH and rod-like sclerite.

Female: BL=8.2–9.5 mm; EW=4.1–4.8 mm. Very similar in general features with male. Antennae slightly shorter than male, relative lengths of segments from base to apex: 68 : 13 : 56 : 59 : 94 : 87 : 83 : 81 : 82 : 81 : 85.

**Material examined. Thailand:** 1♂, 1♀, Doi Pui, near Puping, Chiang Mai, Thailand, 19-V-1989, M. Tao leg. (PCMT and EUMJ); 1♂, same locality, 11-V-1989, M. Tao leg. (PCMT); 1♀, Doi Suthep, Chiang Mai, 4-VI-1980, M. Tao leg. (PCMT); 1♀, Pu Ping – Meo Village, Chiang Mai, Thailand, 27-V-1980, M. Tao leg. (PCMT); 1♀, Meo Village, Chiang Mai, Thailand, 27-IV-1980, S. Tsuyuki leg. (PCST); 2♂♂, Phu Rua (alt. 1,300 m), Loei, NE Thailand, 24–25-V-2004, S. Ohmomo leg. (PCST). **China:** 1♀, Menglunzhen, 55# Sample plot, alt. 630 m, Xishuangbanna, Yunnan, 29-V-2009, Xiu-Shuai Yang leg. (IZAS, IOZ(E) 1858368); 1♂, Menglun 55 km (= 55# Sample plot), Yunnan, 2014-V-27, leg. Mei-Ying Lin (IZAS, IOZ(E) 1905362); 1♀, Guomenshan Station, 22.24497°N, 100.60635°E, alt. 1,120 m, Menghai County, Nabanhe, Yunnan, 9-V-2013, Zhi-Ming Ma leg. (IZAS,

IOZ(E) 1905361); 1♂, vic. Guo Men Shan, N22°17.91/E100°38.85, 1,000–1,200 m, 37 km NW Jinghong, Xishangbanna, S-Yunnan, 25-V-2008, A. Weigel leg., *Castanopsis flower* (PCCH); 1♂, Hainan, Jianfengling, Tianchi, 1984.VII.27, leg. Jian-Guo Long (SYSU, En-366116); 1♂, Dongyinchang, alt. 750 m, Bawangling, Changjiang, Hainan, 5–7-VI-2008, Yi-Bin Ba and Jun-Tong Lang leg. (HBU=Hebei University, China).

**Distribution.** Thailand, China (Yunnan, Hainan).

**Remarks.** This species has a close relationship with *C. borneana* and *C. huai* **sp. nov.**, but is distinguishable by the very narrow interocular distance, and long parameres of tegmen. The specimens from China are rather variable in antennal length and the length of the parameres of tegmen when compared with the specimens from Thailand, but thought to be *C. thailandica* based on the other features.

## 8. *Caraphia borneana* Vives, 2005

(Figs 23, 24, 47, 57, 73, 89, 105, 120)

*Caraphia borneana* Vives, 2005: 305, fig. 3 (Type locality: Mt. Trus Madi, Borneo); Chou & N. Ohbayashi, 2008: 142, fig. 5.

**Diagnosis.** Male: BL=10.0 mm; EW=2.5 mm. Body yellowish brown. Antennae with apical three segments exceeding elytral apex; scape 3.7 times as long as wide; relative lengths of segments from base to apex: 85 : 16 : 52 : 66 : 106 : 95 : 89 : 81 : 82 : 81 : 90. Pronotum as long as basal width, nearly straightly convergent from base to apex; sub-recumbent scales becoming denser laterally.

Elytra densely and rather regularly foveate in rows; scales pale yellow, suberect and barely curved, nearly as long as the diameter of each fovea, alternating on rows of foveae.

Genitalia (Fig. 120) with paramere of tegmen very short and wide, 1.49 times as long as basal width, slightly narrowed toward rounded apices, 0.15 times as long as tegmen. Median lobe with dorsal plate slightly shorter than ventral plate. Endophallus was failed to observe.

Female: BL=8.5–10.0 mm; EW=20–25 mm. Very similar in general features with male, relative lengths of segments from base to apex: 82 : 15 : 53 : 66 : 105 : 94 : 89 : 81 : 84 : 77 : 89.

**Material examined.** 1♂, 4♀♀, 16 miles point of Keningau, alt. 1,400 m, Sabah, Borneo, 17–21-V-1983, 22-IV–6-V-1984, S. Nagai leg. (EUMJ); 1♀, S. Bingkor, Keningau, Sabah, Malaysia, 31-III–5-IV, 1981, A. Kurachi and T. Hirowatari leg. (EUMJ); 1♀, Kimanis Road, Nr. Keningau, Sabah, Borneo, 26–30-III-1992, N. Kanie leg. (EUMJ).

**Distribution.** Malaysia (Sabah).

**Remarks.** This is a small species of less than 10 mm long. Other than the small size, it is characterized by the short elytral scales and very short and wide parameres of tegmen. It seems to be endemic to Borneo Island.

## 9. *Caraphia huai* N. Ohbayashi & Lin, **sp. nov.**

(Figs 25, 26, 27, 58, 74, 90, 106, 121, 134)

**Description.** Male: BL=8.4 mm; EW=2.2 mm. Body dark brown; elytra, antennae except dark scapes and legs reddish to yellowish brown. Head moderately, and pronotum sparsely furnished with pale yellow recumbent setaceous scales. Elytra provided with short scales along suture, and suberect scales on 6 alternating rows of foveae; scutellum, scapes and legs furnished with short whitish hairs, and ventral surface moderately with recumbent rather long whitish hairs.

Head nearly as long as wide, widest across eyes, wider than base of prothorax, without tempora and directly narrowed to neck behind eyes; disk moderately and finely punctured; labrum very short, transverse; clypeus produced in front, trapezoidal; frons inclined anteriorly; vertex flattened; genae short; antennal insertion distinctly elevated; eyes very large, coarsely faceted, deeply emarginate near the middle of lobes around antennal insertions; interocular distance ca 0.2 times as wide as width of head. Antennae long and slender, about 1.5 times as long as body length and the middle of 8th segment exceeding the elytral apex; scape 3.5 times as long as wide, longer than 3rd and 4th, shorter than 5th which is the longest; basal 4 segments cylindrical, 5th to 7th more or less carinate, and 8th to the last ones square shaped in cross section with distinct carinae; relative lengths of segments from base to apex: 77 : 15 : 62 : 70 : 103 : 98 : 90 : 92 : 92 : 100.

Prothorax widest near base, 1.10 times as long as wide, almost parallel-sided in basal half, then slightly convergent apically; disk lightly convex above with a transverse depression near base; apex narrowly marginate, 0.78 times as wide as basal width. Scutellum linguulate.

Elytra about 2.55 times as long as basal width, widest near base, basal four-fifths nearly parallel-sided, then gently narrowed toward truncate apices; disk lightly swollen on both sides behind scutellum, provided with almost regularly arranged 11 rows of quadrate shaped deep foveae; scales 1.5 times as long as the diameter of each fovea.

Legs moderately long and slender; femora sub-linear; tibiae slender and slightly cambered, hind tarsi with first segment shorter than second and third combined; 3rd tarsal segment deeply cleft.

Genitalia (Fig. 121) with paramere of tegmen 4.35 times as long as basal width, slightly emarginate on basal third of outside, then gently attenuate apically, 0.23 times as long as the length of tegmen. Median lobe with dorsal plate slightly shorter than ventral plate; basal struts nearly one-third of the length of median lobe. Endophallus (Fig. 134) with MPH slightly curved dorsally, with dense hair-like fine spicules and a pair of sclerites near base; APH narrowed, with a rod-like sclerite.

Female: BL=9.2–9.3 mm; EW=4.7–4.8 mm. Very similar in general features with male; relative lengths of segments from base to apex: 69 : 14 : 59 : 63 : 106 : 95 : 91 : 89 : 88 : 86 : 91.

**Type series. Holotype:** ♂, Mohaocun, Fangtianlu, 19.01021°N, 109.36910°E, alt. 300 m, Baisha County, Yinggeling, Hainan, 16-IV-2010, Mei-Ying Lin leg. (IZAS, IOZ(E) 1905200). **Paratypes:** 1♀, Heishiding, Fengkai, Guangdong, 7-V-2010, Hai-Dong Chen, Hong-Sheng Wu, Yong-Jun Li and Hong Pang leg. (SYSU, En-382340); 1♀, Danxiashan, Shaoguan, Guangdong, 30-V–8-VI-2008, Yun Wang leg. (SYSU, En-319744).

**Etymology.** The species name is dedicated to Professor of Sun Yatsen University, Guangzhou, Hua Li-Zhong who is one of the great pioneers on the taxonomy of Chinese Cerambycidae.

**Distribution.** China (Hainan, Guangdong).

**Remarks.** This new species is very close to *C. thailandica*, but can be distinguished by short elytra (EL/EW=2.55–2.62 instead of 2.68–2.75), and short parameres of tegmen.

## 10. *Caraphia laticeps* (Pic, 1922)

(Figs 28, 29, 30, 31, 59, 75, 91, 107, 122, 135)

*Microrabdium laticeps* Pic, 1922: 10 (Type locality: Yunnan fou, China).

*Encyclops laticeps*: Gressitt, 1951: 52; Hua, 2002: 206.

*Neosalpinia laticeps*: Villiers & Chûjô, 1970: 53.

*Caraphia laticeps*: Hayashi & Villier, 1985, 4, 25; Hua, 2002: 199; Hua *et al.*, 2009: 451.

*Leptura reductipennis* Pic (misidentification? see Remarks): Hayashi & Villiers, 1985, 4, 24, pl. 3, fig. 7.

*Caraphia reductipennis*: Hua *et al.*, 2009: 451.

**Diagnosis.** Male: BL=11.2–11.9 mm; EW=3.0–3.2 mm. Body dark reddish brown, rather stout. Antennae moderate in length, 1.35 times as long as body length with apical two and a half segments exceeding the apex of elytra; relative lengths of segments from base to apex: 67 : 15 : 68 : 68 : 99 : 92 : 87 : 85 : 84 : 83 : 104. Pronotum nearly as long as wide, constricted at apical fourth, then expanded laterally near middle; disk shallowly sculptured with a pair of indistinct protuberant at apical fourth and basal depression. Elytra 2.74 times as long as wide, densely and rather regularly foveate in 12–13 rows, and most of foveae associate with pale yellow scales which are suberect, slightly curved, and twice as long as the diameter of each fovea.

Genitalia (Fig. 123) with paramere of tegmen 4.00 times as long as basal width, parallel-sided in basal 2/3, then gently narrowed apically, 0.28 times as long as the length of tegmen. Median lobe with dorsal plate distinctly shorter than ventral plate; basal struts short, ca 1/4 length of median lobe. Endophallus (Fig. 135) with MPH gently curved in S-shape, with dense hair-like fine spicules and a pair of sclerites near base; APH narrowed, with a rod-like sclerite.

Female: BL=13.5–16.5 mm; EW=3.5–4.5 mm. Similar to male in body color, foveae and scales. Antennae not so long, 1.15 times as long as body length with apical one and a half segments exceed the apex of elytra; relative lengths of segments from base to apex: 60 : 12 : 68 : 65 : 88 : 77 : 74 : 66 : 68 : 62 : 75.

**Type material examined. Holotype:** ♂, Yunnan fou / *Microrabdium laticeps* Pic / HOLOTYPE / Type / *Neosalpinia* Mats. *laticeps* Pic, A Villiers det, 1970 (MNHN);

**Other material examined.** 1♀, Env de Yunnan fou / HOLOTYPE / Type / Pic det. / *L. reductipennis* Pic (MNHN); 1♂, Kunming, Yunnan, 10-VI-1978, Yong-Shan Shi leg. (IZAS, IOZ(E) 1906483); 1♂, 1♀, Weibaoshan, 2,700–3,000 m, Weishan County, Dali Zhou, Yunnan, 30-VI–17-VII-1993, C. Holzschuh leg. (PCCH).

**Distribution.** China (Yunnan).

**Remarks.** This species can be distinguished from the other species by combination of dark body color and nearly parallel-sided elytra with 12 rows of scales.

Hayashi & Villiers (1985) introduced the *Leptura reductipennis* Pic, in litt. as a *Caraphia* species with a photograph of the specimen of MNHN. This specimen (Fig. 30) has a holotype label with handwritten determined label as *L. reductipennis* Pic (Fig. 31), but it is not Pic's handwriting. In addition, no description by Pic was found to coincide with features of this specimen. According to our examination, this specimen is unquestionably a female of *C. laticeps* Pic, 1922. On the other hand, there is another type of *Leptura reductipennis* Pic, 1928 in MNHN. It coincides well with Pic's description and also with the type locality. This species is now regarded as belonging to the genus *Paranaspia*, and there is no relation with the genus *Caraphia*. Thus the type label with scientific name on the *Caraphia* specimen is presumably someone's unintentional mistake.

### 11-1. *Caraphia lepturoides lepturoides* (Matsushita, 1933)

(Figs 1–5, 32, 33, 60, 76, 92, 108, 123, 136)

*Neosalpinia lepturoides* Matsushita, 1933: 304, pl. II, figs. 15a–b (Type locality: Okinawa, Ryukyu, Japan); Kojima & Watanabe, 1960: 39, pl.1, figs. 1–7 (description of larva).

*Caraphia (Neosalpinia) lepturoides*: Ohbayashi, 1963: 7.

*Caraphia lepturoides*: N. Ohbayashi, 1964: 38; Hayashi & Villiers, 1985: 25, 26, fig. 1; pl. 3, fig. 6; Chou & N. Ohbayashi, 2008: 140, fig. 3.

*Caraphia lepturoides lepturoides*: N. Ohbayashi *et al.*, 1994: 270; N. Ohbayashi, 2007, pl. 14, fig. 2.

**Diagnosis.** Male: BL=10.2–12.3 mm; EW=2.6–3.5 mm. Body mostly reddish brown, rather stout. Antennae moderate in length, apical three segments exceeding elytral apex, with scape long and slender, 3.45 times as long as wide, relative lengths of segments from base to apex: 80 : 14 : 58 : 66 : 93 : 81 : 80 : 73 : 75 : 73 : 76. Pronotum slightly longer than wide, nearly straightly convergent apically with slight constriction at apical fourth; disk moderately punctured with slight depression at apical third and near base. Elytra 2.59 times as long as wide, with 12–13 rows of foveae associated with suberect scales which are ca 1.5 times as long as the diameter of each fovea.

Genitalia (Fig. 123) with paramere of tegmen 3.57 times as long as basal width, parallel-sided in basal 2/3, then gently narrowed apically, 0.20 times as long as the length of tegmen. Median lobe with dorsal plate slightly shorter than ventral plate; basal struts nearly half length of median lobe. Endophallus (Fig. 136) with MPH distinctly inflated near apical 1/3, well curved dorsally, with dense hair-like fine spicules and a pair of sclerites near base; APH narrowed, with a rod-like sclerite.

Female: BL=10.6–14.3 mm; EW=3.3–4.0 mm. Similar to male in body color, punctures and scales. Antennae slightly shorter than in male, apical two and a half of segments exceeding elytral apex, relative lengths of segments from base to apex: 75 : 13 : 56 : 60 : 87 : 78 : 75 : 71 : 69 : 68 : 73.

**Material examined** (All the specimens belong to the collection of EUMJ). **Is. Okinawa:** 1 ex., Mt. Nekumachiji, Ôgimi-son, 24-V-2001, S. Inada leg.; 2 exs, Mt. Nishime-dake, Kunigami-son, 30-VI-1993, N. Ohbayashi leg.; 1 ex., Ôkunibashi, Hiji, Kunigami-son, 2-VI-2000, N. Ohbayashi leg.; 2exs, Sueyoshi, Naha, 6-VI-1986, K. Shimizu leg.; 1 ex., same locality, 19-V-1989, N. Ohbayashi leg. **Is. Kumejima:** 1 ex., Mt. Aradake, 5-V-1978, H. Hiramatsu leg.; 1ex. Nakasato, 3-V-1993, M. Kimura leg. **Is. Okinoerabu:** 1 ex. Mt. Ôyama, 6-V-1989, Y. Kamano leg. **Is Tokunoshima:** 1 ex., Hagedake-rindô, 20–22-VI-2001, N. Ohbayashi leg. **Is Amami-Ôshima:** 2 exs, Hatsuno, reared and emerged on 20-IV-1963, N. Ohbayashi leg.; 1 ex., same locality, 27-V-1960, T. Shibata leg.; 1 ex, Shinmura, 3-V-1977, A. Oda leg.; Ogamiyama, Naze, 30-IV-1977, A. Oda leg.; 7exs, Akatsuchi-yama, 17–18-VI-2001, N. Ohbayashi leg.; 1 ex., Yanma, Naze, 22-V-2014, K. Matsuda leg. **Is. Yakushima:** 1 ex., Kurio, 10–18-VI-1959, M and T. Okadome leg. **Kyushu:** 1 ex., Mt. Hoyoshi, Kagoshima Pref., 10-VII-2010, N. Ohbayashi leg.; 1 ex., Cape Sata, Kagoshima Pref., 27-V-1958, M. Miyake leg. **Shikoku:** 1ex., Okinoshima, Kochi Pref., 28-VI-1956, K. Miyamori leg.; 1 ex., Cape Ashizuri, Kochi Pref., 6–7-VI-1998, N. Ohbayashi leg.; 1ex.,

same locality, 5-VI-1982, K. Shimizu leg.; 1 ex., same locality, 12-VII-1987, M. Sakai leg.; 1 ex., Cape Koumo, Ainan-chô, Ehime Pref., 3-VII-2006, T. Kurihara leg. **Honshu:** 2 exs, Adera valley, Ôkuwa-mura, Nagano Pref., 8-VIII-1996, M. Takakuwa leg.; 1 ex., Odaru, Izu Peninsular, Shizuoka Pref. 5-VII-1959, H. Inoue leg.; 1 ex., Sueyoshi, Is. Hachijô, Tokyo Pref., 25-VII-1992, T. Itô leg.

**Distribution.** Japan (Honshu, Shikoku, Kyushu, Islands of Izu, Gotô, Koshiki, Tanegashima, Yakushima, Tokara, Amami, Okinawa).

**Remarks.** This species has close relation with *C. laticeps*, but distinguishable by simple pronotal disk, short elytra, or number of elytral rows (13 in male and 15 in female instead of 12). Also similar to *C. taiwana*, but easily separable by short antennae.

The host plant of this species is *Clerodendron trichotomum* Thunb. (Verbenaceae) (Kojima & Nakamura 2011).

## 11-2. *Caraphia lepturoides babai* Makihara, 1982

(Figs 34, 124)

*Caraphia babai* Makihara, 1982: 127, figs. 3, 5-D (Type locality: Takeda, Ishigaki Island, Ryukyu, Japan); Hayashi & Villiers, 1985: 24, 25, 26.

*Caraphia lepturoides babai*: N. Ohbayashi, 1992: 5, figs. 11-13; N. Ohbayashi, 2007: 389, pl. 14, fig. 2; Chou & N. Ohbayashi, 2008: 140.

**Diagnosis.** Male: BL=9.9–11.6 mm; EW=2.6–3.1 mm. Body mostly dark reddish brown. Close to the nominotypical subspecies, but can be distinguished by the shape of pronotum which is widest at middle instead of at base. Male genitalia (Fig. 124) very similar to the nominotypical subspecies except for more or less shorter basal struts of median lobe.

Female: BL=12.2 mm; EW=3.2 mm.

**Material examined. Is. Ishigaki-jima:** 1♂, Mt. Banna, 29-VI-1985, T. Itô leg. (EUMJ); 2♂♂, same locality, reared and emerged on 11-V-1989, K. Mori leg. (EUMJ); 1♂, 1♀, Sanwa, 12-IV-2013, T. Miyamoto leg. (PCST); 1♂, same locality, 30-III-2013, A. Toba leg. (PCST).

**Distribution.** Japan (Is. Ishigaki-jima, Okinawa Pref.).

**Remarks.** This subspecies was first described as an independent species by Makihara (1982), but the differences from *C. lepturoides* are slight and it is appropriate to treat the taxon as a subspecies.

## 12. *Caraphia taiwana* Chou & N. Ohbayashi, 2008

(Figs 35, 36, 61, 77, 93, 109, 125, 137)

*Caraphia taiwana* Chou & N. Ohbayashi, 2008: 136, Figs. 1–2 (Type locality: Urai, Taipei County, Taiwan).

*Caraphia laosica* (nec Gressitt & Rondon, 1978): Hua *et al*, 1993: 63, 184, pl. III, fig. 22a; Chiang & Chen, 2001: 35, 235; Hua, 2002: 199; Chou & N. Ohbayashi, 2008: 139 (partim); Hua *et al*, 2009: 270 (note: the picture in pl. VII, fig. 83 is actually *Japanopsimus* Matsushita).

**Diagnosis.** Male: BL=12.3–13.7 mm; EW=3.3–3.6 mm. Body dark reddish brown, rather stout. Antennae very long, nearly 1.7 times as long as body length and exceeding elytral apex at the middle of seventh segment; scape long and slender, 3.73 times as long as wide, relative lengths of segments from base to apex: 80 : 16 : 73 : 80 : 109 : 107 : 101 : 104 : 98 : 94 : 94. Pronotum longer than basal width with basal half parallel-sided, then slightly convergent apically. Elytra ca 2.4 times as long as wide, with 12 rows of foveae associated with suberect scales which are ca 1.5 times as long as the diameter of each fovea.

Genitalia (Fig. 125) with paramere of tegmen rather long and both sides nearly straight, 4.00 times as long as basal width, converging toward rounded apex, 0.22 times as long as the length of tegmen. Median lobe with dorsal plate slightly shorter than ventral plate; basal struts nearly 1/3 length of median lobe. Endophallus (Fig. 137) with MPH well curved dorsally, with dense hair-like spicules and a pair of sclerites near base; APH narrowed with a rod-like sclerites.



Female: BL=11.6–13.2 mm; EW=3.0–3.5 mm. Similar to male in body color, foveae and scales. Antennae long, 1.73 times as long as body length with apical four segments exceeding the apex of elytra; relative lengths of segments from base to apex: 76 : 13 : 70 : 75 : 112 : 106 : 99 : 98 : 101 : 99 : 107.

**Type material examined.** **Holotype:** ♂, Urai, Taipei County, Taiwan, 1-VI-1997, Wei-Tsao Tsai leg. (coll. of National Taiwan University, Taipei, Taiwan). **Paratype:** 1♂, Chien shih, Litungshan, alt. 1,500 m, Hsinchu Hsien, Taiwan, 14-VI-1994, Liang-Chuen Lee leg. (private coll. of Chou Wen-I, Taitung, Taiwan).

**Other material examined.** 1♀, Niuxueling, Tunchang, Hainan, China, 30-V-1982 (SYSU, En-366117); 1♀, Nada, Danzhou, Hainan, China, 30-V-1954, Ke-Ren Huang leg. (IZAS, IOZ(E) 1906482).

**Distribution.** Taiwan, China (Hainan).

**Remarks.** This species has close relation with *C. lepturoides*, but easy to distinguish by long antennae (ca 1.7 times as long as body length instead of ca 1.4 times in *C. lepturoides*). It is also resembles *C. paulastoni* **sp. nov.** but is distinguishable by the larger body size and different structure of the male genitalia.

The Hainan population was misidentified as *Caraphia laosica* by Hua *et al.* (1993), and followed by Chiang & Chen (2001), Hua (2002) and Chou & N. Ohbayashi (2008), but two examined specimens are identified as females of *C. taiwana*.

### 13. *Caraphia paulastoni* N. Ohbayashi & Lin, sp. nov.

(Figs 37, 38, , 62, 78, 94, 110, 126, 138)

*Caraphia* sp.: Lin & Aston, 2014: 19, figs. 1–6.

**Description.** Male: BL=9.0 mm; EW=2.5 mm. Body dark brown. Head and pronotum moderately furnished with pale yellow setaceous recumbent curved hairs; elytra provided with short scales along suture, and suberect scales which are 1.2 times as long as the diameter of each fovea along every row of foveae; scapes, legs and ventral surface furnished with short yellowish whitish hairs; scutellum and pedicel to 11th antennomeres furnished with very thin appressed pubescence.

Head nearly as long as wide, widest across eyes, broader than base of prothorax, without tempora and directly narrowed to neck behind eyes; disk moderately and finely punctured; labrum very short, transverse; clypeus produced in front, trapezoidal; frons inclined anteriorly; vertex lightly depressed in U-shape; genae short; antennal insertion distinctly elevated; eyes very large, coarsely faceted, deeply emarginate near the middle of lobes around antennal insertions; interocular distance ca 0.20 times as wide as width of head. Antennae long and slender, about 1.5 times as long as body length and the middle of 8th segment exceeding the elytral apex; scape 3.7 times as long as wide, longer than 3rd and 4th, shorter than 5th which is the longest; basal 4 antennomeres cylindrical, 5th to the last ones more or less carinate, and 8th to the last ones square shaped in cross section with distinct carinae; relative lengths of segments from base to apex: 79 : 14 : 61 : 71 : 106 : 100 : 97 : 93 : 91 : 89 : 90.

Prothorax widest near base, 1.2 times as long as wide, almost parallel-sided in basal half, then slightly convergent apically; disk lightly convex above with a transverse depression near base; apex marginate, 0.73 times as wide as basal width. Scutellum lingulate.

Elytra about 2.5 times as long as basal width, widest near base, basal four-fifths nearly parallel-sided, then gently narrowed toward the truncate apices; disk provided with almost regularly arranged 11 rows of quadrate shaped deep foveae.

Legs moderately long and slender; femora sub-linear; tibiae slender and slightly cambered, hind tarsi with 1st segment shorter than 2nd and 3rd combined; 3rd tarsal segment deeply cleft.

Genitalia (Fig. 126) with paramere of tegmen wide and rather short, 3.13 times as long as basal width, strongly narrowed toward bluntly pointed apex, 0.18 times as long as the length of tegmen. Median lobe with dorsal plate slightly shorter than ventral plate; basal struts nearly 0.4 times as long as median lobe. Endophallus (Fig. 138) with MPH strongly turned up dorsally near basal third, with dense hair-like spicules and a pair of sclerites; APH curved oppositely with a rod-like sclerite.

Female: BL=10.0 mm; EW=2.8 mm. Similar to male, but differ from male as follows: interocular distance ca 0.26 times as wide as width of head; relative length of segments from base to apex: 80 : 12 : 62 : 65 : 103 : 97 : 95 : 92 : 89 : 88 : 95.

**Type series. Holotype:** ♂, Wang Tong, Lantau, Hong Kong, 28-V-2011, P. Aston leg. (IZAS, IOZ(E) 1905360). **Paratype:** 1 ♀, same locality as for the holotype, 24-VI-2011, Paul Aston leg. (by light trap), (EUMJ).

**Etymology.** This species is named after Mr. Paul Aston, a resident coleopterist of Hong Kong who provided his material for this study.

**Distribution.** China (Hong Kong).

**Remarks.** This species belongs to the group with the elytral scales mostly associated along every row of foveae. It is very close to *C. taiwana* in having long antennae, but distinguishable by the smaller body, more elongate scape, and male genitalia with dorsal plate of median lobe not shorter than ventral plate.

#### 14. *Caraphia squamosa* (Chemsak & Linsley, 1984), comb. nov.

(Figs 39, 48, , 63, 79, 95, 111)

*Noctileptura squamosa* Chemsak & Linsley, 1984: 282 (Type locality: 12 miles North of Tuxtla Gutierrez, Chiapas, Mexico); Chemsak *et al.*, 1992: 98; Monné & Giesbert, 1994: 167; Monné, 1995: 116; Noguera & Chemsak, 1996: 403.

**Diagnosis.** Female: BL=12–13.5 mm; EW=3.8 mm. Body dark reddish brown. Head and pronotum densely punctured with short recumbent triangular whitish scales. Antennae short, slightly exceeding elytral apex. scape slender and moderate in length, 3.0 times as long as wide, relative lengths of segments from base to apex: 63 : 13 : 73 : 76 : 64 : 78 : 63 : 63 : 58 : 54 : 62. Pronotum longer than basal width, with slight lateral inflation; disk provided with a pair of protuberance behind apical constriction near apical fourth. Elytra ca 2.4 times as long as wide, with 12 rows of foveae associated with recumbent spindle shaped scales which are about 0.25 times as wide as long, 2.5 times as long as the diameter of each fovea.

Male: Unknown.

**Material examined.** 1 ♀, Mexico, Chiapas. Pq. Nac. Smidero. 1000 m. 25-V-1990, H. and A. Howden leg. (CNCI).

**Distribution.** Mexico.

**Remarks.** This is a Central American species and belonging to the group in which the elytral scales are mostly associated along every row of foveae. It can be easily distinguished from the other congeners by the dense elytral punctures with remarkable recumbent spindle-shaped scales.

#### 15. *Caraphia seriata* (Chemsak & Linsley, 1984), comb. nov.

(Figs 40, 41, 64, 80, 96, 112)

*Noctileptura seriata* Chemsak & Linsley, 1984: 283 (Type locality: Livingston, Guatemala); Chemsak *et al.*, 1992: 98; Monné & Giesbert, 1994: 167; Monné, 1995: 116; Turnbow *et al.*, 2003: 19; Lingafelter *et al.*, 2014: 318.

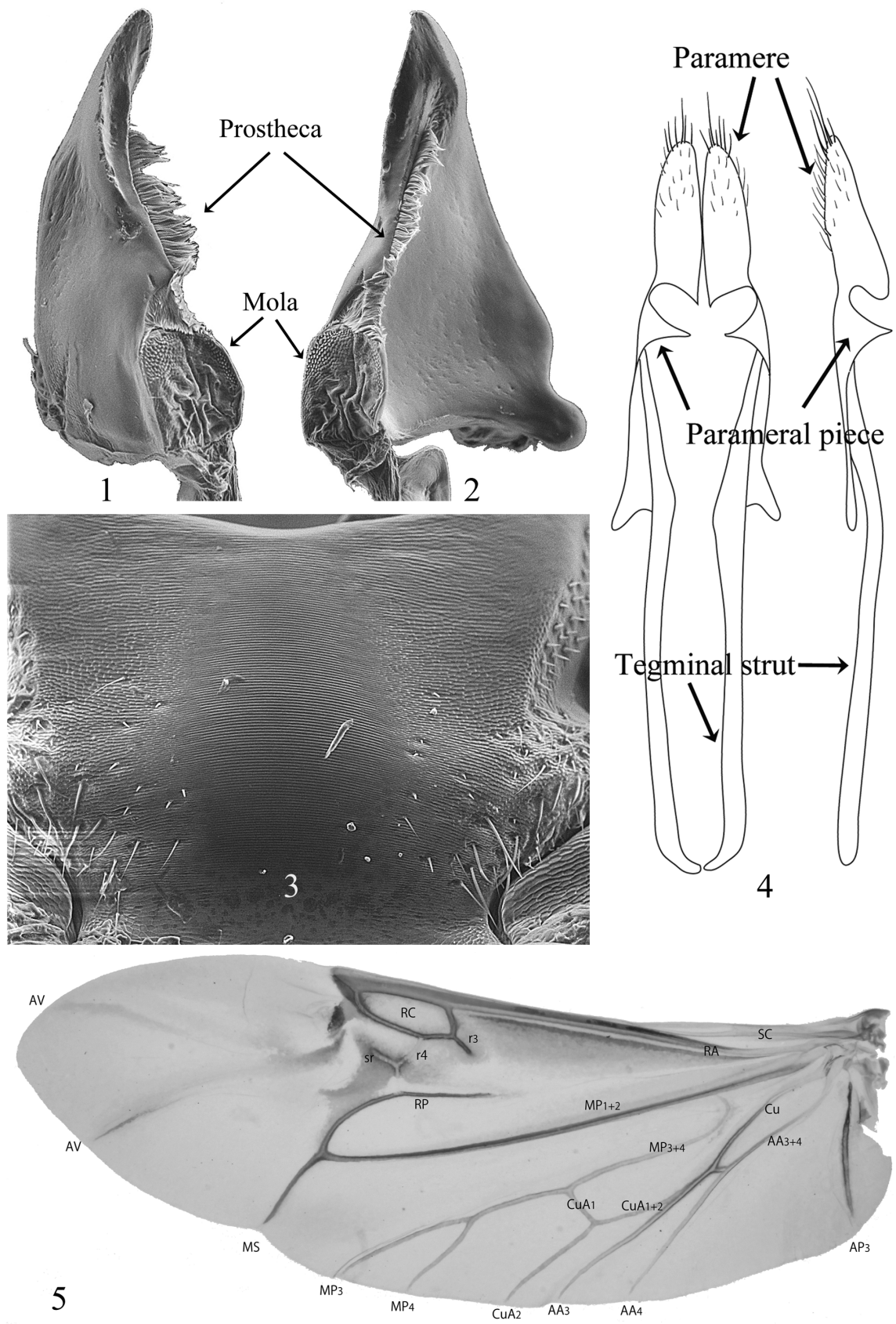
**Diagnosis.** Female: BL=9.1 mm; EW=2.6 mm. Body dark reddish brown. Head densely, and pronotum shallowly punctured with short recumbent whitish scales. Antennae short, only the last segment exceeding elytral apex; scape slender and moderate in length, 2.5 times as long as wide, relative lengths of segments from base to apex: 54 : 13 : 61 : 53 : 61 : 50 : 49 : 41 : 41 : 39 : 66. Pronotum longer than basal width, nearly straightly convergent apically with slight constriction at apical fourth. Elytra ca 2.3 times as long as wide, densely and rather regularly foveate in rows; scales slender, suberect and barely curved, nearly 1.5 times as long as the diameter of each fovea, alternating on rows of foveae.

Male: Unknown.

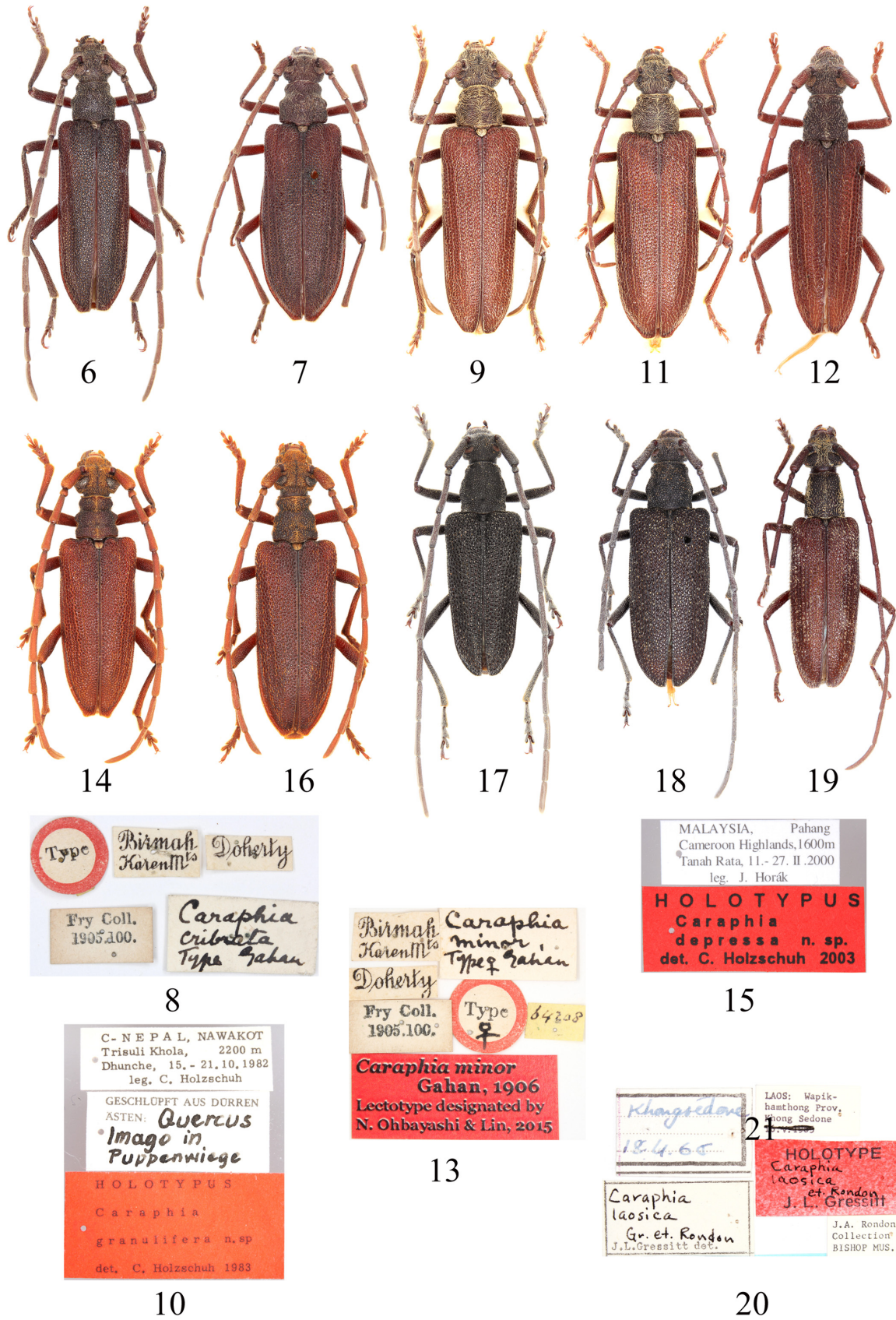
**Type material examined. Holotype:** ♀, Livingston, Guatemala, 6 May, Barber and Schwarz coll. (no collecting year) (USNM, Type number: 105726).

**Distribution.** Guatemala.

**Remarks.** This species is distinguishable from another Central American species by the elytral scales which are alternatively associated with row of foveae. Also it differs from other congeners by the distinctly long pronotum and short elytra.

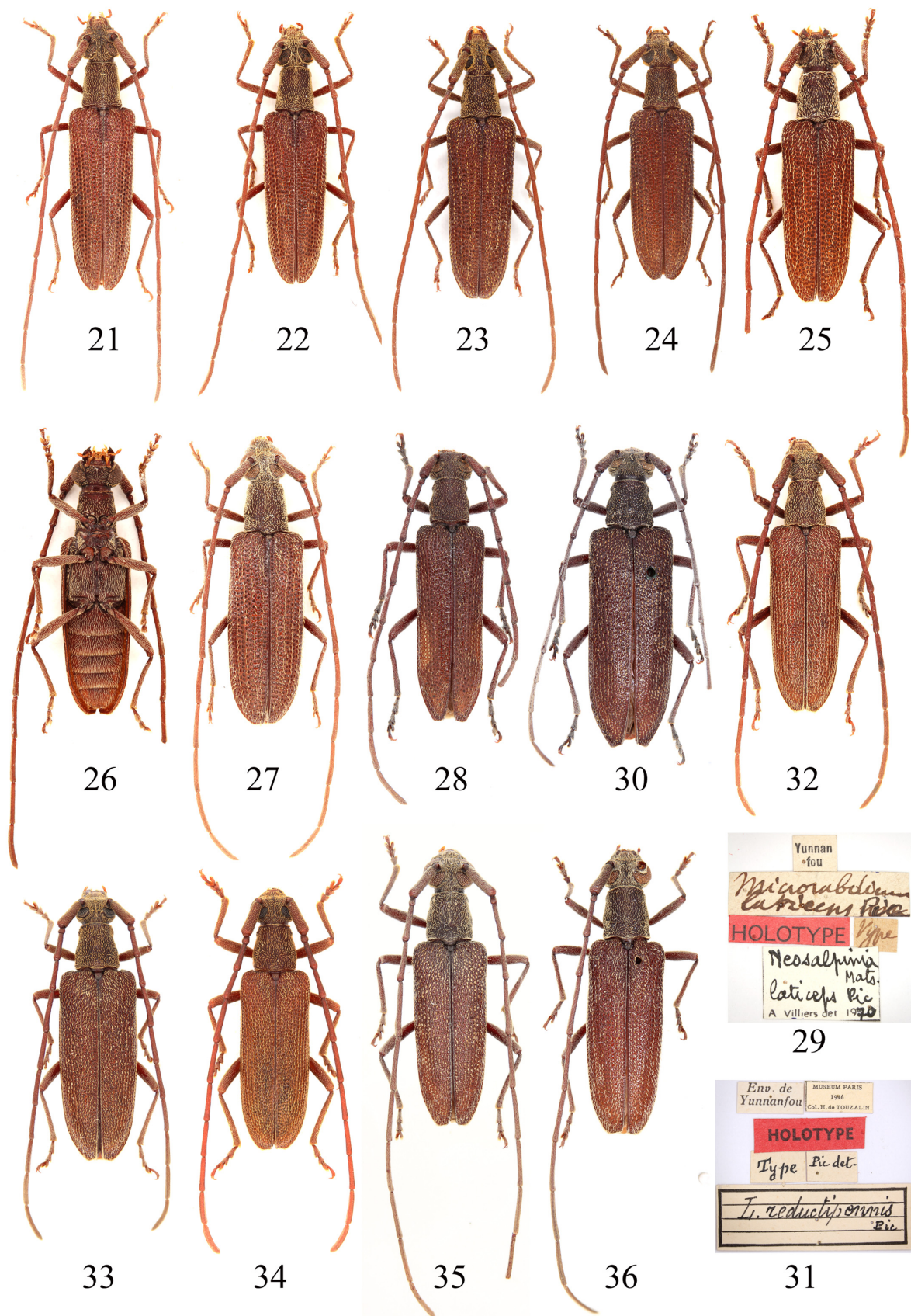


**FIGURES 1–5.** *Caraphia lepturoides*. 1. Left mandible, dorsal view; 2. ditto, ventral view; 3. mesonotum (stridulatory files); 4. tegmen of male genitalia; 5. hind wing venation.

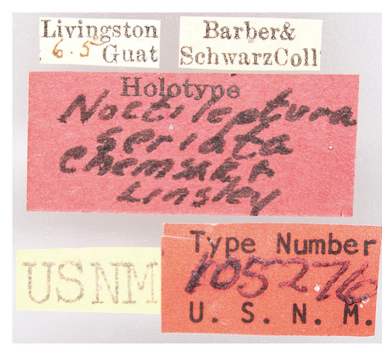
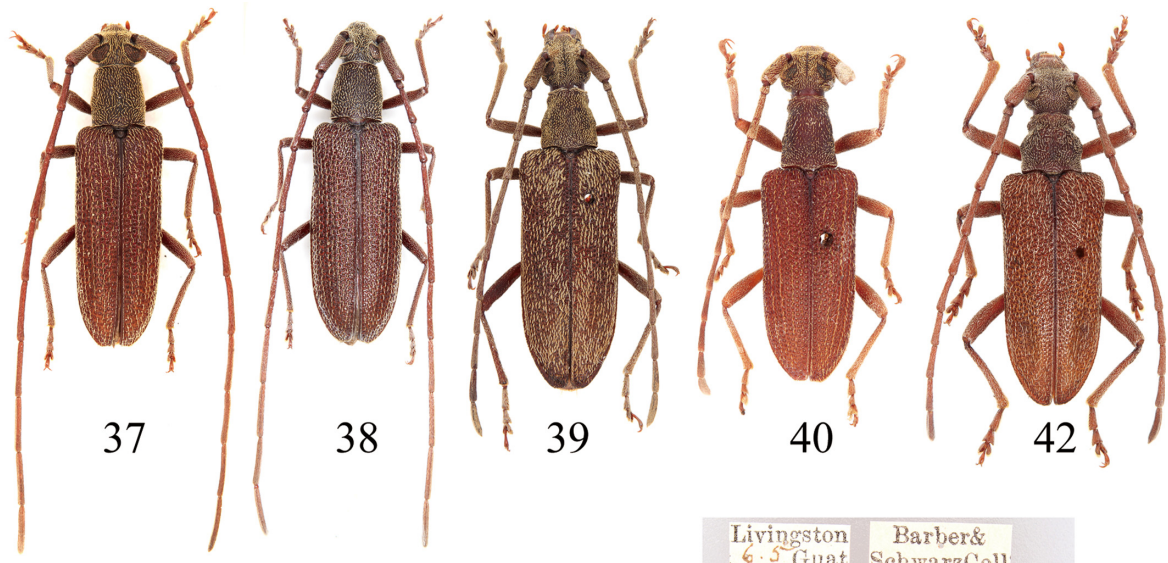


FIGURES 6–22. Habitus and type-labels of *Caraphia* spp. 6, 7, 8. *Caraphia cribrata* (6. ♂; 7. holotype, ♀; 8. ditto, type label); 9, 10, 11. *C. granulifera* (9. holotype, ♂; 10. ditto, label; 11. paratype, ♀); 12, 13. *C. minor* (12. lectotype ♀; 13. ditto, label); 14, 15, 16. *C. depressa* (14. holotype, ♂; 15. ditto, label; 16. paratype, ♀); 17, 18. *C. ebrenina* (17. ♂; 18. ♀); 19, 20. *C. laosica* (19. holotype, ♂; 20. ditto, label).



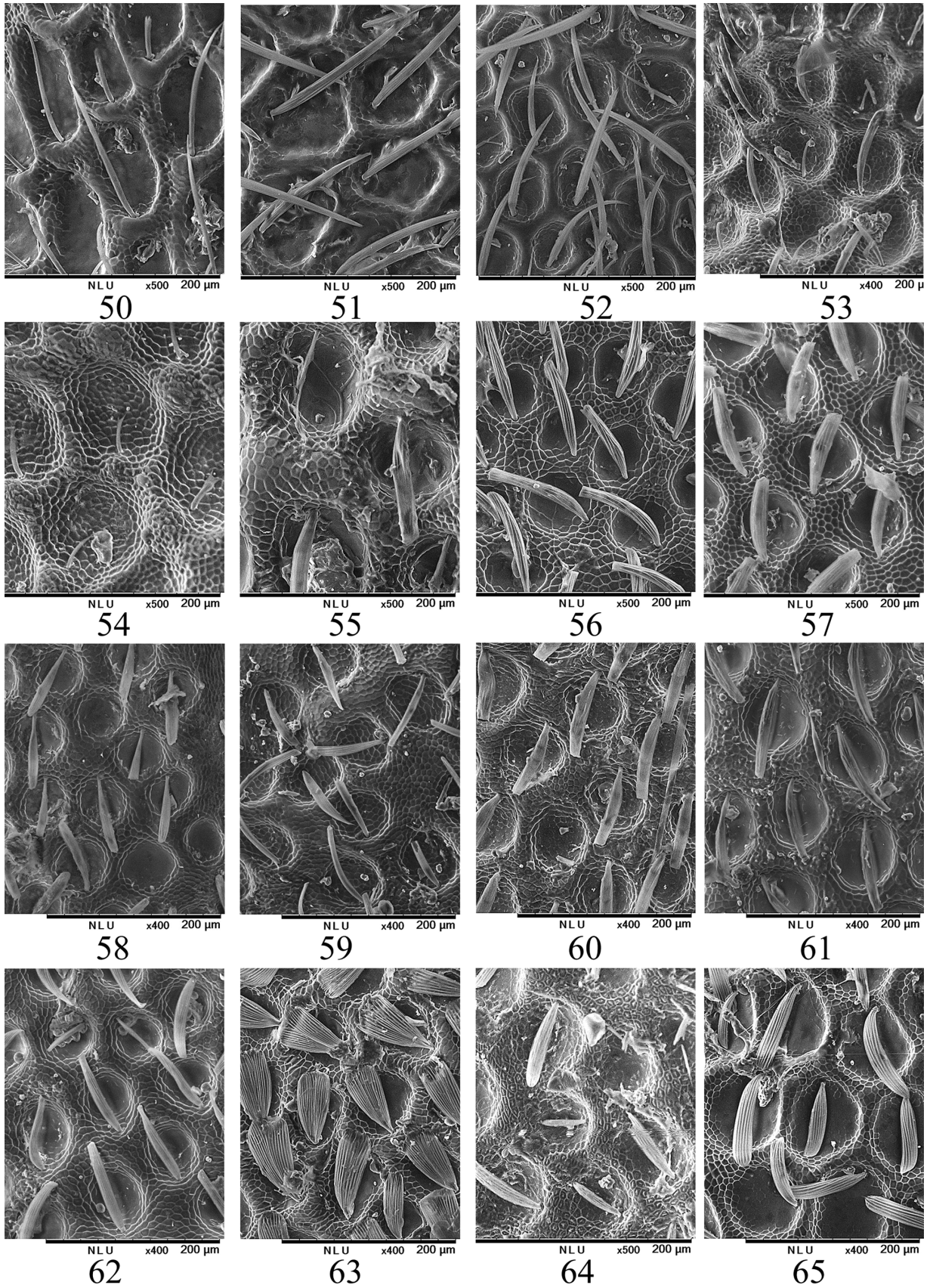


**FIGURES 23–36.** Habitus and type-labels of *Caraphia* spp. 21, 22. *Caraphia thailandica* (21. ♂; 22. ♀); 23, 24. *C. borneana* (23. ♂; 24. ♀); 25, 26, 27. *C. huai* sp. nov. (25, 26. holotype, ♂; 27. paratype, ♀); 28, 29, 30, 31. *C. laticeps* (28. holotype ♂; 29. ditto, label; 30. ♀; 31. ditto, unintentionally attached misidentified type label on the specimen shown in fig. 30); 32, 33. *C. lepturoides lepturoides* (32. ♂; 33. ♀); 34. *C. lepturoides babai* ♂; 35, 36. *C. taiwana* (35. paratype, ♂; 36. ♀).

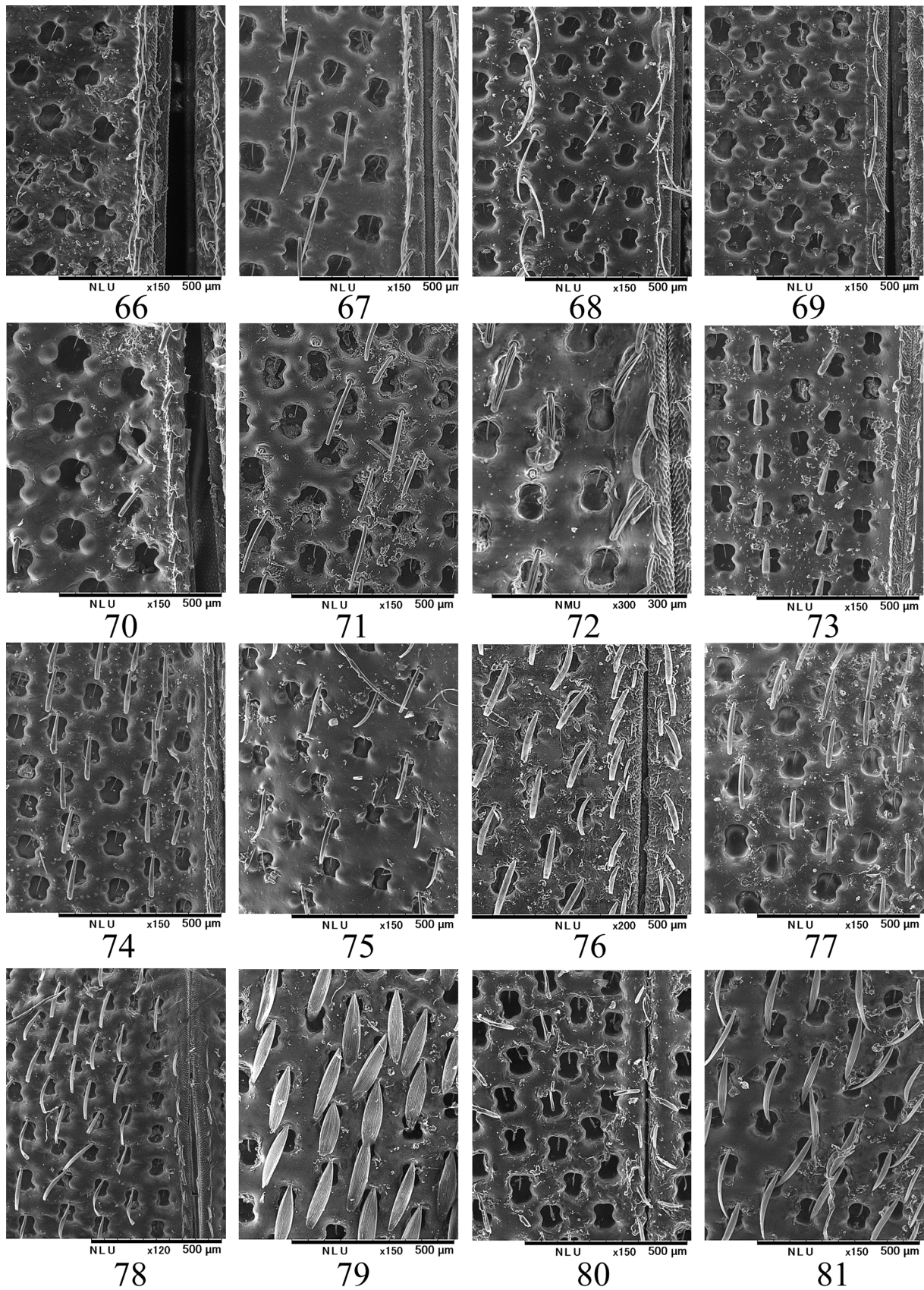


**FIGURES 37–49.** Habitus, type-labels and hind wing of *Caraphia* spp. 37, 38. *Caraphia paulastoni* sp. nov. (37. holotype ♂; 38. paratype ♀); 39. *C. squamosa* comb. nov., ♀; 40, 41. *C. seriata* comb. nov. (40. holotype, ♀; 41. ditto, label); 42. *C. lingafelteri* sp. nov. (holotype, ♂); 43. *C. cribrata*; 44. *C. granulifera*; 45. *C. depressa*; 46. *C. ebenina*; 47. *C. borneana*; 48. *C. squamosa*, comb. nov.; 49. *C. lingafelteri*, sp. nov.



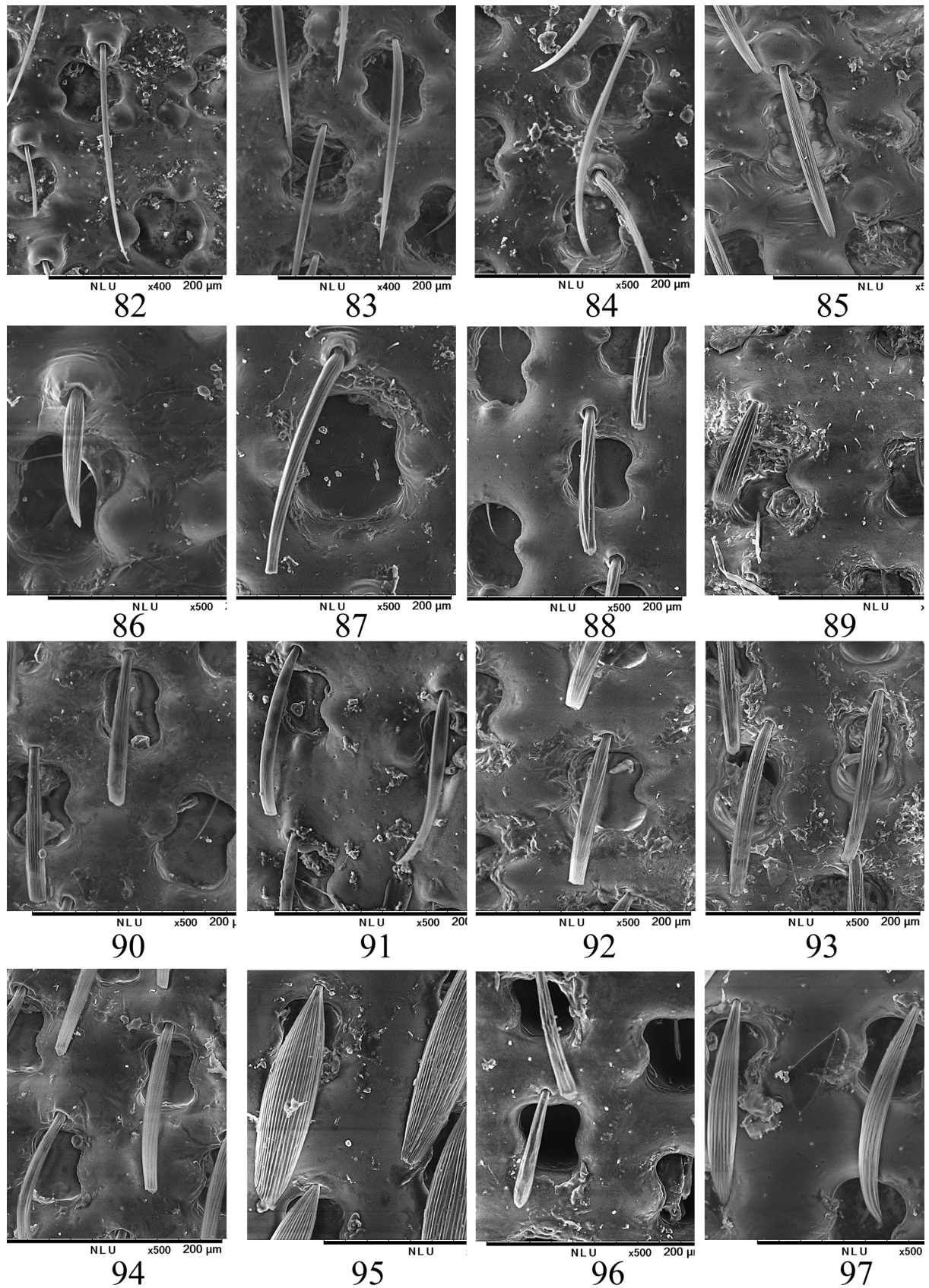


**FIGURES 50–65.** SEM images (400–500×) of pronotal sculpture and scales of *Caraphia* spp. 50. *Caraphia cribrata*; 51. *C. granulifera*; 52. *C. minor*; 53. *C. depressa*; 54. *C. ebenina*; 55. *C. laosica*; 56. *C. thailandica*; 57. *C. borneana*; 58. *C. huai* **sp. nov.**; 59. *C. laticeps* (Pic, 1922); 60. *C. lepturoides lepturoides*; 61. *C. taiwana*; 62. *C. paulastoni* **sp. nov.**; 63. *C. squamosa*, **comb. nov.**; 64. *C. seriata*, **comb. nov.**; 65. *C. lingafelteri*, **sp. nov.**



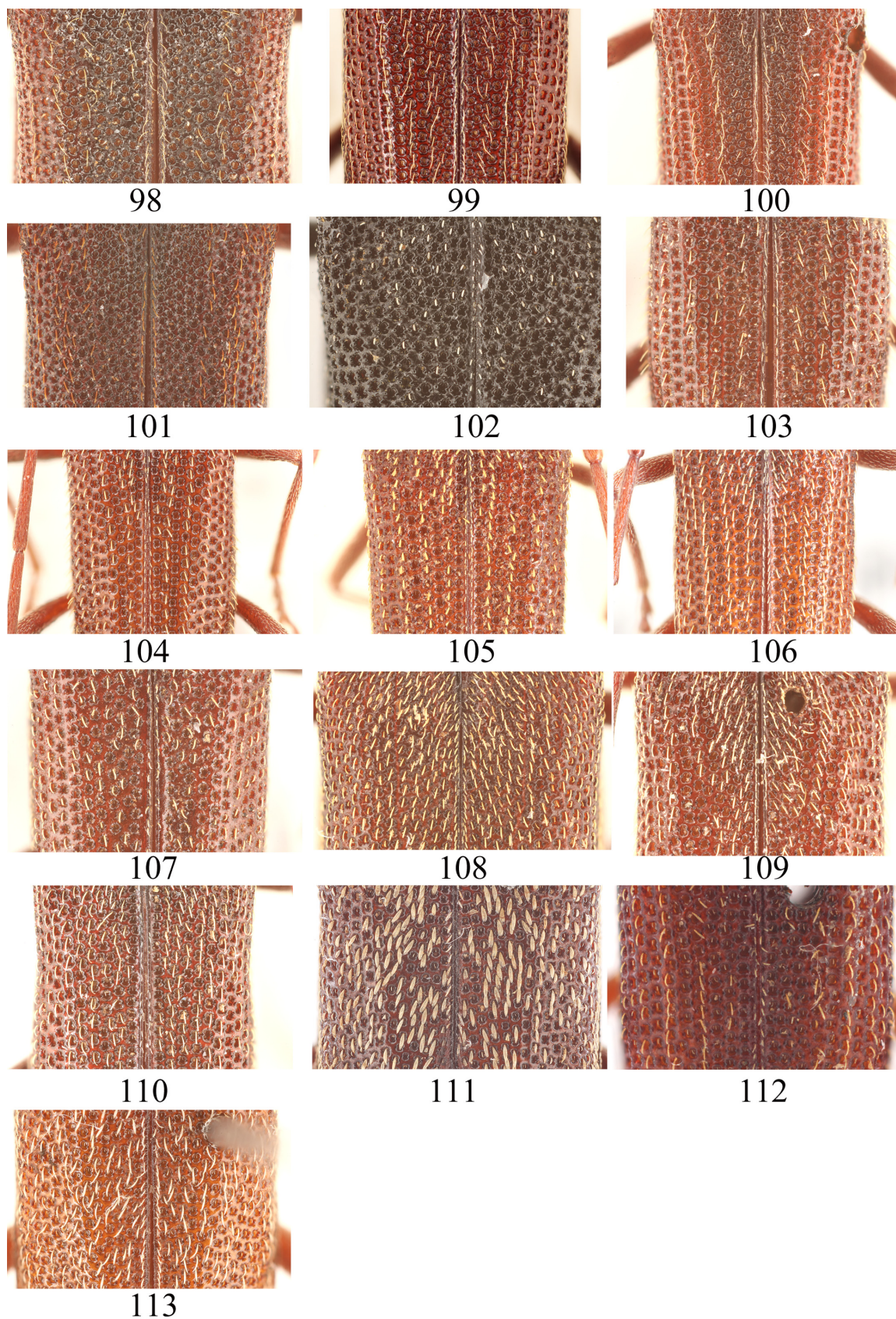
**FIGURES 66–81.** SEM images (120–150 $\times$ ) of elytral foveae and scales of *Caraphia* spp. 66. *Caraphia cribrata*; 67. *C. granulifera*; 68. *C. minor*; 69. *C. depressa*; 70. *C. ebenina*; 71. *C. laosica*; 72. *C. thailandica*; 73. *C. borneana*; 74. *C. huai* **sp. nov.**; 75. *C. laticeps*; 76. *C. lepturoides lepturoides*; 77. *C. taiwana*; 78. *C. paulastoni* **sp. nov.**; 79. *C. squamosa*, **comb. nov.**; 80. *C. seriata*, **comb. nov.**; 81. *C. lingafelteri*, **sp. nov.**



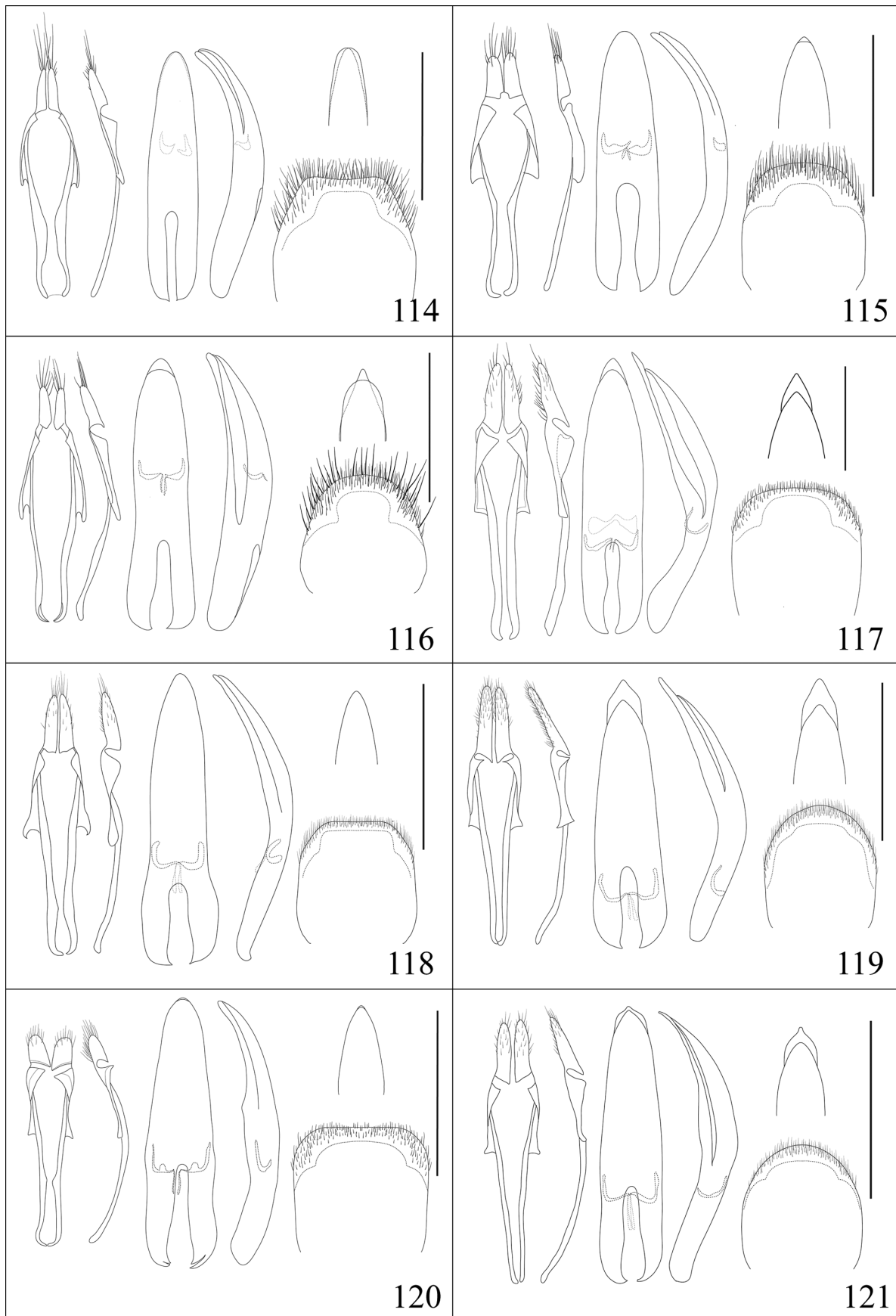


**FIGURES 82–97.** SEM images (400–500×) of elytral foveae and scales of *Caraphia* spp. 82. *Caraphia cribrata*; 83. *C. granulifera*; 84. *C. minor*; 85. *C. depressa*; 86. *C. ebenina*; 87. *C. laosica*; 88. *C. thailandica*; 89. *C. borneana*; 90. *C. huai* sp. nov.; 91. *C. laticeps*; 92. *C. lepturoides lepturoides*; 93. *C. taiwana*; 94. *C. paulastoni* sp. nov.; 95. *C. squamosa*, comb. nov.; 96. *C. seriata*, comb. nov.; 97. *C. lingafelteri*, sp. nov.

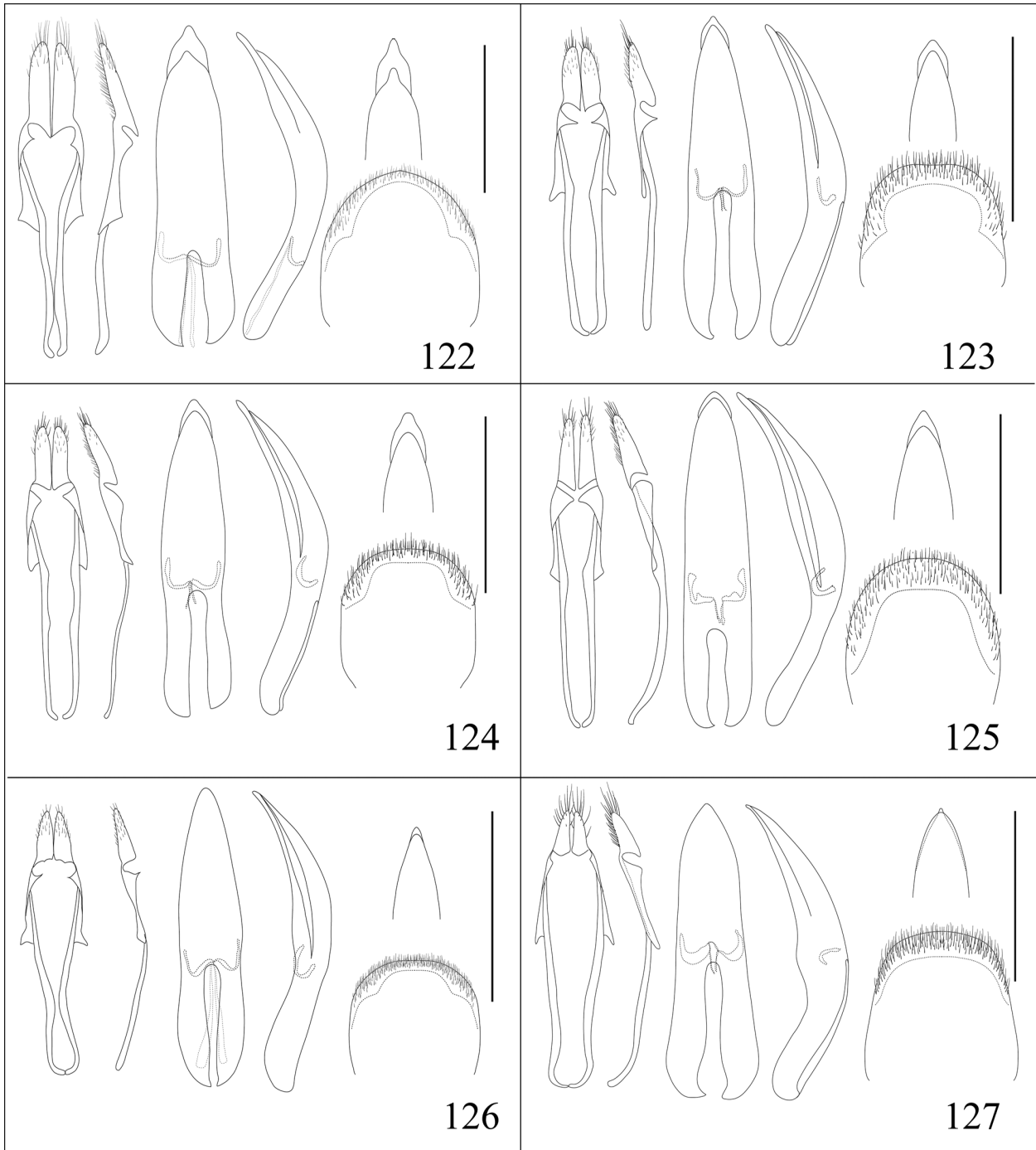




**FIGURES 98–113.** Alignment of scales of *Caraphia* spp. near middle of elytra. 98. *Caraphia cribrata*; 99. *C. granulifera*; 100. *C. minor*; 101. *C. depressa*; 102. *C. ebenina*; 103. *C. laosica*; 104. *C. thailandica*; 105. *C. borneana*; 106. *C. huai* **sp. nov.**; 107. *C. laticeps*; 108. *C. lepturoides lepturoides*; 109. *C. taiwana*; 110. *C. paulastoni* **sp. nov.**; 111. *C. squamosa*, **comb. nov.**; 112. *C. seriata*, **comb. nov.**; 113. *C. lingafelteri*, **sp. nov.**



**FIGURES 114–121.** Male genitalia of *Caraphia* spp. 114. *Caraphia cribrata*; 115. *C. granulifera*; 116. *C. depressa*; 117. *C. ebenina*; 118. *C. laosica*; 119. *C. thailandica*; 120. *C. borneana*; 121. *C. huai* **sp. nov.**



**FIGURES 122–127.** Male genitalia of *Caraphia* spp. 122. *Caraphia laticeps*; 123. *C. lepturoides lepturoides*; 124. *C. lepturoides babai*; 125. *C. taiwana*; 126. *C. paulastoni* **sp. nov.**; 127. *C. lingafelteri*, **sp. nov.**

**16. *Caraphia lingafelteri* N. Ohbayashi & Yamasako, sp. nov.**

(Figs 42, 49, 65, 81, 97, 113, 127, 139)

**Description.** Male: BL=12.2 mm; EW=3.6 mm. Body dark brown; elytra, antennae except dark scapes, and legs reddish to yellowish brown. Head and pronotum moderately furnished with pale yellow setaceous recumbent curved hairs; elytra provided with short scales along suture, and suberect scales which are 2.0 times as long as the diameter of each fovea along every row of foveae; scutellum, scapes and legs furnished with short whitish hairs, and ventral surface moderately with recumbent whitish hairs.





**FIGURES 128–136.** Endophallus of *Caraphia* spp. 128. *Caraphia cribrata*; 129. *C. granulifera*; 130. *C. depressa*; 131. *C. ebenina*; 132. *C. laosica*; 133. *C. thailandica*; 134. *C. huai* **sp. nov.**; 135. *C. laticeps* (Pic, 1922); 136. *C. lepturoides lepturoides*; 137. *C. taiwana*; 138. *C. paulastoni* **sp. nov.**; 139. *C. lingafelteri*, **sp. nov.**

Head slightly longer than wide, widest across eyes, broader than base of prothorax, temples behind the posterior margin of prominent eyes distinct, as long as genae, then narrowed to neck; disk densely punctured; labrum short, semicircular; clypeus produced in front, trapezoidal; frons inclined anteriorly; genae short; vertex depressed in U-shape with an indistinct median line between distinctly elevated antennal insertions; eyes very large, coarsely faceted, deeply emarginate near the basal third of lobes around antennal insertions; interocular distance rather wide, ca 0.4 times as wide as head across eyes. Antennae rather short, only the last segment exceeding the elytral apex; scape 2.5 times as long as wide, shorter than 3rd, subequal to 4th; basal 4 antennomeres cylindrical, 5th to 7th moderately carinate, and 8th to the last ones square shaped in cross section with distinct carinae; relative lengths of segments from base to apex 64 : 14 : 69 : 64 : 76 : 68 : 65 : 60 : 58 : 58 : 63.

Prothorax widest near middle, same as long as wide, constricted deeply at apical fourth and shallowly at basal fourth, with lateral swellings near middle; disk closely punctured with reticulated sculptures, provided with a pair of distinct protuberant at apical third and rudimentary swellings at basal third; apex narrowly marginate, 0.70 times as wide as basal width. Scutellum lingulate.

Elytra about 2.2 times as long as basal width, widest near base, basal four-fifths nearly parallel-sided, then gently narrowed toward the apices; apex not truncate, roundly narrowed to sutural angles; disk provided with irregularly arranged quadrate shaped deep foveae which are closest beside scutellum, and smaller and shallower at apical third; every foveae associated with recumbent spindle shaped scales which are about 0.13 times as wide as long, 2.5 times as long as the diameter of each fovea.

Legs moderately long and slender; femora sub-linear; tibiae slender and slightly cambered, hind tarsi with 1st segment shorter than 2nd and 3rd combined; 3rd tarsal segment deeply cleft.

Genitalia (Fig. 127) with paramere of tegmen short, 2.63 times as long as basal width, strongly narrowed toward bluntly pointed apex, 0.15 times as long as tegmen. Median lobe with dorsal plate almost reaching the apex of ventral plate; basal struts slightly shorter than a half of median lobe. Endophallus (Fig. 139) rather simple, without sclerotized armature on MPH and APH; MPH with minute spicules throughout on apical half, slightly inflated in basal half and bent ventrally like an elbow; APH slightly swollen cylindrically.

*Female.* Unknown.

**Type series. Holotype:** ♂, Nicaragua: Matagalpa Prov., Selva Negra Mountain Resort lower forest, 1220–1300 meters, 12°59.89'N, 85°54.64'W, 16–17-VI-2007, S. Lingafelter, N. E. Woodley, lights. (USNM).

**Etymology.** This species is named after Dr. Steven Lingafelter who kindly provided the specimen for our study.

**Distribution.** Nicaragua.

**Remarks.** This is a Central American species and belonging to the group in which the elytral scales mostly associated along every row of foveae. In this group, this new species easily distinguishable by distinctly inflated sides of pronotum, and roundly narrowed elytral apex to sutural angles.

### Key to the species of the genus *Caraphia*

1. Elytra provided with rows of scales nearly alternately associated with rows of foveae. . . . . 2
- Elytra provided with rows of scales mostly along every row of foveae. . . . . 11
2. Antenna with scape short and robust, not reaching the anterior margin of pronotum. . . . . 3
- Antenna with scape long and slender, exceeding the anterior margin of pronotum. . . . . 6
3. Elytral disk longitudinally depressed beside suture and forming weak longitudinal ridges on apical half. . . . . 4
- Elytral disk flattened but not depressed beside suture; without ridges. . . . . 5
4. Pronotum shorter than basal width, moderately constricted near apical fourth; scales on head and pronotum grayish yellow. . . . . *C. cribrata* Gahan, 1906 (Figs 6, 7, 8, 43, 50, 66, 82, 98, 114)
- Pronotum longer than basal width, strongly constricted near apical third; scales on head and pronotum orange yellow. . . . . *C. depressa* Holzschuh, 2003 (Figs 14, 15, 16, 45, 53, 69, 85, 101, 116)
5. Body smaller; head with interocular distance narrow, ca 0.3 times as wide as head. . . . . *C. minor* Gahan, 1906 (Figs 12, 13, 52, 68, 84, 100)
- Body larger; head with interocular distance wide, ca 0.5 times as wide as head. . . . . *C. granulifera* Holzschuh, 1984 (Figs 9, 10, 11, 44, 51, 67, 83, 99, 115)
6. Body entirely black; pronotal disk strongly convex. . . . . *C. ebenina* Holzschuh, 1989 (Figs 17, 18, 46, 54, , 70, 86, 102, 117)
- Body blackish brown to reddish brown. Pronotal disk not convex. . . . . 7
7. Elytra short, about 2.3 times as long as elytral width. . . . . *C. seriata* (Chemsak & Linsley, 1984) (Figs 40, 41, 64, 80, 96, 112)
- Elytra elongate, more than 2.5 times as long as elytral width. . . . . 8

8. Scales on the pronotum shortened on apical half besides median area and forming indistinct triple longitudinal vittae. . . . .  
 . . . . . *C. laosica* Gressitt & Rondon, 1970 (Figs 19, 20, 55, 71, 87, 103, 118) . . . . . 9
- Scales on the pronotum uniform and not forming longitudinal vittae . . . . . 9
9. Elytra more than 2.7 times as long as wide; parameres of tegmen long, 0.30 times as long as tegmen. . . . .  
 . . . . . *C. thailandica* Hayashi & Villiers, 1987 (Figs 21, 22, 56, 72, 88, 104, 119) . . . . . 10
- Elytra less than 2.5 times as long as wide; parameres of tegmen short, less than 0.2 times as long as tegmen . . . . . 10
10. Antennae 1.3 times as long as body length; parameres of tegmen very short, 0.15 times as long as tegmen . . . . .  
 . . . . . *C. borneana* Vives, 2005 (Figs 23, 24, 47, 57, 73, 89, 105, 120) . . . . . 11
- Antennae 1.5 times as long as body length; parameres of tegmen moderate in length, 0.23 times as long as tegmen . . . . .  
 . . . . . *C. huai* sp. nov. (Figs 25, 26, 27, 58, 74, 90, 106, 121) . . . . . 12
11. Scales of elytra spindle-shaped; sides of pronotum angulate or roundly inflated laterally near middle; . . . . . 12
- Scales of elytra rod-shaped; sides of pronotum nearly straightly narrowed apically. . . . . 13
12. Scales of elytra ca 4 times as long as wide; elytral apex obliquely truncate. . . . .  
 . . . . . *C. squamosa* (Chemsak & Linsley, 1984) (Figs 39, 48, , 63, 79, 95, 111) . . . . . 13
- Scales of elytra ca 6 times as long as wide; elytral apex roundly narrowed to sutural angles . . . . .  
 . . . . . *C. lingafelteri* sp. nov. (Figs 42, 49, 65, 81, 97, 113, 127) . . . . . 14
13. Antennae long, apical 4 segments exceeding elytral apex. . . . . 14
- Antennae with apical 1 to 3 segments exceeding elytral apex. . . . . 15
14. Body larger; parameres of tegmen moderate in length, 0.22 times as long as tegmen; tegmen with dorsal plate shorter than ventral plate. . . . . *C. taiwana* Chou & Ohbayashi, 2008 (Figs 35, 36, 61, 77, 93, 109, 125) . . . . . 15
- Body smaller; parameres of tegmen short, 0.18 times as long as tegmen; tegmen with dorsal plate as long as ventral plate. . . . .  
 . . . . . *C. paulastoni* sp. nov. (Figs 37, 38, , 62, 78, 94, 110, 126) . . . . . 16
15. Elytra elongate, about 2.7–2.8 times as long as elytral width; antenna with scape subequal to 3rd. . . . .  
 . . . . . *C. laticeps* (Pic, 1922) (Figs 28, 29, 30, 31, 59, 75, 91, 107, 122) . . . . . 16
- Elytra rather short, about 2.5–2.6 times as long as elytral width; antenna with scape 1.2 times as long as 3rd. . . . . 16
16. Pronotum with sides straight and converging apically. . . . .  
 . . . . . *C. lepturoides lepturoides* (Matsushita, 1933) (Figs 1–5, 32, 33, 60, 76, 92, 108, 123) . . . . . 17
- Pronotum with sides gently swollen laterally. . . . . *C. lepturoides babai* Makihara, 1982 (Figs 34, 124) . . . . . 17

## Discussion

Švácha & Danilevsky (1989) preliminarily proposed six tribes in the subfamily Lepturinae mainly based on the larval morphology. These are Xylosteini, Rhagiini, Lepturini and three unnamed tribes referred to as Tribe II, Tribe III and Tribe IV. The three unnamed tribes were basically accepted and named by subsequent authors. As a result, the following eight tribes are currently accepted generally.

Lepturini Latreille, 1802

Rhagiini Kirby, 1837

Xylosteini Reitter, 1913

Encyclopini LeConte, 1873

Oxymirini Danilevsky, 1997 = Tribe III (Švácha & Danilevsky 1989)

Enoplopterini Danilevsky, 1997 = Tribe II partim (Švácha & Danilevsky 1989)

Rhamnusiini Sama, 2009 = Tribe II partim (Švácha & Danilevsky 1989)

Sachalinobiini Danilevsky, 2010 = Tribe IV (Švácha & Danilevsky 1989)

In the present paper, we add a new tribe Caraphiini as a ninth tribe of Lepturinae. Švácha & Danilevsky (1989) pointed out that two most advanced and species-richest tribes, i.e. Lepturini and Rhagiini mostly contain typical diurnal flower-visiting group. On the other hand, most of the primitive forms (Xylosteini, Tribe II, *Oxymirus* and some of others) are pronouncedly crepuscular or nocturnal, and often do not visit flowers, or at least are not typical flower-visitors (Švácha & Danilevsky 1989).

All the species of this new tribe have coarsely faceted eyes and are thought to be nocturnal. This is supported by the observation that many species of the tribe were collected at night by light trap. In addition, the characteristic sculpture and scales of elytra or rather short first tarsomere are unique in the tribes of Lepturinae. However, little is known about the life history except for the Japanese species, *Caraphia lepturoides* (Matsushita, 1933).

The host plant of *C. lepturoides* is *Clerodendron trichotomum* Thunb. (Tubiflorae, Verbenaceae) (e.g. Kojima & Nakamura 2011), and larvae feed in the stem of living tree beginning from a dead branch in which the eggs are

laid (pers. information of Kazuki Mori). Holzschuh (1984) reared adults of *C. granulifera* from a branch of *Quercus* sp. and also from *Rhododendron* sp.

As explained in the systematic section, the new world genus *Noctileptura* is basically identical with the Asian *Caraphia*, and is here synonymized with it. Thus, the newly defined genus *Caraphia* shows intercontinental disjunct distribution along the boreal tropics in southeastern Asia and Central America. This distribution pattern of the genus corresponds well to that of the cerambycid fauna having an Arcto-Tertiary relationship (Linsley 1963) and also many plants show a similar distribution (*e.g.* Azuma *et al.* 2001; Guo *et al.* 2012). From this point of view, although neither fossil evidence nor phylogenetic information are available for discussing the biogeographic history, the disjunct distribution of the genus may have close correlation with paleontological evidence explained by the Arcto-Tertiary Geoflora and the boreotropics hypotheses (*e.g.* Wolfe 1975; Tiffney 1985). That is, the group probably had a continuous distribution in the Arctic region covered by subtropical and/or tropical vegetation via the Beringian bridge during the Paleogene and/or Neogene, and then retreated southwardly in both Asia and the New World due to the climate cooling in later Cenozoic.

**TABLE 1.** Measurement of body parts (average of examined specimens).

Species	Sex	RF	RS	HW/IOD	PL/PW	EL/EW	AL/BL	A <sub>1</sub> L/A <sub>1</sub> W	A <sub>1</sub> L/A <sub>3</sub> L	A <sub>3</sub> L/A <sub>3</sub> L
<i>C. cribrata</i>	♂	15	8	0.31	0.98	2.69	1.30	2.25	1.01	1.98
	♀	16	9	0.44	0.88	2.33	0.95	2.30	0.89	1.25
<i>C. granulifera</i>	♂	14	8	0.52	0.89	2.62	0.98	2.11	0.93	1.49
	♀	14	8	0.49	0.87	2.60	0.76	2.06	0.97	1.34
<i>C. minor</i>	♂	12	6	0.33	1.00	2.54	?	2.40	1.09	1.58
<i>C. depressa</i>	♂	15	5	0.34	1.03	2.44	1.25	1.90	0.89	1.47
	♀	15	5	0.37	1.03	2.36	1.09	1.91	0.83	1.29
<i>C. ebenina</i>	♂	12	7	0.39	1.14	2.14	1.47	3.45	0.89	1.19
	♀	13	8	0.40	1.10	2.24	1.47	3.24	0.86	1.10
<i>C. laosica</i>	♂	12	6	0.21	1.10	2.52	1.31	3.18	1.23	1.68
<i>C. thailandica</i>	♂	12	6	0.18	1.21	2.75	1.48	3.72	1.20	1.72
	♀	12	6	0.24	1.08	2.70	1.34	3.23	1.21	1.75
<i>C. borneana</i>	♂	12	6	0.29	1.03	2.67	1.31	3.53	1.66	2.06
	♀	12	6	0.29	1.00	2.63	1.31	3.40	1.54	1.97
<i>C. huai</i>	♂	12	6	0.19	1.14	2.55	1.59	3.54	1.24	1.68
	♀	12	6	0.20	1.10	2.62	1.49	3.75	1.16	1.78
<i>C. laticeps</i>	♂	12	12	0.26	1.08	2.74	1.35	2.88	0.98	1.51
	♀	12	12	0.35	1.02	2.76	1.16	2.91	0.88	1.34
<i>C. lepturoides</i> <i>lepturoides</i>	♂	13	13	0.28	1.05	2.59	1.30	3.68	1.38	1.61
	♀	15	15	0.31	1.04	2.45	1.22	3.43	1.34	1.54
<i>C. lepturoides</i> <i>babai</i>	♂	15	15	0.28	1.16	2.58	1.40	3.18	1.29	1.62
	♀	14	14	0.31	1.11	2.61	1.33	3.32	1.31	1.50
<i>C. taiwana</i>	♂	12	12	0.21	1.06	2.43	1.69	3.75	1.04	1.48
	♀	12	12	0.25	1.12	2.65	1.73	3.73	1.06	1.65
<i>C. paulastoni</i>	♂	11	10	0.20	1.17	2.49	1.73	4.23	1.28	1.72
	♀	12	11	0.26	1.16	2.47	1.62	4.21	1.28	1.65
<i>C. squamosa</i>	♀	20	19	0.37	1.07	2.39	1.09	3.00	0.86	1.06
<i>C. seriata</i>	♀	13	7	0.36	1.33	2.27	1.16	2.53	0.88	0.94
<i>C. lingafelteri</i>	♂	14	14	0.39	1.02	2.22	1.14	2.57	0.93	1.10



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## References

- Azuma, H., García-Franco, J.G., Rico-Gray, V. & Thien, L.B. (2001) Molecular phylogeny of the Magnoliaceae: the biogeography of tropical and temperate disjunctions. *American Journal of Botany*, 88 (12), 2275–2285.  
<http://dx.doi.org/10.2307/3558389>
- Boppe, P.L. (1921) Coleoptera Longicornia, fam. Cerambycidae, subfam. Disteniinae–Lepturinae. In: Wytzman, P. (Ed.), *Genera Insectorum*, fasc. 178, Bruxelles, pp. 1–119, 8 pls.
- Chemsak, J.A. & Linsley, E.G. (1984) New Genera and Species of Neotropical Cerambycidae (Coleoptera). *The Pan-Pacific Entomologist*, 60 (4), 279–288, 4 figs.
- Chemsak, J.A., Linsley, E.G. & Noguera, F.A. (1992) *II. Los Cerambycidae y Disteniidae de Norteamérica, Centroamérica y las Indias Occidentales (Coleoptera)*. Instituto de Biología, Universidad Nacional Autónoma de México. Listados Faunísticos de México, México, 204 pp.
- Chiang, S.-N. & Chen, L. (2001) *Coleoptera, Cerambycidae, Lepturinae. Fauna Sinica, Insecta, Volume 21*, Science Press, Beijing, xiv + 296 pp., 299 figs.
- Chou, W.-I. & Ohbayashi, N. (2008) A New Species of the Genus *Caraphia* from Taiwan, with Consideration of the Status of the Genus (Coleoptera: Cerambycidae) Studies on the Taiwanese Lepturinae, II. *The Entomological Review of Japan*, 63 (2), 135–144, 5 figs.
- Gahan, C.J. (1906) *The Fauna of British India, including Ceylon and Burma. Coleoptera. Vol. I. (Cerambycidae)*. C. T. Bingham, London, xviii + 329 pp., 107 figs.
- Gressitt, J.L. (1951) Longicorn beetles of China. *Longicornia*, 2, 1–667, 22 pls.
- Gressitt, J.L. & Rondon, J.A. (1970) Cerambycid-beetles of Laos (Disteniidae, Prioninae, Philinae, Aseminae, Lepturinae, Cerambycinae). *Pacific Insects Monograph*, 24: ii–iii + 1–314, 48 pls.
- Guo, Y.-Y., Luo, Y.-B., Liu, Z.-J. & Wang, X.-Q. (2012) Evolution and Biogeography of the Slipper Orchids: Eocene Vicariance of the Conduplicate Genera in the Old and New World Tropics. *PLoS ONE*, 7 (6), e38788.  
<http://dx.doi.org/10.1371/journal.pone.0038788>
- Hayashi, M. (1950) On the systematic position of *Neosalpinia lepturoides* Matsushita (Col., Ceramb.). *The Entomological Review of Japan*, 5 (1), 62–63.
- Hayashi, M. (1955) Cerambycidae. In: The Kinki Coleopterological Society (Ed.), *Coloured Illustrations of the Insects of Japan, Coleoptera*, 1 (1), Hoikusha, Osaka., pp. 18–76, pls 9–27.
- Hayashi, M. (1960) Additions to the Cerambycid-Fauna of the Loochoo Archipelago (Col.) (1). *The Entomological Review of Japan*, 11 (1), 21–29, 4 figs, pl. 4.
- Hayashi, M. (1961) The Cerambycidae from Amami-Ôshima Islands. I. Additions to the Cerambycid fauna of the Loochoo Archipelago. 2 (Col.). *The Entomological Review of Japan*, 13 (2), 35–46, pls 9–10.
- Hayashi, M. & Villiers, A. (1985) Revision of the Asian Lepturinae (Coleoptera : Cerambycidae) With special reference to the type specimens' inspection. Part I. *Bulletin of the Osaka Jonan Women's Junior College*, 19–20 (1), 1–75, 15 pls.
- Hayashi, M. & Villiers, A. (1987) Revision of the Asian Lepturinae (Coleoptera: Cerambycidae) With special reference to the

- type specimen's inspection. Part II. *Bulletin of the Osaka Jonan Women's Junior College*, 22, 1–20, 3 pls.
- Holzschuh, C. (1984) Beschreibung von 21 neuen Bockkäfern aus Europa und Asien (Cerambycidae, Col.). *Koleopterologische Rundschau*, 57, 141–165, 24 figs.
- Holzschuh, C. (1989) Beschreibung von 20 neuen Bockkäfern aus Thailand, Vietnam und Taiwan (Coleoptera, Cerambycidae). *Entomologica Basiliensa*, 13, 361–390, 29 figs.
- Holzschuh, C. (2003) Beschreibung von 72 neuen Bockkäfern aus Asien, vorwiegend aus China, Indien, Laos und Thailand (Coleoptera, Cerambycidae). *Entomologica Basiliensa*, 25, 147–241, 72 figs.
- Hua, L.-Z. (2002) *List of Chinese Insects, Vol. 2*. Zhongshan (Sun Yat-sen) University Press, Guangzhou, 612 pp.
- Hua, L.-Z., Nara, H. & Yu, S.-K. (1993) *Longicorn Beetles of Hainan and Guangdong*. Muh-Sheng Museum of Entomology, Taiwan, 320 pp., 24 pls.
- Hua, L.-Z., Nara, H., Samuelson, G.A. & Lingafelter, S.W. (2009) *Iconography of Chinese Longicorn Beetles (1406 species) in Color*. Sun Yat-sen University Press, Guangzhou, 474 pp., 75 pls.
- Kojima, K. & Watanabe, H. (1960) Morphological studies of the Cerambycidae larvae in Japan, II. *Research reports of Kôchi University*, 9, *Natural science II*, (6), 39–48, pls.1–3.
- Kojima, K. & Nakamura, S. (2011). *Food plants of cerambycid beetles (Cerambycidae, Coleoptera) in Japan (Revised and enlarged edition)*. Hiba Society of Natural History, Hiroshima, 506 pp.
- Kusama, K. & Takakuwa, M. (1984) *The Longicorn Beetles of Japan in Color*. Japanese Society of Coleopterology, Kôdansha, Tokyo, 565 pp., 95 pls.
- Lin, M.-Y. & Aston, P. (2014) First record of the subfamily Lepturinae from the Hong Kong Fauna (Coleoptera, Cerambycidae). *Hong Kong Entomological Bulletin*, 6 (1), 19–21.
- Lingafelter, S.W., Nearn, E.H., Tavakilian, G.L., Monné, M.Á. & Biondi, M. (2014) *Longhorned Woodboring Beetles (Coleoptera: Cerambycidae and Disteniidae) Primary Types of the Smithsonian Institution*. Smithsonian Institution Scholarly Press, Washington D.C., v-xviii + 390 pp., 187 figs. ISBN: 978-1-935623-40-3.
- Linsley, E.G. (1963) Bering Arc relationships of Cerambycidae and their host plants. In: Gressitt J.L. (Ed.), *Pacific Basin Biogeography*. Bishop Museum Press, Honolulu, pp. 159–178.
- Löbl I. & Smetana A. (2011) In: Löbl I. & Smetana A. (Eds), *Catalogue of Palaearctic Coleoptera. Volume 7, Curculionoidea I*. Apollo Books, Stenstrup, 373 pp.
- Makihara, H. (1982) New longicorn beetles of the Ryukyus (Coleoptera, Cerambycidae). *Special Issue to the Memory of Retirement of Emeritus Professor Michio Chûjô*: 127–133, 12 figs.
- Matsushita, M. (1933) Beitrag zur Kenntnis der Cerambyciden des japanischen Reichs. *Journal of the Faculty of Agronomy of Hokkaido Imperial University*, 34 (2), i–ix + 157–445, 5 pls.
- Matsushita, M. (1938) Neue und wenig bekannte Bockkäfer aus Shikoku (I. Okubo's und M. Okamoto's Ausbeute). *Insecta Matsumurana*, 12 (2–3), 99–106.
- Mitono, T. (1938) Information of the distribution of Cerambycidae? *Nippon no Kôchû*, 2 (1), 49–54. [in Japanese]
- Monné, M.A. (1995) *Catalogue of the Cerambycidae (Coleoptera) of the western hemisphere. Part XXI. Subfamily Lepturinae*. Sociedade Brasileira de Entomologia, São Paulo, 159 pp.
- Monné, M.A. (2015) Catalogue of the Cerambycidae (Coleoptera) of the Neotropical Region. Part III. Subfamilies Lepturinae, Necdalinae, Parandrinae, Prioninae, Spondylidinae and Families Oxypeltidae, Vesperidae and Disteniidae. Available from: [http://www.cerambyxcat.com/Parte3\\_Lepturinae\\_e\\_outros.pdf](http://www.cerambyxcat.com/Parte3_Lepturinae_e_outros.pdf) (accessed 19 August 2015)
- Monné, M.A. & Giesbert, E.F. (1994) *Checklist of the Cerambycidae and Disteniidae (Coleoptera) of the Western Hemisphere*. Wolfsgarden Books. Burbank, California, xiv+410 pp.
- Noguera, F.A. & Chemsak, J.A. (1996) Cerambycidae (Coleoptera). In: Llorente Bousquets, J., García Aldrete, A.N. & González Soriano, E. (Eds.) *Biodiversidad, taxonomía y biogeografía de artrópodos de México: Hacia una síntesis de su conocimiento*. Instituto de Biología, Universidad Nacional Autónoma de México, Mexico, pp. 381–409.
- Ohbayashi, K. (1963) Systematic notes and descriptions of new forms in Cerambycidae from Japan. *Fragmenta Coleopterologica*, (2), 7–10.
- Ohbayashi, N. (1964) A List of Cerambycidae from the Tokara and the Amami Islands (Coleoptera). *Reports of the Scientific Researches to the Tokara and the Amami Islands of the Ehime University*, 1, 37–44, pl. 17.
- Ohbayashi, N. (1992) Taxonomic Notes on Japanese Cerambycidae (Coleoptera). *Acta Coleopterologica Japonica*, (2), 1–11, 22 figs.
- Ohbayashi, N., Satô, M. & Kojima, K. (2002) *An illustrated guide to identification of longicorn beetles of Japan*. Tokai University Press, Tokyo, x + 696 pp.
- Ohbayashi, N. & Niisato, T. (2007) *Longicorn Beetles of Japan*. Tokai University Press, Hadano, xii + 818 pp., 22 figs, 130 color pls.
- Ohbayashi, N., Kimura, M. & Satô, M. (1994) The Cerambycid Fauna of the Tokara Island. In: Satô, M., Morita, S., Ohbayashi, N., Kimura, M., Sakai, M., Notsu, Y., Kaneno, S. & Hori, Y. (Eds.), *The Insects Fauna of the Tokara Islands of*

- the Ryukyu Archipelago*, WWF Japan Science Report, 2 (2), pp. 251–309, 5 pls.
- Pic, M. (1922) Nouveautés diverses. *Mélanges Exotico-Entomologiques*, 37, 1–32.
- Pic, M. (1928) Sence du 23 mai 1928. Longicornes nouveaux de Chine [Col.]. *Bulletin de la Société Entomologique de France, Paris*, 158–161.
- Samuelson, G.A. & Gressitt, J.L. (1965) The Cerambycidae of the Ryukyu Archipelago, 1. *Pacific Insects*, 7 (1), 47–81.
- Svacha, P. & Lawrence, J.F. (2014) 2.4. Cerambycidae Latreille, 1802. In: Leschen R.A.B. & Beutel R.G. (Eds.), *Handbook of Zoology, Arthropoda: Insecta: Coleoptera, Beetles, Volume 3: Morphology and systematics (Phytophaga)*. Walter de Gruyter, Berlin/Boston, pp. 77–177.
- Svacha, P. & Danilevsky, M.L. (1989) Cerambycoid Larvae of Europe and Soviet Union (Coleoptera, Cerambycoidea). Part 3. *Acta Universitatis Carolinae (Biologica)*, 32 C, 1–205. [1988]
- Tiffney, B.H. (1985) Perspectives on the origin of the floristic similarity between eastern Asia and eastern North America. *Journal of the Arnold Arboretum*, 66, 73–94.
- Turnbow, R.H. Jr., Cave, R.D. & Thomas, M.C. (2003) A list of the Cerambycidae of Honduras, with additions of previously unrecorded species. *Ceiba*, 44 (1), 1–43.
- Villiers, A. & Chûjô, M. (1970) Coleoptera of the Loo-Choo Archipelago (II) Arranged by Michio Chûjô. 36. Famille Cerambycidae (2). *Memoirs of the Faculty of Education Kagawa University*, 2 (192), 53–55.
- Vives, E. (2005) Notes on Lepturinae (XI). Four new species of Lepturinae from South East Asia (Col. Cerambycidae). *Lambillionea*, 105 (2), 302–307, 4 figs.
- Weigel, A. (2006) Checklist and Bibliography of Longhorn Beetles from Nepal (Insecta: Coleoptera: Cerambycidae). In: Hartmann, M. & Weipert, J. (Eds.), *Biodiversität und Naturlausstattung im Himalaya II*. Verein der Freunde und Förderer des Naturkundemuseums Erfurt e. V., Erfurt, pp. 495–510.
- Weigel, A., Meng, L.-Z. & Lin, M.-Y. (2013) *Contribution to the Fauna of Longhorn Beetles in the Naban River Watershed National Nature Reserve*. Formosa Ecological Company, Taiwan, 219 pp., 52 pls.
- Wolfe, J.A. (1975) Some aspects of plant geography of the northern hemisphere during the late Cretaceous and Tertiary. *Annals of the Missouri Botanical Garden*, 62, 264–279.  
<http://dx.doi.org/10.2307/2395198>
- Yamasako, J. & Ohbayashi, N. (2011) Review of the genus *Paragolsinda* Breuning, 1956 (Coleoptera, Cerambycidae, Lamiinae, Mesosini), with reconsideration of the endophallic terminology. *Zootaxa*, 2882, 35–50.