

A Review of the Buprestid Genus *Cochinchinula* Volk. with Description of New Taxa from Thailand, and Notes on the Composition and Classification of the Tribe Acmaeoderini (Coleoptera, Buprestidae, Polycestinae)

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Abstract—A review of the Oriental genus *Cochinchinula* Volk. (Coleoptera, Buprestidae, Polycestinae, Acmaeoderini) comprising three species is presented. The new species *C. thailandica* and *C. bilyi* spp. n. and the new genus *Thaichinula* gen. n. (type species *T. ohmomo* sp. n.) from Thailand are described. A key to species of the genera *Cochinchinula* and *Thaichinula* is provided. The Nearctic genus *Paracmaeoderoides* Bellamy and Westcott is transferred from the subtribe Nothomorpha to the subtribe Acmaeoderoidina, and the South African genus *Richtersveldia* Bellamy is transferred from the subtribe Nothomorpha of Acmaeoderini to the tribe Ptosimini. The generic status is restored for another South African genus, *Brachmaeodera* Volkovitsh and Bellamy. The main evolutionary trends are discussed, and the taxonomic composition and classification of the tribe Acmaeoderini are clarified.

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The genus *Cochinchinula* Volk. was established for a single species, *Acmaeodera quadriareolata* Obenb., described from “Cochinchina” and known only from the holotype (Volkovitsh, 1984). Later, among the material from Thailand sent by various collectors for identification, some specimens were found to belong not only to *C. quadriareolata* but also to three new species. One of these new species, although being similar to *Cochinchinula* in appearance, deserved distinguishing in a separate genus. Examination of these material has allowed me to specify the diagnostic characters and taxonomic position of the genus *Cochinchinula*, to reveal the main evolutionary trends of some characters, and to make changes to the classification of the tribe Acmaeoderini.

The following abbreviations are used in text: CASC, California Academy of Sciences (San Francisco, California, USA); COTJ, S. Ohmomo’s collection (Tsukuba, Japan); MHNG, Muséum d’Histoire Naturelle (Geneva, Switzerland); NMPC, National Museum (Prague, Czech Republic); TMSA, Transvaal Museum (Pretoria, Republic of South Africa); VKCS, V. Kubán’s collection (Šlapanice, Czech Republic); ZMHB, Museum für Naturkunde der Humboldt-Universität (Berlin, Germany); ZIN, Zoological Institute (Russian Academy of Sciences, St. Petersburg, Russia).

Genus **COCHINCHINULA** Volkovitsh, 1984

Volkovitsh, 1984 : 556; Bellamy, 1985 : 472 (addenda); 2003 : 18.

Type species *Acmaeodera quadriareolata* Obenberger, 1924 (by monotypy).

Diagnosis. Subhumeral lobes of elytral epipleura wide, entirely concealing metepisterna; lateral margin strongly curved behind them at level of hind coxae (Figs. 16, 19, 28), with distinct teeth along nearly entire length (Figs. 17, 20, 29). Scutellum absent. Elytral suture closed along entire length (Figs. 15, 18, 27). Wing venation (Figs. 50, 57) strongly reduced, of “*Acmaeodera*” type, but posterior sector of cubitus (*CuP*) absent, rudiment of open radial cell present, apices of recurrent radius (*Rr*) and recurrent median (*Mr*) distant from each other, “radiomedian” vein (*r-m*) distinct, long and curved [terminology following that by Fedorenko (2006)]. Posterior margin of abdominal sternite II with small tuft of transparent or yellowish setae sharply distinguished against scaly background, occasionally also with obsolete tubercle in both sexes (Figs. 17, 20, 21–23, 29). Hind coxa with distinct lateral emargination and wide tooth visible in dorsal view (Figs. 16, 19, 28); tarsal claws with large tooth at inner margin (Fig. 3). Aedeagus of “*Acmaeod-*

era s. str.” type, penis with distinct apical apodema and wide long lamina (Figs. 8, 60, 62); ovipositor of tubular type, elongate (Figs. 4, 5, 74). Surface, at least partly, covered with very large umbilicate punctures bearing distinct granules and micropunctures and also with scaly, frequently two-color pubescence. Clypeus with short lobiform carinae not reaching anterior margin.

A. quadriareolata was placed in a separate genus primarily owing to the well-developed subhumeral lobes of the elytral epipleura, which are characteristic of representatives of the subtribes Odetteina, Nothomorpha, and Acmaeoderoidina (Figs. 36, 39, 42, 45) and are lost in the subtribe Acmaeoderina (Fig. 31), frequently with formation of a subhumeral curvature or emargination (Volkovitsh, 1979a). The partly membranous apices of the parameres with large rounded sensilla (Fig. 6) are characteristic of *A. quadriareolata* exclusively, those in other species are regularly sclerotized and bear usual campaniform sensilla (Figs. 59, 61). The elytral pattern widely varies within the genus and, at least in *C. thailandica* sp. n., is close to the “*Acmaeodera ottomana*” type (Figs. 15, 18, 27). The entirely serrate lateral margin of the elytra occurs in the African *Acmaeodera (Rugacmaeodera) irrorella* Lap. & Gory and some other species. Two-color scales are absent in *C. thailandica* sp. n. and occur in many groups of the subtribe Acmaeoderina. Spots and tufts of modified hairs and scales, frequently situated in depressions on the 2nd visible abdominal sternite, are characteristic of species of the genus *Galbella* Westw. (Galbellinae) and of females of the subgenus *Acmaeoderella* s. str. Thus, the only reliable diagnostic character of *Cochinchinula* (its rather characteristic wing venation has been examined only in one species) is a well-developed subhumeral lobes of its epipleura, combined with the merged elytral suture. However, the loss of this lobes in the undoubtedly closely related genus *Thaichinula* gen. n. raises doubts even in its stability. Nevertheless, a combination of the considered characters and the distribution of the taxon in southeastern Asia exclusively (all the species of the genus are reliably known only from Thailand) support the generic status of *Cochinchinula*.

Cochinchinula quadriareolata (Obenberger, 1924)
(Figs. 1, 6–8, 15–17, 21, 24)

Obenberger, 1924 : 33 (*Acmaeodera*); Volkovitsh, 1984 : 557 (redescription); Ohmomo, 2003 : 36, 39, fig. 5; Bellamy, 2003 : 18, fig. 37.

Holotype: male, “Cochinchina” (NMPC).

Additional material. 1 male, “Thai N., Chiang May Prov., San Pakia Vill., 19°19'N, 98°50'E, 1400 m, 1–15.V.1998, Vit Kubáň leg.” (VKCS); 1 male, 2 females, “Thai, Mae Hong Son Prov., Soppong, 19°27'N, 98°20'E, 1500 m, 7–12.V.1996, Vit Kubáň leg.” (ZIN, NMPC).

Diagnosis. *A. quadriareolata* clearly differs from the other species of the genus in the following characters: coloration black, without metallic shine; body larger and wider (length 4.8–6.5 mm, width 1.7–2.3 mm), dorsal scales erect, two-color: white and dark; elytral pattern regular, symmetrical, consisting of two short transverse bands (Figs. 15, 16); lateral margin of elytra with very large teeth (Fig. 17), and structure of aedeagus distinctive (Figs. 6–8). This species additionally differs from *C. thailandica* sp. n. in the deeply emarginate anterior margin of the clypeus (Figs. 1, 24). The ovipositor is tubular, typical of *Cochinchinula*.

Distribution. Thailand: Chiang May, Chanthaburi, and Mae Hong Son provinces; “Cochinchina.”

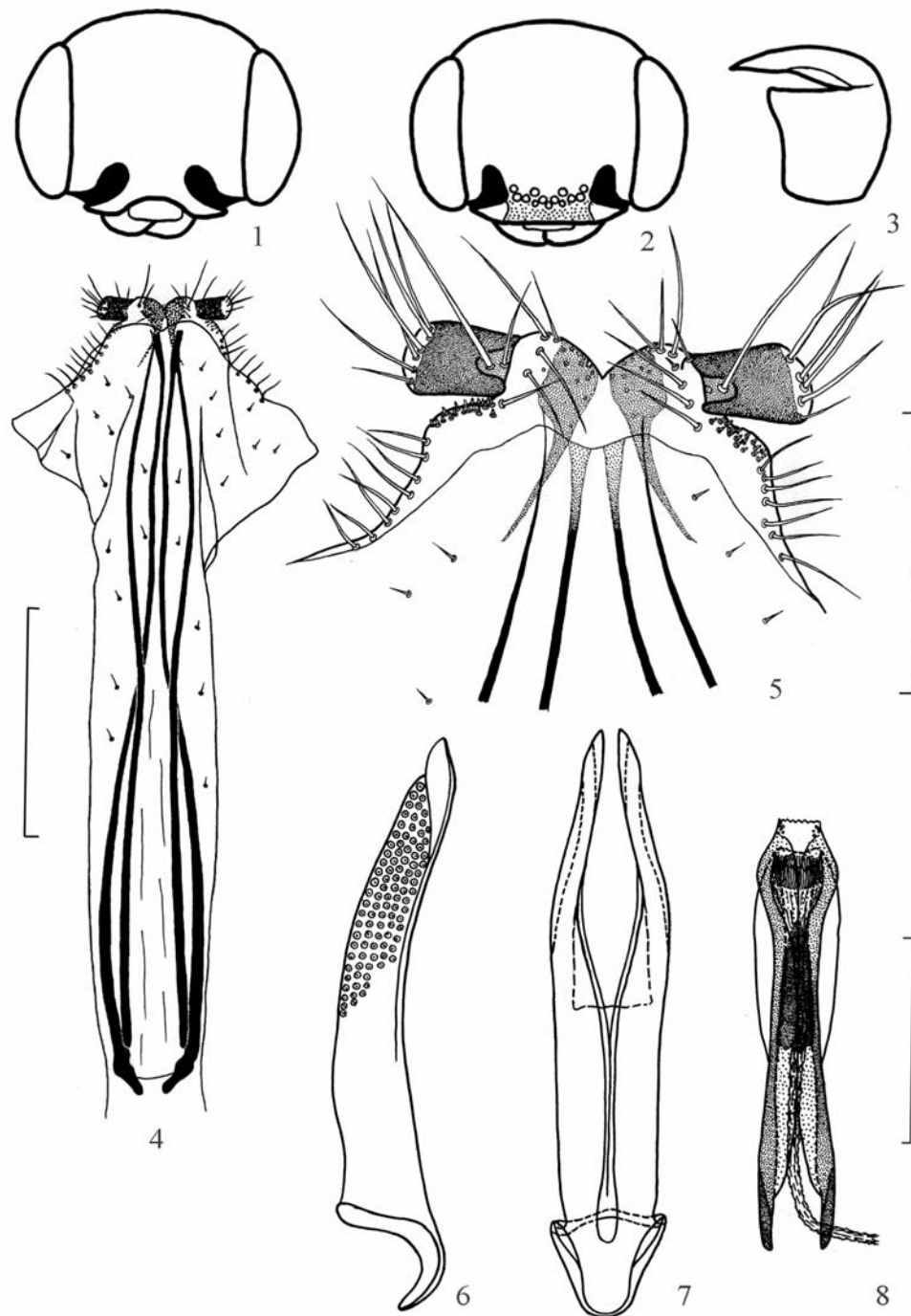
Ecology unknown.

Cochinchinula thailandica Volkovitsh, sp. n.
(Figs. 2–5, 18–20, 22, 25, 59, 60)

Cochinchinula sp.: Ohmomo, 2003 : 33, 39, fig. 4.

Description. Body small (Figs. 18–20) [length 4.2–6.0 (5.0) mm, width 1.4–1.9 (1.6) mm], slightly elongate, weakly convex, without dorsal curvature, blackish bronze, nearly black; elytra blackish brown, with 3 wide transverse, slightly oblique yellow bands not reaching suture, occasionally also with small isolated spots; 2 anterior bands usually entirely or partly merging in middle, forming longitudinal zigzag stripe in anterior 2/3; body covered with recumbent, white exclusively, widely lanceolate and oval scales.

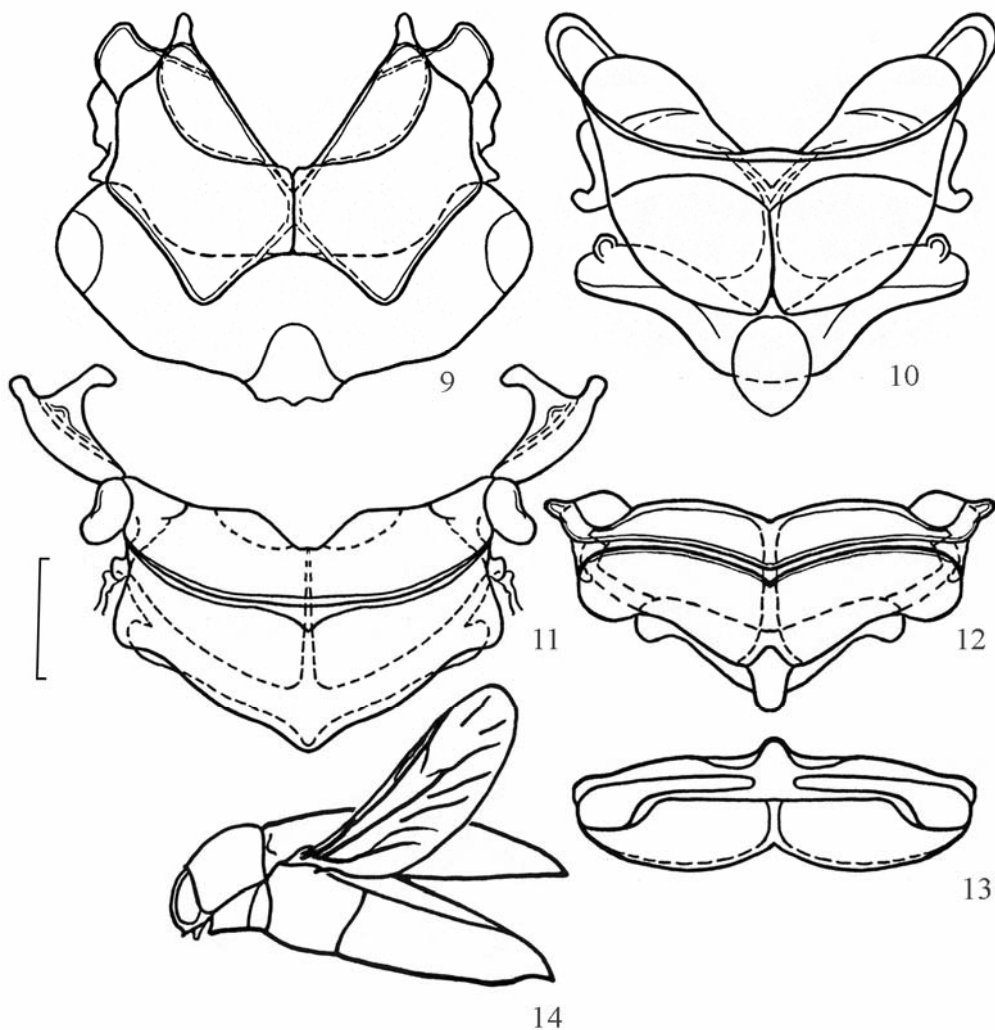
Head (Figs. 2, 25) wide, flattened or weakly convex dorsally. Frons wide, slightly convex, without longitudinal sulcus or depression, with slightly arcuate lateral margins subparallel or weakly diverging toward vertex. Vertex width 1.82–2.17 (1.96) times diameter of eye and 1.00–1.07 (1.03) times width of frons above antennal fossae. Clypeus not emarginate; its anterior margin nearly straight, slightly arcuately projecting, and covered with fine shagreenity sharply separated from coarse punctation of upper part of clypeus.



Figs. 1–8. *Cochinchinula* Volk.: (1, 6–8) *C. quadriareolata* (Obenb.), holotype (NMPC), male [(1) head, front view; (6, 7) tegmen; (8) penis (after: Volkovitsh, 1984)]; (2–5) *C. thailandica* sp. n., holotype (NMPC), female: [(2) head, front view; (3) claw of fore tarsus; (4, 5) ovipositor]. Scale 0.5 mm.

Sculpture of head reticulate, ocellate medially, consisting of large rounded umbilicate punctures with large flat central granules, eccentric micropunctures, and narrow shining intervals; head covered with widely lanceolate, recumbent, white scales. Antennae relatively short, their length 1.65–1.92 (1.82) times height

of eye in male, 1.58–1.67 (1.62) times height of eye in female; antennae widened (more sharply in male) beginning with 5th antennomere; 2nd antennomere irregularly oval, swollen; 3rd and 4th antennomeres narrowly oval, considerably narrower than 5th one, slightly widened toward apices; 5th antennomere tri-

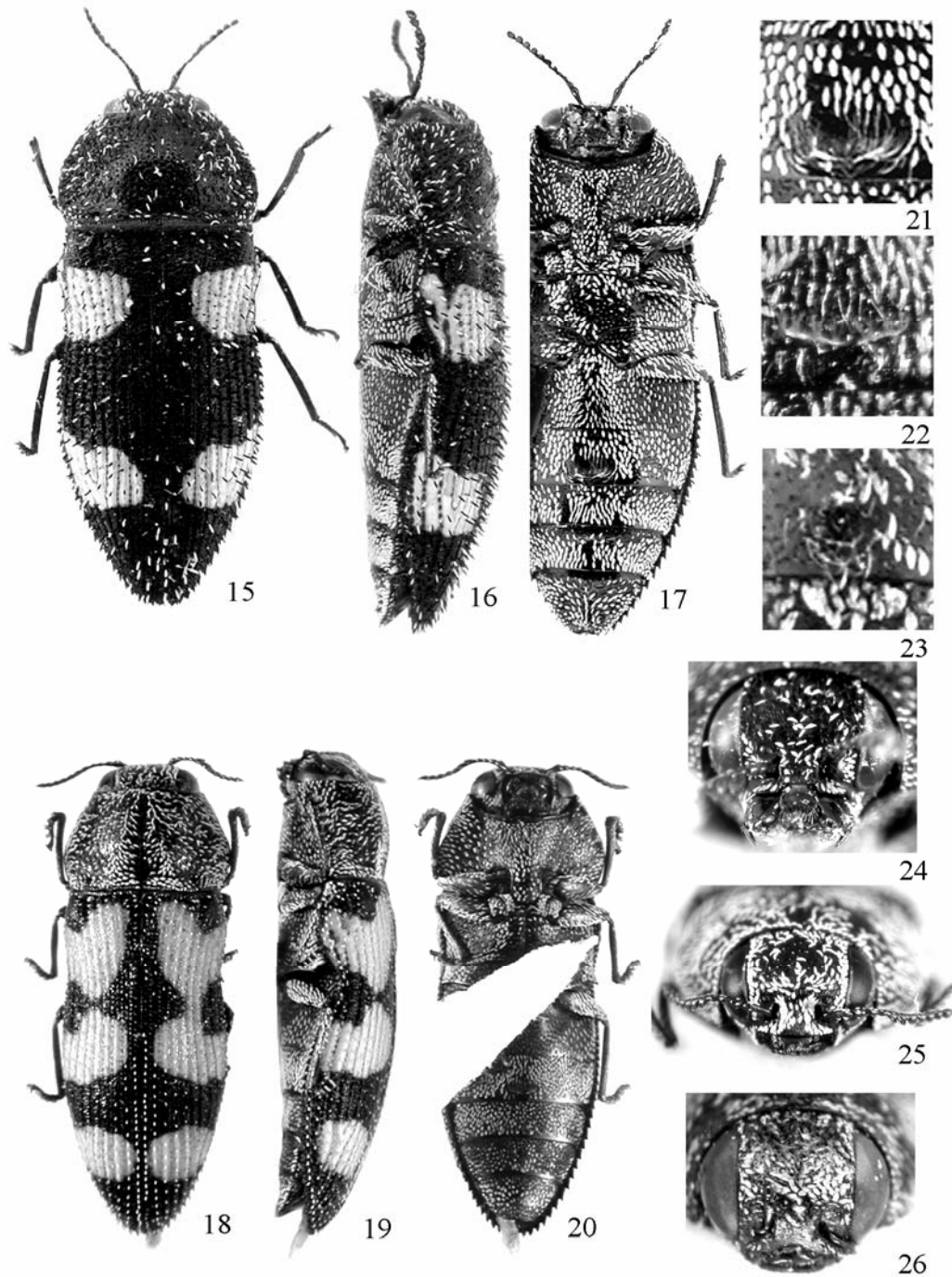


Figs. 9–14. Polycestinae, mesonotum, and *Acmaeoderella*, during flight. (9–13) Mesonotum: (9) *Strigopteroides depressa* (F.), (10) *Ptosima undecimmaculata* (Herbst), (11) *Acmaeodera* (*Acmaeotethya*) *pallidepicta* Reitt., (12, 13) *Acmaeoderella* (*Carininota*) *flavofasciata* (Pill. et Mitterp.) [(12) dorsal view, (13) posterior view]; (14) *Acmaeoderella* (*Euacmaeoderella*) *vetusta* (Mén.), schematic sketch of position of elytra and wings during flight. Scale 1 mm for Fig. 9–13.

angular, strongly widened; 6–10th antennomeres trapeziform in male and roundly triangular in female, their length subequal to their width; 11th antennomere slightly elongate, with rounded apex, slightly longer than wide.

Pronotum (Figs. 18, 19) rounded, convex, distinctly transversely depressed at base, weakly transverse, 1.36–1.5 (1.45) times as wide at base as long, widest before middle. Sides arcuate, converging forward more strongly than backward. Anterior margin weakly angularly projecting forward, slightly bisinuate. Basal margin nearly straight. Disc with weak longitudinal median sulcus not reaching anterior margin. Basal fossae surrounded by distinct transverse depressions, prescutellar fossa small. Lateral carina fine, entire,

slightly curved, reaching anterior angles. Sides with reticulation formed by small superficial umbilicate, rounded and polygonal punctures with distinct small granules and central micropunctures. Sculpture of disc reticulate, changing into ocellate one, formed by very large, rounded and oval, superficial umbilicate punctures with large flat central granules and with indistinct, central or eccentric micropunctures; punctures arranged in longitudinal chains, forming no distinct wrinkles. Sides, base, and areas along lower 1/3 of median sulcus with recumbent, widely oval, white scales; disc with narrower, sparse, exclusively white scales. Anterior margin of prosternum (Fig. 20) slightly concave, without collar, not reaching anterior angles of pronotum; prosternum with small umbilicate



Figs. 15–26. *Cochinchinula* Volk., habitus and details of structure. (15–20) habitus: (15–17) *C. quadriareolata* (Obenb.), female (body length 6.5 mm) [(15) dorsal view, (16) lateral view, (17) ventral view; (18–20) *C. thailandica* sp. n., paratype (ZIN), male (body length 4.9 mm): [(18) dorsal view, (19) lateral view, (20) ventral view]; (21–23) setal tuft on abdominal sternite II: (21) *C. quadriareolata* (Obenb.), (22) *C. thailandica* sp. n., (23) *C. bilyi* sp. n.; (24–26) head, front view: (24) *C. quadriareolata* (Obenb.), (25) *C. thailandica* sp. n., (26) *C. bilyi* sp. n.

punctures; similar but coarser sculpture present on meso- and metathorax and hind coxae; hypomera with large rounded umbilicate punctures; thorax ventrally with dense, widely oval scales.

Elytra (Figs. 18, 19) flattened, wide, weakly elongate, 2.16–2.36 (2.28) times as long as wide at base, widest behind middle. Sides weakly and shortly converging behind humeral calli, then arcuately diverging

to middle, then smoothly arcuately converging toward commonly rounded apices. Subhumeral lobes of epipleura entirely concealing metepisterna; lateral margin smoothly curved at level of hind coxae and bearing, beginning nearly from base, sharp teeth claw-shaped apically. Strial punctures rounded, merging in posterior 1/3 of elytra; striae superficial. Intervals flat, slightly convex posteriorly, subequal, 3–5 times as wide as striae; lateral intervals narrower; 9th interval not elevated and not serrate; surface of intervals with vague uniseriate punctures against finely rugulose background and with small, uniseriate, recumbent, narrowly oval, exclusively white scales. Pattern formed by 3 wide, transverse, slightly oblique, yellow bands not reaching suture and lying in anterior 1/4, behind middle, and in posterior 1/4, occasionally also with small isolated spots before apices; 2 anterior bands usually entirely or partly (only at one side) merging in middle, forming longitudinal zigzag stripe (pattern of “*Acmaeodera ottomana*” type).

Legs (Figs. 18–20) brownish black, with bronze sheen; posterior margins of hind coxae slightly concave, forming deep lateral emarginations and bearing small rectangular lateral teeth with apices visible in dorsal view. Tibiae slender, fore tibia weakly widened and curved. Legs covered with scales, hind tibia with row of dense yellowish setae along outer margin. Tarsomeres short, identical, with well-developed tarsal pads becoming larger toward apex; 5th tarsomere relatively short, widened toward apex. Claws (Fig. 3) short, wide, strongly curved, with very large, wide tooth at inner margin, this tooth nearly identical in both sexes.

Abdomen (Fig. 20) dark bronze; sternite I, anal sternite, and sides of other sternites with rounded punctures; middle of abdomen with large umbilicate, partly obliterated punctures; surface with oval recumbent regular scales nearly concealing background; sternite II with short row of fine erect yellowish setae arising from fine sulcus near posterior margin (Fig. 22). Anal sternite in both sexes relatively short, triangular, obtused at apex, with recumbent fine scales.

Male. Aedeagus as in Figs. 59, 60. Shape of penis (Fig. 60) similar to that in *C. quadriareolata* (Fig. 8), but apices of parameres regularly sclerotized, without visible large rounded sensilla ventrally.

Female. Ovipositor (Figs. 4, 5) tubular, of medium length, 3 times as long as widened part, weakly sclerotized apically, covered with short sparse setae, simi-

lar in structure to ovipositors of species of the genus *Acmaeodera*, subgenera *Palaeotethya*, *Acmaeotethya*, and many other groups. Structure of pregenital segments also usual.

Material. Holotype (NMPC): female, Thailand, Takhli, RTAFB [Central Thailand, Nakhon Sawan Prov., Takhli, Royal Thai Air Force Base, 15°16'N, 100°17'E], 14 June 1972, Coll. John C. Banfill. Paratypes: 1 female, Ubol Ratana, Khon Kaen, NE Thai, [NE Thailand, Khon Kaen Prov.], 9.5.2002, S. Ohmomo leg. (COTJ); 3 males, 3 females; NE Thailand, Sakon Nakhom Prov., Phu Phan (alt. 300 m) [Phu Kao—Phu Phan Kham National Park], 20.5.2007, T. Kurihara and S. Ohmomo leg. (COTJ, ZIN).

Diagnosis. *C. thailandica* sp. n. clearly differs from the congeners in the nearly straight, not emarginate, finely shagreened anterior margin of the clypeus, in the exclusively white recumbent scales on the head, pronotum, and elytra, in the elytral pattern consisting of three transverse bands longitudinally merging anteriorly, and in the structure of the aedeagus.

Etymology. The species is named for the country of the origin of the type series.

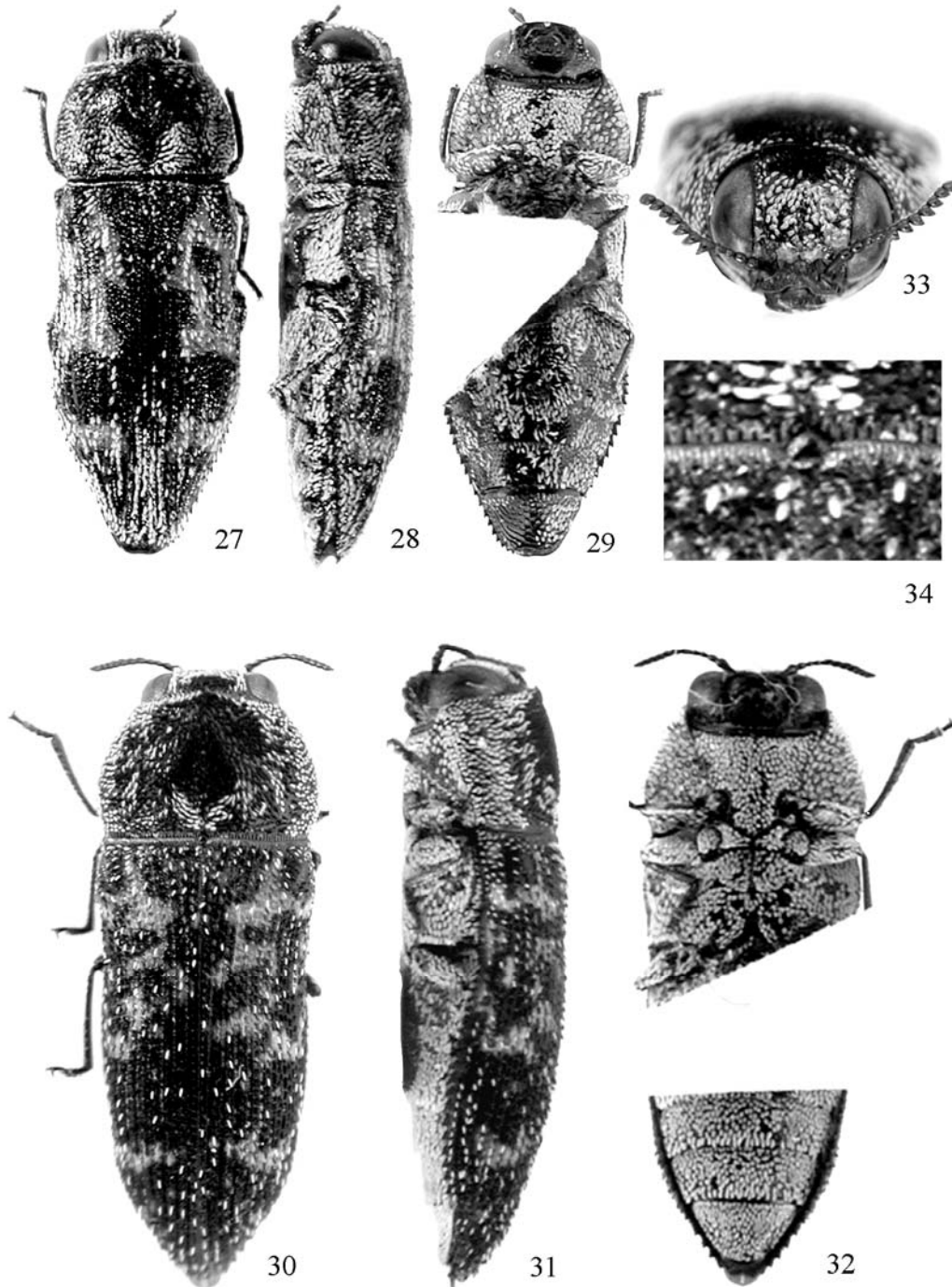
Distribution. Thailand, Khon Kaen, Nakhon Sawan, and Sakon Nakhom provinces.

Ecology unknown. According to Dr. S. Ohmomo, the beetles were collected with a telescopic entomological net in crowns of trees at a height of 8–10 m.

Cochinchinula bilyi Volkovitsh, sp. n.
(Figs. 23, 26–29, 50, 57, 61, 62, 74)

Description. Body small (Figs. 27–29) [length 4.1–6.2 (5.0) mm, width 1.3–1.9 (1.5) mm], elongate, flattened, without dorsal curvature; dark bronze, with copper or slightly violet sheen. Elytra dark bronze, with weakly contrasting, almost symmetrical, varying, ochre-brown pattern formed by merging longitudinal, transverse, and oblique stripes and bands. Body dorsally covered with mixed white and brown scales, ventrally with white scales.

Head (Fig. 26) wide, flattened dorsally. Frons wide, flattened, without traces of longitudinal sulcus or depression, with nearly straight lateral margins inconspicuously diverging toward vertex. Vertex with distinct longitudinal carina, width of vertex 1.6–1.87 (1.76) times diameter of eye and 1.03–1.08 (1.06) times width of frons above antennal fossae. Clypeus



Figs. 27–34. *Cochinchinula* Volk. and *Thaichinula* gen. n., habitus and details of structure: (27–29) *C. bilyi* sp. n., paratype (ZIN), male (body length 4.3 mm), habitus [(27) dorsal view, (28) lateral view, (29) ventral view]; (30–34) *T. ohmomi* sp. n., holotype (COTJ), female (body length 6.2 mm): (30–32) habitus [(30) dorsal view, (31) lateral view, (32) ventral view]; (33) head, front view; (34) rudiment of scutellum at elytral base.

relatively wide, with shallow arcuate emargination anteriorly. Head with ocellate sculpture formed by small, rounded, rather deep, umbilicate punctures denser at sides and in lower half; punctures with distinct flat granules, eccentric micropunctures, and narrow shining intervals. Scales on head widely lanceo-

late, recumbent, white; vertex with touch of brown scales. Antennae relatively short, their width 1.48–1.57 (1.53) times height of eye in males and 1.38–1.48 (1.42) times height of eye in females; antennae sharply widened, beginning with 5th antennomere; 2nd antennomere oval, swollen; 3rd and 4th identical, oval, con-

siderably narrower than 2nd and 5th, slightly widened toward apices; 5th triangular, strongly widened; 6–10th triangular, slightly wider than long; 11th antennomere of irregular shape, with pointed apex and slightly emarginate apical margin.

Pronotum (Figs. 27, 28) convex in anterior, and flattened in posterior half; weakly transverse, 1.19–1.41 (1.3) times as wide at base as long, widest in posterior 1/3–1/4. Sides arcuate, converging forward more strongly than backward. Anterior margin weakly angularly projecting forward, basal margin straight. Disc with deep longitudinal median sulcus from base to apex and with additional shallow lateral oblique depressions merging with basal lateral fossae. Basal fossae not connected by transverse depression. Lateral carina fine, distinct, entire, reaching anterior angles. Sides with alveolate sculpture formed by rather deep, polygonal cells with smooth shining bottoms; disc with reticulate-rugose sculpture consisting of umbilicate punctures with indistinct granules and micropunctures; merged lateral intervals forming fine but distinct concentric rugosity. Sides and base of pronotum with oval recumbent scales nearly concealing background; disc with oval white and lanceolate brown scales. Anterior margin of prosternum (Fig. 29) straight, nearly reaching anterior angles of pronotum; prosternum with small umbilicate punctures; meso- and metathorax and hind coxae with similar but coarser sculpture; hypomera with large rounded umbilicate punctures bearing large flat granules; thorax ventrally with widely oval scales nearly concealing background.

Elytra (Figs. 27, 28) distinctly flattened, narrow, rather elongate; 2.22–2.41 (2.32) times as long as wide at base, widest in posterior 1/3. Sides converging behind humeral calli, then distinctly, nearly straightly diverging to posterior 1/3 and sharply converging toward commonly rounded apices. Subhumeral lobes of epipleura entirely concealing metepisterna; lateral margin strongly angularly curved at level of hind coxae, with distinct teeth from humeri to apex. Strial punctures in anterior half of elytra rounded, small, superficial, isolated, hardly visible against background of coarse sculpture of intervals; those in posterior half larger, deep, merging, striae slightly sulcate. Intervals flat, 2–4 times as wide as striae; lateral intervals narrower, 9th interval not elevated and not serrate. Surface with fine confused punctures indistinct against coarsely rugulose background and with recumbent, widely oval, white scales forming confused rows, with touch of widely lanceolate brown scales against dark

background. Elytra dark bronze with violet or copper sheen; pattern poorly contrasting, rather symmetrical, formed by curved ochre-brown longitudinal, transverse and oblique stripes merging and surrounding dark spots in anterior half between 3rd and 11th intervals; in addition, transverse band and isolated spots present in posterior 1/4; pattern similar to strongly destructed that of preceding species in arrangement of elements, but demonstrating more distinct tendency toward longitudinal confluence.

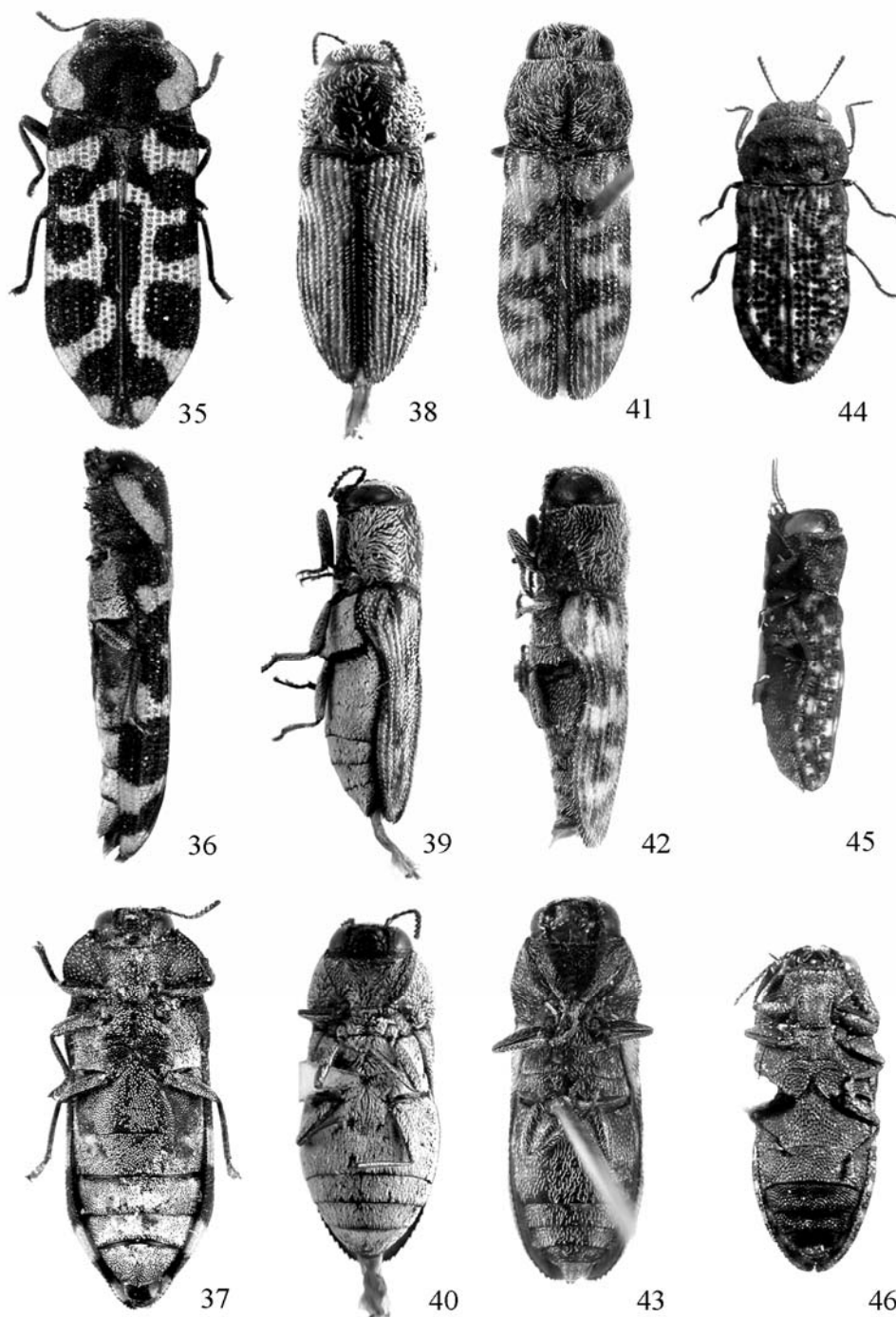
Wings (Figs. 50, 57). On the whole, the general plan of the venation is characteristic of species of the subtribe Acmaeoderina, except for the following characters: obsolete rudiment of open radial cell (*rc*) present, posterior sector of cubitus (*CuP*) absent (compare Fig. 51), apices of recurrent radius (*Rr*) and recurrent median (*Mr*) distant from each other, “radiomedian” vein (*r-m*) long and strongly curved.

Legs (Figs. 27–29) dark bronze; posterior margins of hind coxae widely arcuately emarginate, with deep lateral incisions and large pointed lateral teeth well visible in dorsal view. Tibiae slender, weakly widened toward apices. Legs covered with small white scales, hind tibia with row of dense yellowish setae along outer margin. Tarsomeres short, identical; tarsal pads poorly developed on 2 basal tarsomeres, becoming larger toward apices of tarsi; 5th tarsomere fine, widened toward apex. Claws wide, strongly curved, with large, nearly rectangular tooth at inner margin.

Abdomen (Fig. 29) dark bronze; sternite I, anal sternite, and sides of other sternites with small dense umbilicate punctures; their middle parts with asperate punctures and uniform, recumbent, widely oval scales nearly concealing background. Sternite II before posterior margin with tuft of long fine erect yellowish setae and inconspicuous small tubercle (in lateral view) (Fig. 23). Anal sternite rather long, with obtused apex, edged by sulcus, with recumbent fine scales.

Male. Aedeagus (Figs. 61, 62): parameres entirely sclerotized, pointed apically; basal lobe short, triangular, with widely rounded apex (Fig. 61). Penis (Fig. 62) elongate, with subparallel, medially emarginate lateral margins, well-developed apical apodeme, and long wide lamina narrowed backward; apophyses long, clearly differentiated, distinctly curved.

Female. Ovipositor (Fig. 74) long, tubular, 5 times as long as widened part; apex damaged in all the specimens examined.



Figs. 35–46. Acmaeoderini Kerr., habitus (dorsal, lateral, and ventral views): (35–37) *Odettea laosensis* Baudon (body length 9.1 mm), (38–40) *Acmaeoderoides rossi* (Cazier) (body length 5.4 mm), (41–43) *Nothomorphoides irishi* Holm, paratype (MHNG), male (body length 7.4 mm), (44–46) *Nothomorpha rugosa carinifrons* Holm (body length 4.6 mm).

Material. Holotype (NMPC), male; paratypes (NMPC, ZIN), 3 males, 6 females: NW Thailand, May Hong Son, Ben Si Leng, 1000 m, 1–7.V.1992, S. Bílý leg.

Diagnosis. *C. bilyi* sp. n. differs from the congeners in the following characters: body rather narrow; sides

of elytra sharply, almost rectilinearly converging toward apices; pronotum weakly transverse, with deep median, and small lateral depressions; elytral striae superficial, hardly visible in anterior half; elytral pattern longitudinal, irregular, strongly destructed. It also differs in the shape of the setal spot on abdominal

sternite II, presence of a tubercle on this sternite, and structure of the aedeagus.

Etymology. The species is named for the collector of the species, Dr. S. Bily (NMPC), a friend and colleague of the author.

Distribution. Thailand, "May Hong Son" Province.

Ecology. All the specimens of *C. bilyi* sp. n. were reared from the stump of an unknown tree. According to Dr. Bily, the beetles *Odettea laosensis* (Baudon) and *Acmaeodera* (*Cobosiella*) *stictipennis* Laporte et Gory were reared from the same stump.

Genus *THAICHINULA* Volkovitsh, gen. n.

Type species *Thaichinula ohmomo* Volkovitsh, sp. n. (by monotypy).

Diagnosis. Elytral epipleura (Fig. 31) reduced, without subhumeral lobes; metepisterna open at base (as those in representatives of the subgenus *Acmaeodera* s. str.); serration of lateral margin only reaching level of hind coxae. Scutellum strongly reduced, but well visible at elytral base (Fig. 34). Elytral suture closed along entire length. Abdominal sternite II of female without distinct setal tuft or tubercle. Hind coxae with distinct lateral emarginations and wide teeth visible in dorsal view (Fig. 31); tarsal claws with large tooth at inner margin. Male unknown. Ovipositor of tubular type, elongate. Body, at least partly, covered with very large umbilicate punctures with distinct granules and micropunctures, and also with two-color scaly pubescence. Clypeus (Fig. 33) with short high lobiform carinae extending from inner margins of antennal fossae and nearly separating its lateral branches.

The main diagnostic character of the genus *Thaichinula* gen. n. is the presence of a rudiment of the scutellum at the elytral base (found in the subtribe Acmaeoderina for the first time). Another important character, the reduced elytral epipleura partly opening the metepisterna, is characteristic of all the genera of the subtribe Acmaeoderina, except for *Cochinchinula*. Despite a great habitual similarity, the species *T. ohmomo* sp. n. (described below) cannot be included in the genus *Cochinchinula*, because of the presence of both these characters. Therefore, a separate genus should be established for the species.

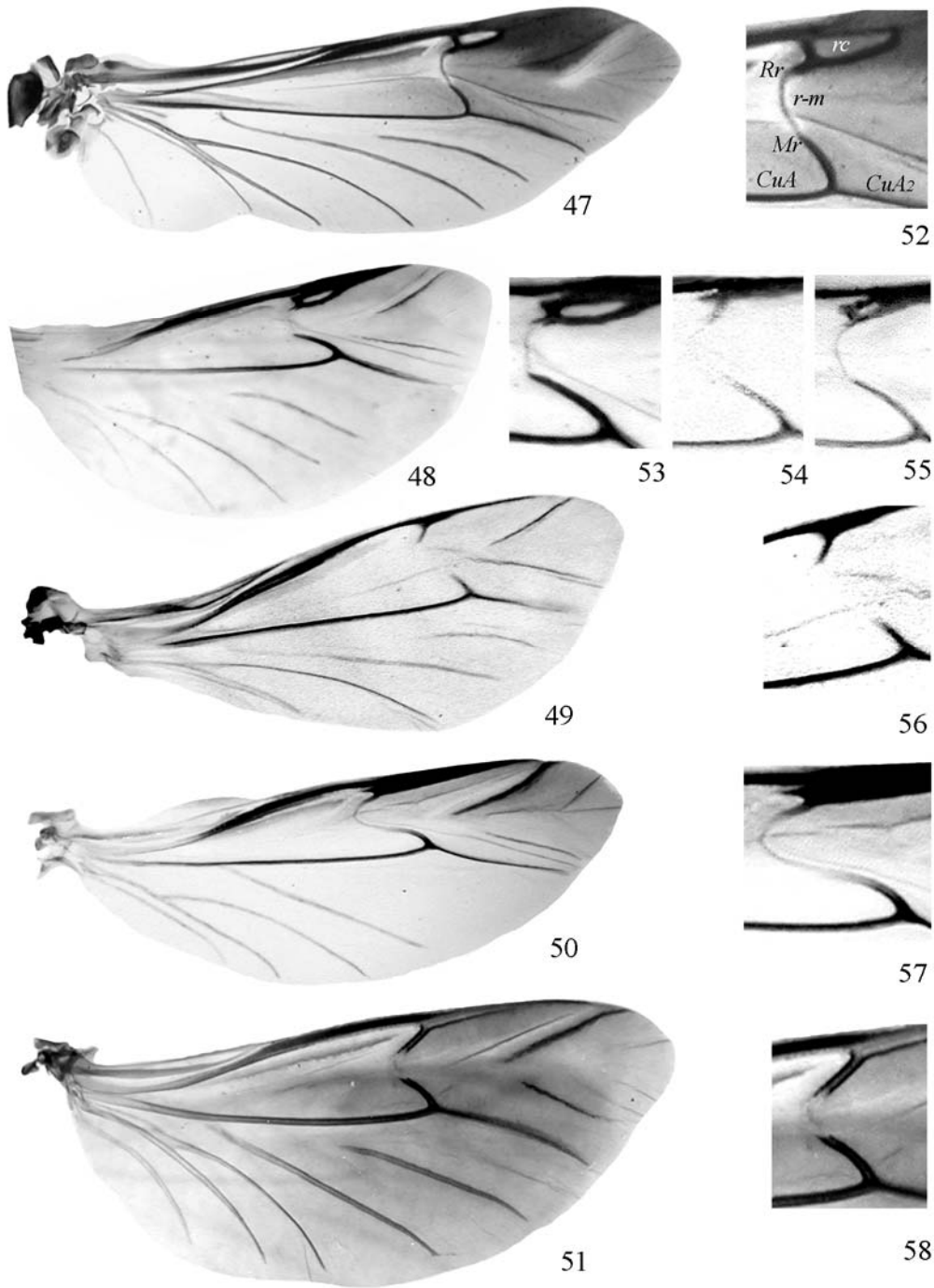
Thaichinula ohmomo Volkovitsh, sp. n.
(Figs. 30–34)

Description. Body medium-sized (Figs. 30–32) [length 6.2 mm, width 2.1 mm], weakly elongate, ro-

bust, slightly convex, without dorsal curvature, black, with obsolete bronze sheen; elytra brownish bronze, nearly black with coppery or violet sheen, with irregular yellowish-orange pattern formed by longitudinal and transverse bands and spots; dorsally with lanceolate and widely lanceolate white and nearly black scales; ventrally with widely oval recumbent white and yellowish scales almost entirely concealing background.

Head (Fig. 33) relatively narrow, weakly convex dorsally. Frons weakly convex, without traces of longitudinal sulcus or depression, with slightly curved lateral margins distinctly diverging toward vertex. Vertex 1.75 times as wide as diameter of eye and 1.13 times as wide as frons above antennal fossae, with low longitudinal carina concealed by scales. Clypeus wide, with deeply angular anterior emargination; inner margins of antennal fossae forming short high lobiform carinae not reaching anterior margin of clypeus but partly separating its lateral branches. Head with ocellate sculpture (sparser on vertex) formed by small rounded umbilicate punctures with distinct central granules, eccentric micropunctures, and narrow (narrower than diameter of punctures) shining intervals; vertex with black, and frons with white, recumbent, widely lanceolate scales. Antennae of female short (length 1.44 times height of eye), sharply widened beginning with 5th antennomere; 2nd antennomere oval, swollen; 3rd and 4th antennomeres nearly identical, oval, considerably narrower than 2nd and 5th antennomeres, not widened toward apices; 5th antennomere triangular, sharply widened, about as long as wide; 6–10th antennomeres triangular, with arcuate inner margins, slightly longer than wide; 11th antennomere irregularly oval, slightly elongate, with widely rounded apex.

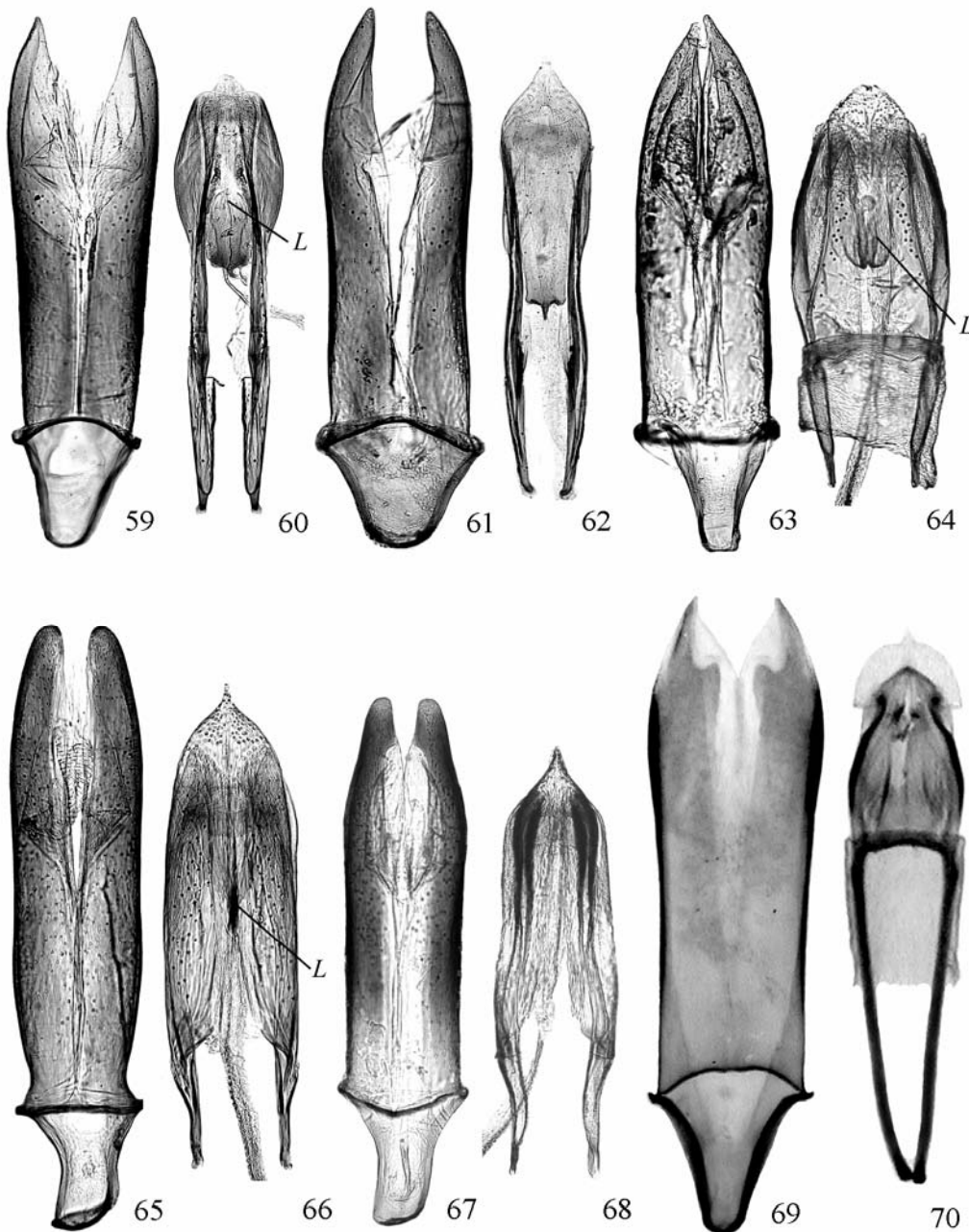
Pronotum (Figs. 30, 31) rounded, flattened, weakly transverse, 1.43 times as wide at base as long, widest in posterior 1/3; sides arcuate, more strongly converging forward than backward. Anterior margin distinctly angularly projecting forward, basal margin straight. Disc with obscure wide shallow longitudinal median depression; basal lateral fossae indistinct, prescutellar fossa hardly visible, shallow, passing into median depression. Lateral carina very fine, interrupted, visible only in basal half. Sides with reticulate, nearly alveolate sculpture formed by deep rounded umbilicate punctures with distinct central granules and micropunctures; near disc punctures merging into longitudinal chains, forming indistinct punctate-rugulose sculp-



Figs. 47–58. Acmaeoderini Kerr., wings: (47, 52) *Odettea laosensis* Baudon (length 8.2 mm); (48, 53) *Acmaeoderoides* Van Dyke: (48, 53) *A. distinctus* Nelson (length 4.0 mm), (54, 55) *A. rossi* (Cazier); (49, 56) *Nothomorpha rugosa* (Thunberg) (length 3.8 mm); (50, 57) *Cochinchinula bilyi* sp. n., paratype (ZIN) (length 3.9 mm); (51, 58) *Acmaeoderella subcyanea* (Reitt.) (length 7.5 mm). (47–51) general appearance, (52–58) region of junction of radial cell with median vein. *CuA*, anterior cubitus; *CuA2* posterior branch of anterior cubitus (cubital spur); *Mr*, recurrent median; *rc*, radial cell; *r-m*, “radiomedial” cross vein; *Rr*, recurrent “radius” (terminology after: Fedorenko, 2006).

ture; disc with simple punctate sculpture consisting of small, slightly asperate punctures forming concentric rows. Sides and base of pronotum with short recumbent, widely lanceolate scales nearly concealing

background; disc with short lanceolate recumbent blackish scales forming concentric rows. Scutellum roundly triangular, strongly reduced but well visible at elytral base (Fig. 34). Anterior margin of prosternum

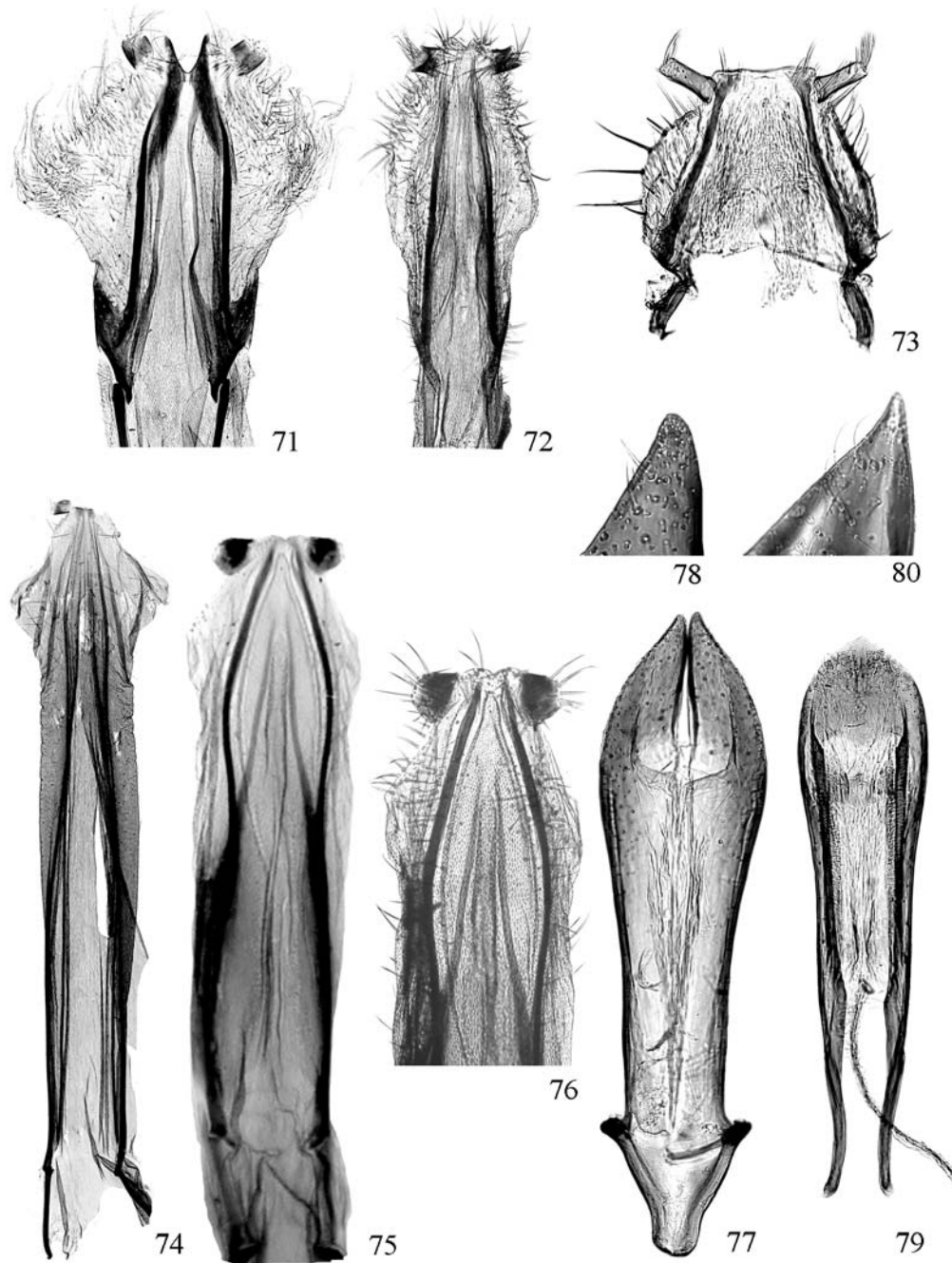


Figs. 59–70. Acmaeoderini Kerr., aedeagus: (59, 60) *Cochinchinula thailandica* sp. n., paratype (ZIN) (length 1.2 and 0.9 mm); (61, 62) *C. bilyi* sp. n., paratype (ZIN) (length 1.1 and 0.9 mm); (63, 64) *Acmaeoderoides stramineus* Nels. (length 1.2 and 0.8 mm); (65, 66) *Nothomorphaoides irishi* Holm, paratype (MHNG) (length 1.5 and 1.1 mm); (67, 68) *Nothomorpha rugosa* (Thunb.) (length 1.5 and 1.0 mm); (69, 70) *Odettea laosensis* Baudon (length 2.3 and 2.0 mm) [(59, 61, 63, 65, 67, 69) tegmen, (60, 62, 64, 66, 68, 70) penis]; L, lamina of penis.

straight (Fig. 32), nearly reaching anterior angles of pronotum, edged by deep transverse sulcus; prosternum convex, without depressions; posterior process wide, with subparallel sides and widely rounded and not edged apex; thorax ventrally and hind coxae with ocellate sculpture formed by small deep umbilicate punctures with central micropunctures; hypomera cov-

ered with large rounded umbilicate punctures with large central granules and eccentric micropunctures; thorax ventrally with widely lanceolate scales nearly concealing background.

Elytra (Figs. 30, 31) weakly convex, slightly flattened dorsally, wide, weakly elongate, 2.19 times as long as wide at base, widest across humeri; sides



Figs. 71–80. Acmaeoderini Kerr., ovipositor and Ptosimini Kerr., aedeagus. (71–76) Ovipositor: (71) *Acmaeoderoides rossi* (Cazier) (length 1.1 mm), (72) *A. stramineus* Nels. (length 1.0 mm), (73) *Nothomorpha rugosa carinifrons* Holm (length 0.5 mm), (74) *Cochinchinula bilyi* sp. n., paratype (ZIN) (length 2.3 mm; apical part damaged), (75, 76) *Odettea laosensis* Baudon (length 2.6 mm); (77–80) aedeagus: (77–79) *Richtersveldia insperata* Bell., holotype (TMSA): (77, 78) tegmen and apex of paramere, (79) penis (length 1.3 and 0.9 mm); (80) *Ptosima undecimmaculata* (Herbst), apex of paramere (length of tegmen 2.1 mm).

slightly converging from humeral calli to anterior third, then subparallel as far as posterior 1/4, then sharply, shortly, almost rectilinearly converging to narrowly rounded apices. Subhumeral lobes of epipleura lost; lateral margin under humeri shallowly emarginate, but without incision or distinct curvature

at level of hind coxae (metepisterna open at base), bearing large sharp claw-shaped serration reaching level of hind coxae. Strial punctures large, oval, deep; those in anterior half of elytra isolated, hardly visible against coarsely rugulose background of intervals; punctures in posterior half of elytra merging, striae

deeply sulcate. Intervals flat, 1–3 times as wide as striae, with large superficial, regularly uniseriate punctures against transversely rugulose background (very coarse in anterior 1/3, punctures not visible there) and with regularly uniseriate, recumbent, widely lanceolate white and blackish scales; 9th interval not elevated and not serrate. Pattern formed by destructed, irregular, yellowish-orange stripes, bands, and spots against nearly black background with coppery, bluish, or violet sheen; background paler anteriorly, dark brown; pattern similar to that in *C. bilyi* sp. n. in arrangement of its elements, but even less differentiated.

Legs (Figs. 30–32) blackish bronze; posterior margins of hind coxae straight, deeply emarginate at sides, with large sharp attenuate lateral teeth, apices of which visible in dorsal view. Tibiae fine, weakly widened toward apices, nearly straight. Legs covered with wide white scales and short, thick, brown and black setae; hind tibia with row of sparse brown setae along outer margin. Tarsomeres short, subequal, 1st tarsomere slightly longer; all tarsomeres with small tarsal pads enlarged toward apices; 5th tarsomere fine, widened toward apex. Claws of female with large rectangular tooth at inner margin.

Abdomen (Fig. 32) black, with almost uniform, regular, ocellate sculpture formed by small rounded umbilicate punctures (slightly obliterated on disc) with indistinct inner structures against smooth shining background; intervals between punctures equal to 0.5–1.0 puncture diameter; surface with uniform, recumbent, widely oval scales nearly concealing background. Sternite II without tubercles and modified scales. Anal sternite of female triangular, narrowly rounded at apex.

Male unknown.

Female. Ovipositor tubular, similar in shape to that in species of the genus *Cochinchinula*.

Material. Holotype (COTJ): female, [Thailand], Mt. Hin Lee Phai, Hua Hin, PKK [Prachuap Khiri Khan Prov.], C-Thai, 4/11/2003, S. Ohmomo leg.

Etymology. The species is named after its collector, Dr. Sadahiro Ohmomo, who has made an important contribution to the study of buprestids of Thailand.

Diagnosis. *T. ohmomo* sp. n. is very similar in appearance to species of the genus *Cochinchinula*, especially to *C. bilyi* sp. n., but differs from them in the characters listed in the diagnosis of the genus and also

in the strongly destructed elytral pattern. The species is similar to representatives of the subgenus *Acmaeodera* s. str. in the shape of the elytral epipleura, but clearly differs from them in the presence of a visible rudiment of the scutellum at the elytral base.

Distribution. Thailand: “Prachuap Khiri Khan Province.”

Ecology unknown.

*A Key to the Genera Cochinchinula Volk. and
Thaichinula gen. n. and to Their Species*

- 1 (6). Elytral epipleura with wide subhumeral lobes entirely concealing metepisterna (Figs. 16, 19, 28). Visible scutellum absent. Serration of lateral margin of elytra nearly reaching their base
..... *Cochinchinula* Volk.
- 2 (5). Anterior margin of clypeus arcuately emarginate (Figs. 1, 24, 26). Body dorsally covered with mixed white and dark scales.
- 3 (4). Body wide, robust (Figs. 15–17), black; elytra with contrasting pattern formed by two wide transverse orange bands or spots broken at suture, occasionally with isolated spots, covered with erect white, blackish, or brown scales; pronotum transverse (basal width 1.42–1.62 times length), disc without longitudinal median sulcus. Aedeagus as in Figs. 6–8. Length of body 4.8–6.5 mm, width 1.7–2.3 mm
..... *C. quadriareolata* (Obenb.).
- 4 (3). Body elongate, narrow (Figs. 27–29), dark bronze, with coppery or violet sheen; elytra with weakly contrasting, varying ochre-brown pattern formed by merging longitudinal, transverse, and oblique stripes and bands, covered with recumbent white and dark scales; pronotum weakly transverse (basal width 1.19–1.41 times length), disc with deep longitudinal median sulcus and oblique lateral depressions. Aedeagus as in Figs. 61, 62. Length of body 4.1–6.2 mm, width 1.3–1.9 mm *C. bilyi* sp. n.
- 5 (2). Anterior margin of clypeus straight (Figs. 2, 25). Body dorsally covered with exclusively white scales, dark bronze; elytra blackish brown, with 3 wide, transverse and oblique yellow bands broken medially; 2 anterior bands usually longitudinally merging (Figs. 18, 19). Aedeagus as in Figs. 59, 60. Length of body 4.2–6.0 mm, width 1.4–1.9 mm *C. thailandica* sp. n.

- 6 (1). Elytral epipleura reduced, without humeral lobes; bases of metepisterna open (Fig. 31). Serration of lateral margin of elytra almost never reaching their base.
- 7 (8). Elytral base with rudiment of scutellum (Fig. 34) *Thaichinula* gen. n.
 Body nearly black, with metallic sheen; elytra with irregular yellowish-orange pattern formed by longitudinal and transverse bands and spots; dorsally covered with wide, white and nearly black scales. Length of body 6.2 mm, width 2.1 mm (Figs. 30–32) *T. ohmomo* sp. n.
- 8 (7). Scutellum absent *Acmaeodera* Eschsch. and other genera of the subtribe Acmaeoderina.

TAXONOMIC COMPOSITION
AND CLASSIFICATION OF THE TRIBE
ACMAEODERINI

The genera *Cochinchinula* Volk. and *Thaichinula* gen. n. are of special interest in the systematics of the tribe Acmaeoderini, as judging from some important characters, they occupy an intermediate position between the more primitive subtribes Odetteina Volk., Acmaeoderoidina Cobos, and Nothomorphina Cobos on the one hand (developed subhumeral lobes of the elytral epipleura of *Cochinchinula*, visible rudiment of the scutellum of *Thaichinula*), and the highly specialized representatives of the subtribe Acmaeoderina Kerr. (closed elytral suture), on the other. Therefore, it is appropriate to reconsider the main evolutionary trends of this tribe and its composition and classification.

The classification of Acmaeoderini (as a subfamily Acmaeoderinae) was mainly elaborated by Cobos (1955, 1980, 1981) (see also: Nelson, 1970; Bellamy, 1985; Cobos, 1986). According to this classification, Acmaeoderinae included three tribes: Acmaeoderoidini Cobos (*Acmaeoderoides* Van Dyke), Nothomorphini Cobos (*Nothomorpha* Saund.), and Acmaeoderini Kerr. (*Acmaeodera* Esch., *Acmaeoderella* Cobos, *Ptychomus* Mars, and *Paracmaeodera* Théry; the two latter taxa are considered at present as subgenera of the genus *Acmaeodera*). Later, Holm (1986) described the monotypical genus *Nothomorphoides* Holm from Namibia and synonymized Acmaeoderoidini with Nothomorphini. Holynski (1993) combined the subfamily Polycestinae with Buprestinae, downgraded the tribes described by Cobos to subtribes,

combined *Nothomorpha* with the Australian genus *Xyroscelis* Saund. within Nothomorphina (= Xyroscelidina), and transferred *Acmaeoderoides* in Ptosimina, with the inclusion of these subtribes in Thrincopygini; *Acmaeodera* and the closely related genera had formed the subtribe Acmaeoderina of the tribe Acmaeoderini. Though Holynski's classification suffered from manifest failings and absence of serious arguments, in particular, for combining Polycestinae with Buprestinae (Bellamy and Bílý, 1997; Kolibáč, 2001; Volkovitsh, 2001), his doubtless merit was the downgradation of some subfamilies determined by Cobos (Acmaeoderinae, Mastogeniinae, Thrincopyginae, Sphenopterinae, Cylindromorphinae, and Trachyinae) to the level of tribes and a wide use of the category of a subtribe. Bellamy and Westcott (1996) described the new genus *Paracmaeoderoides* from Mexico and, despite its obvious similarity to *Acmaeoderoides*, placed *Paracmaeoderoides* in the subtribe Nothomorphina. Volkovitsh (2001), basing of examination of the structure of the antennal sensory organs, confirmed the close relationship and status of the subtribes Acmaeoderoidina, Nothomorphina, and Acmaeoderina and included the monotypical subtribe Odetteina Volk. in the tribe Acmaeoderini; this concept was reflected in the summarised classification of the family Buprestidae (Bellamy, 2003). Recently, one more monotypical genus (*Richtersveldia* Bell.) was described in the subtribe Nothomorphina from South Africa (Bellamy, 2005). Thus, the tribe Acmaeoderini includes at present four subtribes with 16 genera: Odetteina Volk. (*Odettea* Baudon), Acmaeoderoidina Cobos (*Acmaeoderoides* Van Dyke), Nothomorphina Cobos (*Nothomorpha* Saund., *Nothomorphoides* Holm, *Paracmaeoderoides* Bell. et Westc., *Richtersveldia* Bell.), and Acmaeoderina Kerr. (10 genera).

One of the main evolutionary trends of the tribe Acmaeoderini is the development and improvement of the particular acmaeoderoid flight (Volkovitsh, 1979a, 2001; Volkovitsh and Bellamy, 1992) resembling that of Cetoniinae and some other Scarabaeidae, but the elytra in representatives of the most advanced subtribe Acmaeoderina form a casing slightly raised during the flight (Fig. 14) (details of the flight of species of *Cochinchinula* and *Thaichinula* are unknown). The development of the acmaeoderoid flight is accompanied by a deep reorganization of the whole pterothorax: the mesonotum (Figs. 9–13) is transformed into two parallel plates covering the margins of the

widened basal process of the elytra; the visible scutellum is lost (Figs. 11–13)¹; the elytra tightly joined along the suture (but not fused); the subhumeral lobes of the epipleura are reduced, with formation of a subhumeral curvature or a subhumeral incision in the most specialized groups (“Acmaeoderae incisae,” according to Kerremans); the body strongly bends dorsally (Volkovitsh, 1979a); further reduction of the venation, in particular, of the radial cell (Figs. 47–58) may be associated with this process. All the transitive stages are observed in the series Odetaina–Acmaeoderoidina–Nothomorphina–Acmaeoderina. Such characters as the presence of the subhumeral lobes of the epipleura, radial cell, and visible scutellum in various groups of Acmaeoderini are plesiomorphic and cannot serve as an evidence of their phylogenetic relationship, in particular, this concerns the relation between the geographically distant Acmaeoderoidina (Nearctic Region) and Nothomorphina (South Africa) (Holm, 1986).² However, many other characters used for differentiation of the genera or subtribes of Acmaeoderini (Holm, 1986; Bellamy and Westcott, 1996), e.g., the pubescence (setae or scales), shape of the frons (with the lateral margins parallel or diverging to the vertex), shape of the apical antennomere, shape of the apex of the submentum (with or without tooth), sculpture of the elytra, and extent of the development of the genal antennal sulci, collar of the prosternum, basal fossae of the pronotum, tarsal pads, and tooth of the claws vary widely within the large genera of the subtribe Acmaeoderina (*Acmaeodera*, *Acmaeoderella*), and the reliability of these characters is also seems to be doubtful. Revealing of such “intermediate” forms as *Cochinchinula* and *Thaichinula* supposes further possible downgradation of the rank of the subtribes Acmaeoderoidina and Nothomorphina to groups of genera in the subtribe Acmaeoderina, but this is inexpedient at the present stage of the investigation.

¹ A concealed rudiment of the scutellum remains (at least, in some species).

² It is of interest that similar states and trends also occur in other groups of Polycestinae, e.g., the loss of the visible scutellum in the genus *Thurmtaxisia* Schatzm. and in *Polycetes johandesi* Bílý (other species of this genus have the normal scutellum), strongly developed subhumeral lobes of the epipleura in *Jelinekia* Cobos and its loss with the formation of an emargination in *Polycestina* Cobos, partial reduction or nearly entire loss of the radial cell of wings in many genera of Polycestini (Holm, 1982); however, these conditions are unlikely to be associated with features of the flight, as they never occur in a complex.

The second problem is the taxonomic position of the genera *Paracmaeoderoides* Bell. et Westc. and *Richtersveldia* Bell. included by the authors in the subtribe Nothomorphina. Analysis of characters of *P. callyntromorion* Bell. et Westc. and examination of the holotype of *R. insperata* Bell. have shown that these genera should be transferred in other groups, as it is indicated below.

Genus *PARACMAEODEROIDES*

Bellamy et Westcott, 1996

Bellamy, Westcott, 1996 : 230 (Thrincopygini: Nothomorphina); Bellamy, 2003 : 16; 2005 : 7 (Acmaeoderini: Nothomorphina).

Type species *P. callyntromorion* Bellamy et Westcott, 1996 (by monotypy).

Holotype (CASC): female, Mexico, Baja California Sur, Loreto.

According to the comments and results of the cladistic analysis (Bellamy and Westcott, 1996), the Nearctic genus *Paracmaeoderoides*, though being similar in appearance to the genus *Acmaeoderoides* Van Dyke (Acmaeoderoidina) and having the same distribution range, is closely related to the South-African *Nothomorphoides* Holm (Nothomorphina). I have not examined the type species, but its description and the diagnosis and illustrations of *P. callyntromorion* in the cited publication give rise to serious doubts in its close relationship to the latter. Among the listed distinctions between *Acmaeoderoides* and *Paracmaeoderoides* (Bellamy, Westcott, 1996 : 232, table 1), the shape of the inner margins of eyes (parallel or diverging upwards) varies [in *A. rossi* (Cazier), they distinctly diverge to the vertex], the extent of development of the median depression of the pronotum varies (it is well-developed in *A. distinctus* Nelson); the relief of the intervals (carinate or punctuate) also varies between species of the genus *Acmaeoderoides* (Nelson, 1968) (distinctly carinate intervals are found in *A. depressus* Nelson); the tarsal pads on the 1st–4th (occasionally on the 2nd–4th) tarsomeres are developed not only in *Acmaeoderoides*, but also in *Nothomorphoides* (1st and 2nd tarsomeres with rudimentary pads); the reduction of pads on the proximal (from 1st to 1st–3rd) tarsomeres is observed in various genera of Polycestinae; the secondary reduction of a tooth of the claws (claws are serrate or simple) is found in the genera *Nothomorpha* and *Acmaeoderella* (Bellamy, 2005, the simple claws are erroneously in-

licated for *Nothomorphoides*); both types of the ovipositor structure (elongate, with sparse setae or short, with dense setae, Figs. 71, 72) are characteristic of representatives of two different groups of the genus *Acmaeoderoides* (Nelson, 1968), in addition, the ovipositor of *Nothomorphoides irishi* Holm is not glabrous but covered with dense short setae; the shape of the 11th antennomere (truncate or rounded apically) and the development of a carina on the epipleural lobe also vary rather widely within the genera. Thus, the supposed relationship between *Paracmaeoderoides* and *Nothomorphoides* is based on unreliable, widely varying, and occasionally erroneously treated characters. In contrast, the close relationship between *Acmaeoderoides* and *Paracmaeoderoides* is substantiated, in addition to the common distribution range, by the presence of large deep laterobasal fossae of the pronotum, the abdominal sides visible in dorsal view, and the structure of the ovipositor of *P. callyntromorion*, which resembles that of the *A. rossi* species-group (Fig. 71), but is covered with even denser and long setae. Unfortunately, the male of *P. callyntromorion* is unknown, and the wing venation (presence of the radial cell) has not been examined. However, the listed characters shared by these two Nearctic genera testify to their much closer relationship; therefore, I consider necessary to transfer the genus *Paracmaeoderoides* from the subtribe Nothomorphina to the subtribe Acmaeoderoidina. It is not improbable that its status will be subsequently downgraded to a subgenus of the genus *Acmaeoderoides*.

Genus **RICHTERSVELDIA** Bellamy, 2005

Bellamy, 2005 : 3 (Acmaeoderini: Nothomorphina).

Type species *R. insperata* Bellamy, 2005 (by monotypy).

Material. Holotype (TMSA): male, R. S. Africa, Northern Cape Prov., Groot Derm 10 (Richtersveld) Yellow Dunes, 12 km SW Brandkaros Camp Site, Succulent Karoo // BIOTA 21.025.2001.7.05.702, 28°36'51.4"S, 16°39'4.4"E, 10 pitfall traps, 12–13.X.2001, leg. K. Vohland // Holotype *Richtersveldia insperata*, ♂, C.L. Bellamy (red.).

Placing the genus *Richtersveldia* in the subtribe Nothomorphina, Bellamy (2005) referred, among other things, to my opinion based on examination of photographs of *R. insperata*. However, the photographs gave no idea of some important characters, and several

details (the body strongly narrowed backward, the even surface of the pronotum, sculpture of the elytra, and shape of the aedeagus) were contrary to the states characteristic of Nothomorphina. Examination of the holotype of *R. insperata* has shown that the genus *Richtersveldia* is similar to *Ptosima* Dejean in the structure of the aedeagus (Figs. 77–79), in particular, the shape of the tegmen, in the structure of the penis, and especially in the presence of short setae at the parameral apices (Figs. 78, 80). The other characters confirming the relationship between *Richtersveldia* and *Ptosima*, and partly *Sponsor* Gory and Laporte, are as follows: the vertex inconspicuously narrowed to the frons (vertex 0.97 times narrower than frons above antennal fossae), the narrow clypeus with partly reduced lateral branches and separated from the frons by a wide transverse depression, the antennal fossae partly open ventrally, the very short (shorter than the eye height) male antennae with strongly transverse antennomeres, the regularly convex pronotum with slit-like laterobasal fossae and with the base slightly angularly projecting backward, the flat intervals and obsolete, occasionally vanishing striae of setiferous punctures (the presutural stria is entire, and the 2nd stria is short, reaching the anterior third), the straight posterior margin of the hind coxa without lateral emargination and tooth, and the strongly developed tooth of claws. Unfortunately, the structure of the wings, in particular, of the radial cell, which rather strongly differs in representatives of Ptosimini and Nothomorphina, has not been examined. *Richtersveldia* differs from *Ptosima* in the shorter body narrowed backward (partly similar to that of *Sponsor*), in the pattern of the body and elytra, actually resembling that in some species of *Nothomorpha*, and in the elytral suture diverging from the anterior third. In addition to the structure of the penis, *Richtersveldia* also differs from *Sponsor* in the absence of an additional suture running from the procoxal margin to the anterior angles of the pronotum. On the basis of the data obtained, the genus *Richtersveldia* is transferred from the tribe Nothomorphina (Acmaeoderini) to the tribe Ptosimini and becomes the first representative of this tribe in the Southern Hemisphere. The question remains still open, whether *Sponsor* belong to the tribe Paratrachysini Cobos (Holynski, 1993; Bellamy, 2003; Volkovitsh, 2006).

Thus, after the proposed changes, the subtribe Acmaeoderoidina includes two Nearctic, and Nothomorphina, two Afrotropical genera.

CLASSIFICATION OF THE TRIBE
ACMAEODERINI

Subfamily **POLYCESTINAE** Lacordaire, 1857

Tribe **Acmaeoderini** Kerremans, 1893.

Diagnosis. Margins of frons parallel or diverging to vertex (Figs. 1, 2, 24–26, 33) (inconspicuously converging to vertex in few species). Antennal fossae close, lateral branches of clypeus well developed (Figs. 1, 2, 24–26, 33) (in *Anambodera* and *Acmaeoderella*, lateral branches very narrow but closing antennal fossae ventrally). Sensory organs of antennae presented by weakly differentiated apical depressions and sensory zones (Volkovitsh, 2001); antennae frequently dimorphic. Base of pronotum straight, with dense parallel longitudinal notches (“cremallera”) (except in *Odettea*, Fig. 35). Elytra usually with well-developed striae, short scutellar stria terminating freely or merging with 1st stria. Wing venation strongly reduced (Figs. 47–58); radial cell short, partly (*Odettea*, Figs. 47, 52) or strongly (*Acmaeoderoides*, Figs. 48, 53–55) reduced or lost (Nothomorpha, Acmaeoderina Figs. 49–51, 56–58). Tarsal claws with inner tooth (Fig. 3) secondarily reduced in some species of *Nothomorpha* and *Acmaeoderella*. Basal piece of tegmen of aedeagus with one (ventral) apodeme (Figs. 6, 7, 59, 61, 63, 65, 67, 69).

Anthophily at adult stage. Larvae known only for representatives of the subtribe Acmaeoderina (see Volkovitsh, 1979b).

On the basis of the structure of the antennal sensory organs, the tribe Acmaeoderini belongs to the acmaeoderioid lineage (Volkovitsh, 2001), which also includes Haplostethini LeConte (= *Mastogeniini* LeConte et Horn), Ptosimini Kerr., and Paratrachysini Cobos. Acmaeoderini differs from Haplostethini first of all in the absence of additional lateral carina on the pronotum; from Ptosimini, in the absence of both the setae at apices of parameres of the aedeagus and the transverse rugosity at sides of the pronotal disc; from Paratrachysini, in the absence of an additional suture running from the procoxal margin to the anterior angles of the pronotum and, partly, in the shape of the body. In addition, Acmaeoderini differs from the mentioned groups in the anthophily characteristic of the adult stage. The other numerous distinctions are not considered in the present study.

Subtribe **ODETTEINA** Volkovitsh, 2001

Odettea Baudon, 1966 (Figs. 35–37, 47, 52, 69, 70, 75, 76); type species *O. laosensis* Baudon, 1966. One species, Southeastern Asia.

Diagnosis. Body (Figs. 35–37) wide, very strongly flattened in lateral view, parallel-sided, covered with wide scales; coloration dimorphic. Base of pronotum bisinuate, with median lobe; “cremallera” not developed, only marked along margin; disc with large longitudinal median depression and 3 basal fossae. Scutellum large. Subhumeral lobes of elytral epipleura wide but short, partly opening posterior part of metepisterna; elytra entirely concealing sides of abdomen dorsally; lateral margin with identical large teeth along entire length; sutural margins serrate; suture open along entire length, symmetrical. Radial cell of wings strongly shortened, anterolateral margin distinctly sclerotized (Figs. 47, 52). Aedeagus (Figs. 69, 70): apices of parameres partly membranous (Fig. 69); penis without lamina, with not sclerotized apical apodeme, and with long apophyses (Fig. 70). Ovipositor (Figs. 75, 76) tubular, rather long, typical of Acmaeoderini.

Subtribe **ACMAEODEROIDINA** Cobos, 1955

Acmaeoderoides Van Dyke, 1942 (Figs. 38–40, 48, 53–55, 63, 64, 71, 72); type species *Acmaeodera insignis* Horn, 1894. 12 species, Nearctic Region: southwestern part of the USA, northwestern part of Mexico.

Paracmaeoderoides Bellamy et Westcott, 1996; type species *P. callyntromorion* Bellamy et Westcott, 1996. 1 species, Nearctic Region: northwestern part of Mexico. The genus is transferred from the subtribe Nothomorpha.

Diagnosis. Body (Figs. 38–40) in lateral view strongly flattened dorsally and convex ventrally. Base of pronotum straight, with developed “cremallera;” disc occasionally with longitudinal median sulcus and 2–3 basal fossae; laterobasal fossae large. Scutellum medium-sized. Subhumeral lobes of elytral epipleura wide, entirely concealing metepisterna; elytra not concealing sides of abdomen dorsally; lateral margin nearly straight behind subhumeral lobes, without distinct curvature at level of hind coxae, with small identical teeth along entire length. Elytra free, suture open at least in posterior 1/3, asymmetrical, with serrate inner margins. Radial cell of hind wing very strongly

reduced, less frequently almost lost (Figs. 48, 53–55);³ anterolateral margin not sclerotized. Coloration similar in both sexes. Aedeagus (Figs. 63, 64): apices of parameres pointed (Fig. 63); penis with wide short lamina (Fig. 64). Ovipositor (Figs. 71, 72) tubular, very short, nearly uritiform, covered with long dense (*Acmaeoderoides rossi* group, *Paracmaeoderoides*) or short sparse (*A. knulli* group) setae.

Subtribe NOTHOMORPHINA Cobos, 1955

Nothomorphoides Holm, 1986 (Figs. 41–43, 65, 66); type species *N. irishi* Holm, 1986. 1 species, Africa: Namibia.

Nothomorpha Saunders, 1871 (Figs. 44–46, 49, 56, 67, 68, 73); type species *Amorphosoma verrucosum* Gory et Laporte, 1839. 7 species, Africa: South Africa, Namibia.

Diagnosis. Body (Figs. 41–46) in lateral view flattened dorsally and convex ventrally. Base of pronotum straight or nearly straight, with developed “cremallera;” disc with 5 large deep (*Nothomorpha*) or shallow (*Nothomorphoides*) fossae. Scutellum medium-sized. Subhumeral lobes of elytral epipleura wide, entirely concealing metepisterna; elytra entirely concealing sides of abdomen dorsally; lateral margin behind subhumeral lobes distinctly curved at level of hind coxae, with small identical teeth along entire length. Elytra free, suture open at least in posterior 1/3, asymmetrical, with serrate inner margins. Radial cell of hind wing (Figs. 49, 56) lost, anterolateral margin not sclerotized. Coloration similar in both sexes. Aedeagus (Figs. 65–68): apices of parameres obtused (Figs. 65, 67); penis with short narrow lamina (Fig. 66) or without any (Fig. 68). Ovipositor (Fig. 73) uritiform (*Nothomorpha*) or transitive to tubular (*Nothomorphoides*).

Subtribe ACMAEODERINA Kerremans, 1893

Cochinchinula Volkovitsh, 1984 (Figs. 1–8, 15–29, 50, 57, 59–62, 74); type species *Acmaeodera quadriareolata* Obenberger, 1924. 3 species, Southeastern Asia.

Thaichinula Volkovitsh, gen. n. (Figs. 30–34), type species *T. ohmomi* sp. n. 1 species, Southeastern Asia: Thailand.

Brachmaeodera Volkovitsh and Bellamy, 1992 (after: Holm and Schoeman, 1999—a subgenus of *Acmaeodera*), **stat. rest.**,⁴ type species *Acmaeodera tantilla* Kerremans, 1906. 1 species, South Africa.

Acmaeodera Eschscholtz, 1829 (Fig. 11); type species *Buprestis cylindrica* Fabricius, 1775. 12 subgenera, over 500 species, World-wide, except for Australia and Oceania.

Atacamita Moore, 1985; type species *Acmaeodera chiliensis* Laporte et Gory, 1835. 4 species, South America: Chile, Argentina.

Acmaeoderopsis Barr, 1974; type species *Acmaeodera junki* Théry. 14 species, Nearctic Region: USA, Mexico.

Anambodera Barr, 1974; type species, *Acmaeodera gemina* Horn, 1878. 7 species, Nearctic Region: Canada, USA, Mexico.

Microacmaeodera Cobos, 1966; type species *Acmaeodera (Microacmaeodera) longicornis* Cobos, 1966. 2 subgenera, 12 species, Southeastern Asia, Palaeartic Region.

Xantheremia Volkovitsh, 1979; type species *Acmaeodera koenigi* Ganglbauer, 1888. 2 subgenera, over 20 species, Palaeartic Region, Afrotropical Region.

Acmaeoderella Cobos, 1955 (Figs. 12–14, 51, 58); type species *Buprestis discoidea* Fabricius, 1787. 6 subgenera, over 120 species, Palaeartic Region.

Diagnosis. Body (see Volkovitsh, 1979a, figs. 1–11) in lateral view flattened to cylindrical, with marked (to strong) dorsal curvature or without any. Base of pronotum straight or nearly straight, with developed “cremallera;” disc with median sulcus and laterobasal fossae or without them. Visible scutellum absent (rudiment remained in *Thaichinula*). Subhumeral lobes of elytral epipleura lost (except in *Cochin-*

³ The extent of reduction varies even within one species: a rudiment of the cell remains in some specimens of *A. rossi*, and lost in the others (Figs. 54, 55).

⁴ Holm and Schoeman (1999) give a discrepant estimation of the status of this genus. They prove its subgeneric status in a discussion (p. 80), but indicate that *Brachmaeodera* corresponds to the criteria of a genus in the conclusions following from the discussion (p. 81). In my opinion, the genus *Brachmaeodera* sharply differs from the other groups of Acmaeoderina not only in the shape of the body but also in the sharply curved lateral carina of the pronotum, strongly widened hind coxae projecting beyond the body contour, and especially in the structure of the aedeagus (Volkovitsh and Bellamy, 1992; figs. 1–6); therefore, I consider necessary to resurrect its generic status.

chinula), metepisterna open at least at base; elytra concealing sides of abdomen dorsally; lateral margin under humeri straight or curved, frequently emarginate, usually with teeth before apices or in posterior 1/3. Elytra tightly jointed; suture close along entire length, symmetrical. Radial cell of wings (Figs. 50, 51, 57, 58) lost, antero-lateral margin not sclerotized. Coloration occasionally dimorphic (some species of *Acmaeodera* belonging to the subgenera *Acmaeodera* s. str., *Paracmaeodera* Théry, and *Ptychomus* Marseul), usually similar in both sexes. Structure of genitalia varying widely between groups (Volkovitsh, 1979a); lamina of penis absent only in several species of the genus *Microacmaeodera* Cobos (Volkovitsh, 2007).

A Key to Subtribes of the Tribe Acmaeoderini

- 1 (2). Base of pronotum bisinuate, without “cremallera.” Southeastern Asia *Odetteina* Volk.
- 2 (1). Base of pronotum straight or nearly straight, with well-developed “cremallera.”
- 3 (6). Elytral suture open at least in posterior 1/3, sutural margins serrate. Scutellum normal. Elytral epipleura always with subhumeral lobes.
- 4 (5). Margins of elytra behind subhumeral lobes nearly straight, without distinct bend at level of hind coxae (Fig. 39), not concealing sides of abdomen dorsally. Pronotal disc with 2–3 basal fossae. Wings at least with rudiment of radial cell (Figs. 48, 53–55). Apices of parameres of aedeagus pointed (Fig. 63); penis with short wide lamina (Fig. 64). Nearctic Region *Acmaeoderoidina* Cobos.
- 5 (4). Margins of elytra behind subhumeral lobes with distinct bend at level of hind coxae (Figs. 42, 45), entirely concealing sides of abdomen dorsally. Pronotal disc with 5 fossae. Radial cell of wings (Figs. 49, 56) absent. Apices of parameres of aedeagus obtused (Figs. 65, 67); penis with or without short narrow lamina (Figs. 66, 68). South Africa *Nothomorpha* Cobos.
- 6 (3). Elytral suture entirely closed. Visible scutellum absent or rudimentary (*Thaichinula* Volk.). Subhumeral lobes of elytral epipleura usually lost (except in *Cochinchinula* Volk.). World-wide, except for Australia *Acmaeoderina* Kerr.

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