



**Revision of the endemic Hispaniolan genus *Asteriza* Chevrolat, 1836,
with description of two new species
(Coleoptera: Chrysomelidae: Cassidinae: Ischyrosonychini)**

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Abstract

The cassidine genus *Asteriza* Chevrolat, 1836 is redescribed and two new species, *Asteriza blakeae* Shin, Chaboo & Clark and *Asteriza tainosa* Shin, Chaboo & Clark, are described from the Dominican Republic. A phylogenetic analysis and an illustrated key to the four *Asteriza* species are provided. *Asteriza blakeae* is diagnosed by the reddish lateral margin of the pronotum and more swollen brownish elytral margins. *Asteriza tainosa* is diagnosed by the relatively swollen maxillary and labial palpi and dominant yellow coloration of the elytra and pronotum.

Introduction

Chevrolat (1836) erected the genus name *Asteriza* for the Hispaniolan species, *Cassida flavicornis* Olivier, 1790. He listed two other names, *Asteriza punctatissima* Klug and *Asteriza flavicornis* var. *retigera* Mannerheim, whose origins are unclear since Klug (1829) and Mannerheim (1825) did not include any *Asteriza* species. Both these two names lack valid records (ICZN 1999, Article 12), and are therefore *nomina nuda*. Dugès (1901: 111) listed the name *Asteriza mexicana* Dugès from Mexico; we obtained photographs of Dugès's specimens and determined this to be *Physonota disjuncta* (Chevrolat, 1834), so the name *A. mexicana* is a junior synonym of *P. disjuncta*. The genus name is often cited as *Asteriza* Chevrolat, 1837 but Madge (1988) determined the date of publication to be 1836. A second species, *Asteriza darlingtoni* Blake, 1939 from the Dominican Republic, was diagnosed on the basis of elytral color, puncture pattern, and aedeagal form. Blake (1939) commented that specimens of *A. darlingtoni* recovered an opalescent color when they were soaked, consistent with Hincks's (1952) distinction that Physonotini Spaeth, 1942 are opalescent. Blackwelder (1946) included *Asteriza* in the tribe Cassidini Gyllenhal, 1813 and treated other genera of Ischyrosonychini Chapuis, 1875 (*Cistudinella* Champion, 1894; *Enagria* Spaeth, 1913; *Eurypedus* Gistel, 1834; *Eurypepla* Boheman, 1854; *Physonota* Boheman, 1854; and *Platycycla* Boheman, 1854) in the tribe Mesomphaliini Hope, 1840. Hincks (1952) erected the tribe Asterizini for *Asteriza* alone; he distinguished three tribes, Asterizini, Ischyrosonychini, and Physonotini on the basis of differences in the elytral margin, pronotal form, prosternal process form, color and opalescence. In couplet 29 (28), he mentioned another taxon, "Eurypedini. However, no morphological features or taxon names were associated and Eurypedini is not used in modern cassidine studies.

Seeno & Wilcox (1982) recognized three distinct tribes—Asterizini Hincks, 1952, Ischyrosonychini Hincks, 1952, and Physonotini Hincks, 1952. The author of Asterizini is indeed Hincks; however, the author of Ischyrosonychini and Physonotini is not Hincks because both tribes were validated previously by Chapuis (1875) and Spaeth (1942). Hincks (1952) only Latinized the family group names (ICZN [1999] article 11.7.2). Borowiec (1995) synonymised Asterizini with Ischyrosonychini and Physonotini under the oldest name Ischyrosonychini, because he considered the tribal boundaries ambiguous. However, Borowiec (1999) used the tribal name Physonotini because *Ischyrosonyx* Sturm, 1843 was already recognized as a junior synonym of *Eurypedus* by Barber (1946). In contrast,

Riley *et al.* (2002) used the oldest name Ischyrosonychini from Ischyrosonychites Chapuis, 1875. We follow this latter usage, which concurs with the arguments and conclusions of Bouchard *et al.* (2011)

Asteriza specimens are poorly represented in museum collections and their biology is virtually unknown. Until this paper, *Asteriza* was comprised of two species from Hispaniola. The genus can be identified using online keys of Borowiec and Świętojańska (2011). Chaboo (2007) found the four sampled ischyrosonychine genera (*Asteriza*, *Eurypepla*, *Eurypedus*, and *Physonota*) to not be closely related, but within a large polytomy of derived cassidines. *Asteriza*'s diagnostic elytral margin (narrowed and thickened) is homoplasious in Cassidinae.

A host plant, *Cordia* Linnaeus (Boraginaceae), and mature larvae and pupae are documented for *A. flavicornis* (Świętojańska & Windsor 2008). *Cordia* is a common host of ischyrosonychine species (Borowiec & Świętojańska 2011).

An inventory of the entomofauna of the Dominican Republic by the Carnegie Museum of Natural History (CMNH), Pittsburgh, USA and Museo Nacional de Historia Natural (MHND), Santo Domingo, Dominican Republic has assembled the largest specimen series that we are aware of. In sorting these specimens, we discovered two new species which stimulated this study.

Material and methods

Descriptions are based on pinned specimens from the Carnegie Museum of Natural History. Specimens were dissected in 100% alcohol or glycerin. For description of internal morphology and sexual organs, the specimens were treated in 5% KOH overnight at room temperature. Hydrogen peroxide was used for bleaching legs. For the observations of the tarsal formula and genitalia, specimens were stained in chlorazol black. All dissections are preserved in glycerin.

The two syntypes of *A. flavicornis* (Figs. 1–2) deposited in the National Museums of Scotland (RSME) and Edinburgh, UK, were examined and the lectotype (Fig. 1) and paralectotype are hereby designated from these syntypes. According to Blake (1939), the holotype and two paratypes of *A. darlingtoni* are deposited in the Museum of Comparative Zoology (MCZ), Harvard University, Cambridge, MA and two paratypes are in the U.S. National Museum of Natural History (USNM), Washington, D.C. However the online cassidine catalog of Borowiec & Świętojańska (2011) currently indicates that the types of *A. darlingtoni* are deposited in the USNM. During a collections study visit by CWS, we discovered that these USNM specimens are actually two paratypes, and the holotype (Fig. 3) is housed in the MCZ as in the original description (Blake 1939). The holotype was borrowed and examined for the present study.

Specimens were examined with an Olympus SZX7 microscope and an Olympus BX51 compound microscope. Measurements were made with an ocular micrometer. Photographs were taken with the Microptics camera system. Illustrations were made with a camera lucida attached to the microscope. Terminology follows Lawrence & Britton (1991) and Chaboo (2007). Label data are transcribed exactly from specimen labels. Museum acronyms (Table. 1) follow Evenhuis (2011).

Cladistic analysis. A character matrix was scored for six taxa: the four species of *Asteriza* (Tables 2, 3) and two outgroups, a species of *Spaethiella* Barber & Bridwell 1940 (tribe Hemisphaerotini Monrós & Viana, 1951) and *Physonota attenuata* Boheman (tribe Ischyrosonychini). Chaboo's (2007) phylogenetic analyses found 10 tribes of derived cassidines collapsed as a polytomy; our two outgroup selections for the present study samples one close relative in Ischyrosonychini and one Hemisphaerotini species, which is outside the Chaboo polytomy. We scored 17 characters (Tables 2, 3) derived from Chaboo (2007), Borowiec & Świętojańska (2011), and seven new characters developed here. The relationship of *Asteriza* with other genera in the tribe Ischyrosonychini has been noted in other studies (Borowiec 1995, Chaboo 2007, Borowiec & Świętojańska 2011). The phylogenetic analysis was performed using WinClada (Nixon 2002), which incorporates Nona (Goloboff 1998). All characters were equally weighted and unordered (Fitch optimization).

Although we found coloration of dried specimens useful for diagnosing each species, we did not use color as a phylogenetic character since the diagnostic colors are autapomorphies, which do not help resolve evolutionary relationships.

TABLE 1. Museum acronyms used in this study (by Neal L. Evenhuis, 2011).

AMNH	American Museum of Natural History, New York, USA
BYU	Brigham Young University, Monte L. Bean Life Science Museum Provo, Utah, USA
CCC	Caroline Chaboo Collection, University of Kansas, Lawrence, USA
CMNH	Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, USA
CUIC	Cornell University, Ithaca, New York, USA
FSCA	Florida State Collection of Arthropods, Gainesville, Florida, USA
HNHM	Hungarian Natural History Museum, Budapest, Hungary
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA
MHND	Museo Nacional de Historia Natural, Santo Domingo, Dominican Republic
RSME	National Museums of Scotland, Edinburgh, United Kingdom
USNM	National Museum of Natural History, Washington D.C., USA
WIBF	The West Indian Beetle Fauna Project collection, Montana State University, Montana, USA
ZMHB	Museum für Naturkunde der Humboldt-Universität, Berlin, Germany

Results

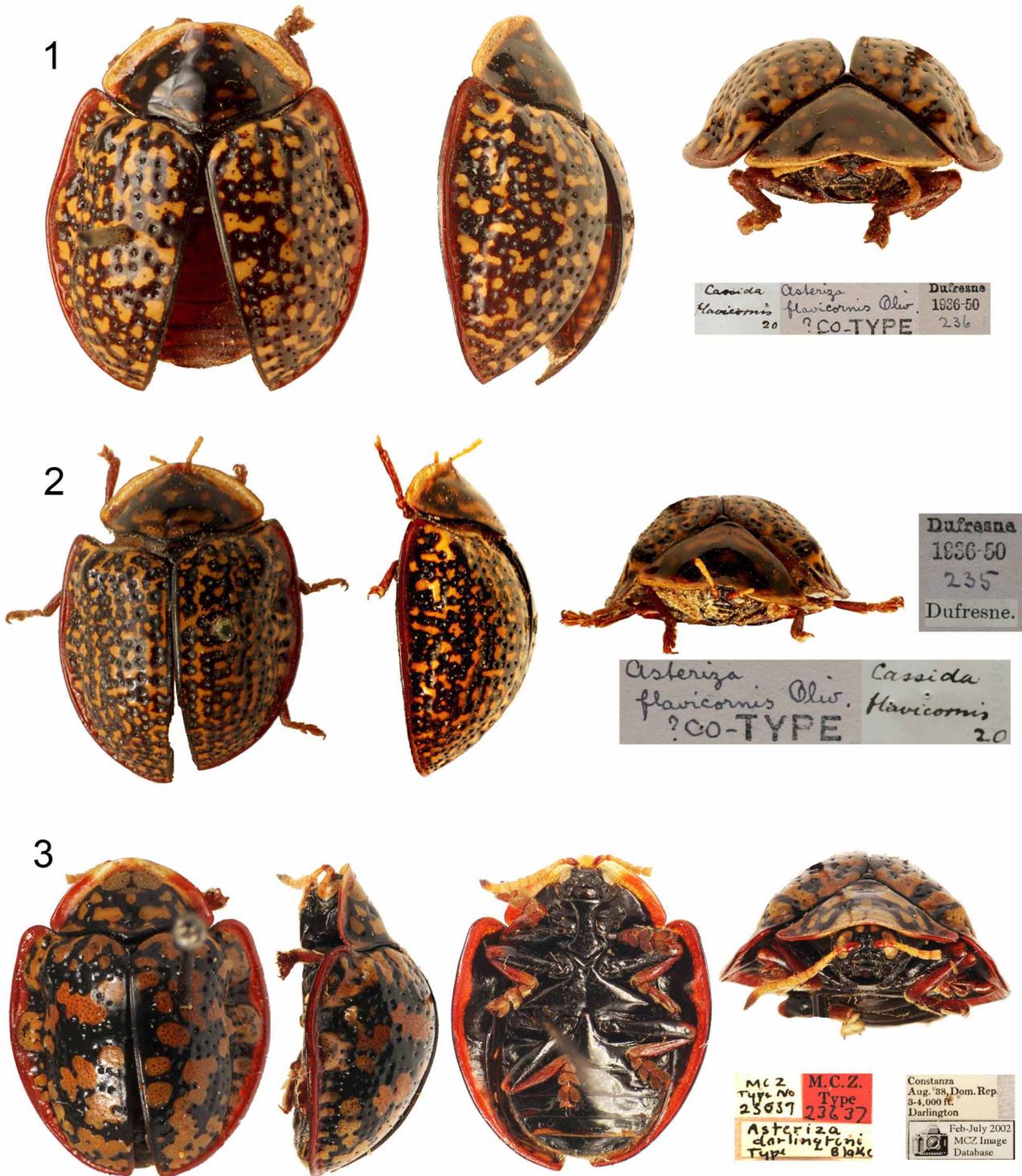
Asteriza Chevrolat, 1836

Asteriza Chevrolat 1836: 372 [type species: *Cassida flavicornis* Olivier, 1790 by monotypy]; Chapuis 1875: 387 [description]; Spaeth 1914: 122 [catalog]; Barber & Bridwell 1940: 10 [nomenclature]; Blackwelder 1946: 748; Hincks 1952: 336 [key to genera]; Wilcox 1975: 154 [catalog]; Seeno & Wilcox 1982: 175 [checklist]; Borowiec 1999: 169 [checklist]; Perez-Gelabert 2008: 125 [checklist]; Takizawa 2003: 97 [checklist]; Borowiec & Świętojańska 2011 [catalog].

Diagnosis of *Asteriza*. Adults of *Asteriza* have an oval body shape in dorsal aspect (Figs. 4–5, 7–8, 10–11, 13–14) and a hemispherical shape without angles in lateral aspect (Figs. 16–23). In dorsal view, the pronotum and elytra are continuous to slightly discontinuous in females (Figs. 5, 8, 11, 14) and slightly to moderately discontinuous in males (Figs. 4, 7, 10, 13). The antennae are pale with scape, pedicel and often antennomere III shiny red to reddish brown and the apical half of the last antennomere tanned. The lateral margins of the pronotum and elytra are moderately explanate, the explanate portion being less than half the width of discal area. The dorsal color (4–5, 7–8, 10–11, 13–14) is mottled or speckled yellow to tan and black. The pronotum (Fig. 42) is smooth. The pronotal anterior margin is semicircular, completely covering the head. The prosternal process (Fig. 43) separates the procoxae by a distance approximately equal to the width of each procoxa. The elytral explanate portion (Figs. 47–54) is interrupted medially by a discal sublateral “bulge and is narrowed posteriad. The elytral edge is moderately thickened. The elytral disc is moderately punctate, with the punctures scattered. Each terminal tarsomere is unmodified.

Redescription of *Asteriza* Chevrolat. *Body* oval in dorsal view (Figs. 4–5, 7–8, 10–11, 13–14); head entirely concealed; pronotum and elytra continuous to slightly discontinuous in females (Figs. 5, 8, 11, 14) and slightly to moderately discontinuous in males (Figs. 4, 7, 10, 13). In lateral view (Figs. 16–23), body hemispherical, highest at middle of elytra. Pronotal and elytral disc moderately to well defined. Pronotal and elytral lateral margins (Figs. 4–5, 7–8, 10–11, 13–14) moderately explanate, explanate portion less than half width of discal area.

Head (Figs. 24–26) withdrawn into pronotum approximately halfway, completely covered dorsally by pronotal margin and partially concealed ventrally by prosternal margin; prosternal margin covering base of maxillary palpi. In dorsal view of dissected specimens (Fig. 25), shape subquadrate, widest medially, moderately rounded on sides, 1.25 times as broad as long; surface finely and sparsely pubescent. *Eyes* (Fig. 24) large, nearly flush with head, not protruding; egg-shaped, with dorsal width narrower than ventral width. Interocular distance 1.5 times as broad as widest part of eye. *Vertex* very finely striate, striations slightly elevated; in dissected specimens, stridulatory file distinct, elongate and slightly convex (Figs. 24–25). *Frontal tubercles* (= antennal calli, Chaboo 2007) similar in size to antennal socket, elevated and flattened. *Coronal suture* in two sections, with mid-cranial suture posteriad



FIGURES 1–3. Type specimens: 1, *Asteriza flavicornis*, lectotype (RSME); 2, *Asteriza flavicornis*, paralectotype (RSME); 3, *Asteriza darlingtoni*, holotype (MCZ).

(hidden by pronotum in intact specimens) extending to anterior margin of stridulatory file; mid-frontal sulcus extending to or bisecting anterior frontoclypeal margin (Figs. 24, 30–33). *Gena* slightly protuberant in mandibular region; prosternum abutting behind protuberance. *Frontoclypeus* (Figs. 30–33) triangular, slightly protuberant anteriorly; epistomal suture barely discernible in dissected specimens; anterior margin of frontoclypeus either uninterrupted or bisected by mid-frontal sulcus; surface flattened or slight swollen, finely to coarsely punctate, with punctures unevenly distributed and finely setose. *Antenna* (Fig. 27) with 11-antennomeres, reaching basal margin

of pronotum. Distance between antennal sockets as broad as socket; distance between antennal socket and eye margin less than half width of socket (Fig. 24). Scape longer than wide; II (pedicel) shortest and rounded; III 1.5 times as long as broad; I–III with relative length ratio 2/1/1.5; IV–X as long as broad; IV as long as III; V–X similar in shape and length; XI longest, 2 times as long as broad. Antennomeres I–III with surface shiny, tanned, and reddish brown, finely and sparsely setose; I finely wrinkled; IV–X pale and densely setose, with fine, long setae at apex; XI longest densely setose with longer fine setae on apical half, with apical half tanned black.

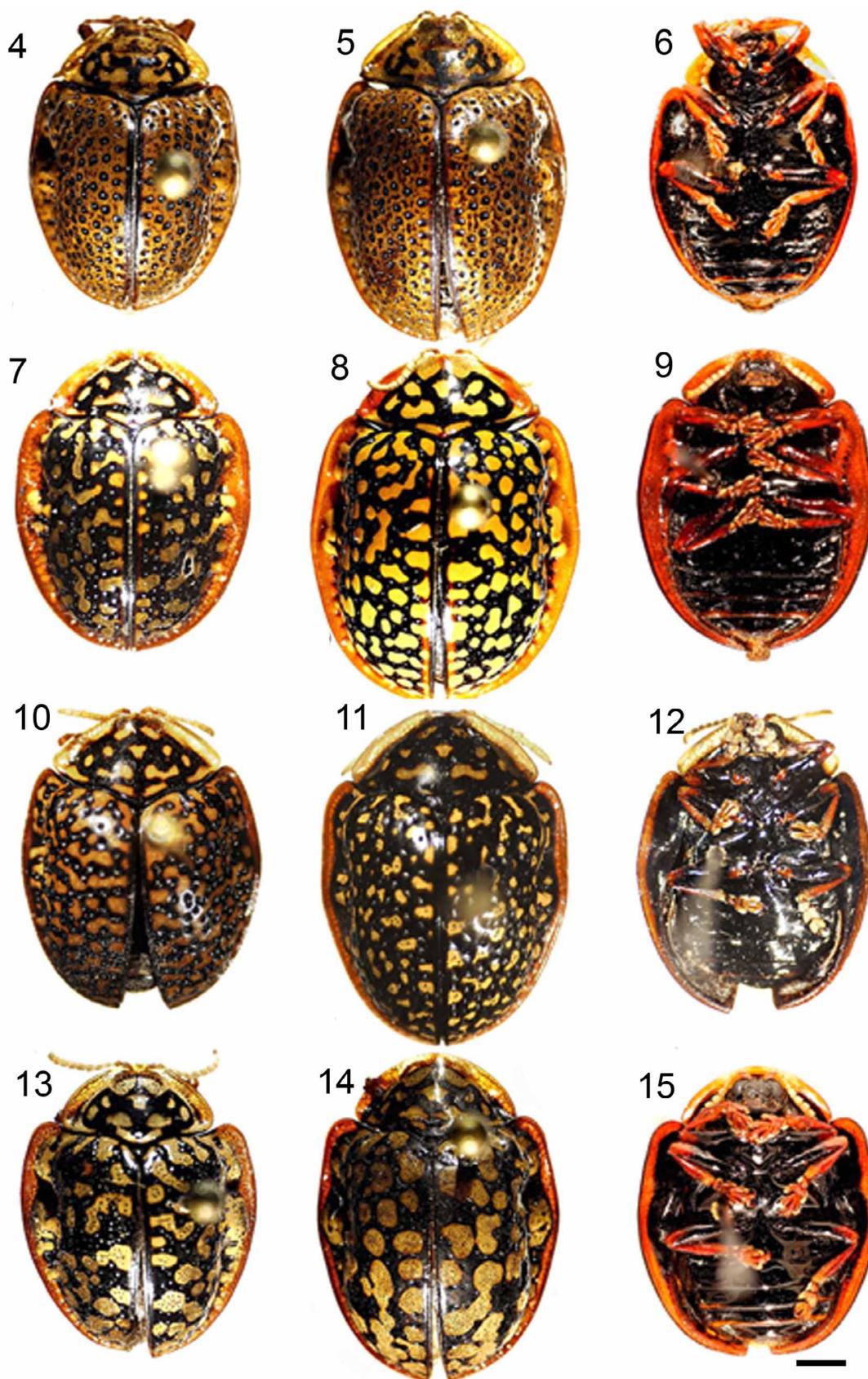
Mouth fossa (Fig. 26) large, irregularly pentagonal, broadest at mandibular articulating region, angled laterad, narrower ventrad. *Labrum* (Fig. 28) well sclerotized; basal half trapezoidal, roughly punctate, longitudinal midline with sparse long setae; anterior half shifted ventrad, narrower anteriorly, with apical margin sinuate and narrowly emarginate. *Mandible* (Fig. 29) well sclerotized, fist-shaped; middle-part projected, with some setae; apical half finely wrinkled, with 5 teeth. *Maxilla* (Figs. 34–37) long and slender; cardo long, medially narrower, sclerotized, with three tendons on basal margin; stipes weakly sclerotized and membranous, irregularly triangular, finely punctate and setose; lacinia broad, weakly sclerotized basally, flattened, membranous apically, with fine setation; galea broadly connected to stipes, with basal half weakly sclerotized and setose, with apical half more sclerotized and densely setose, with medial surface finely and coarsely setose; maxillary palpus with 5-palpomeres, palpifer laterally connected to stipes, weakly sclerotized; palpomere I as long as palpifer, more sclerotized, with setae; palpomere II setose, longer than I and III, broader anteriorly; III setose, as long as I; IV as long as II, with sensilla on apex. *Labium* (Fig. 38–41) with mentum subrectangular, 1.5 times as broad as long, finely punctate medially, sparsely setose; prementum subquadrate, apicomediaally broadly emarginate; ligula oval with long and narrowly extended tendon, with anterior half more setose than posterior half; labial palpus with three-palpomeres and setose; palpomere I shorter than II and III, weakly sclerotized; palpomere II setose, broader anteriorly; palpomere III as long as II, setose, with sensilla on apex and subapical region.

Pronotum (Fig. 42) with anterior margin semicircular; posterolateral and posteromedial angles well developed; maximum width across posteromedial angles. Dorsum smooth, without punctation or setation. Anterior and lateral margins explanate; explanate portion broader posteriorly; width less than half width of disc. Posterior margin smooth, shallowly sinuate, angled from lateral corners toward scutellum. Disc slightly convex in profile; anterior margin flattened or slightly convex; lateral margins reflexed, forming shallow groove that may be absent anteriorly. Posteromedial angle overlapping scutellum. *Prosternum* (Fig. 43) with hypomeron angled medially, surface with weak microsculpture, with some shallow ridges and microelevations; hypomeral process narrow, meeting apex of prosternal process. Anterior prosternal margin smooth, curving around head laterally, expanded, covering mouth parts up to basal part of maxillary palpi, with edge slightly concave laterally. Prosternal process shiny, flat, smooth, overlapping mesosternal margin, with scattered fine punctation posteriorly; tip articulating with recess in mesosternal process; apex medially angled or rounded, broadly expanded behind procoxae, meeting hypomeron. Cervical cavity oval; posterior prothoracic foramen setose internally on ventral half, setose externally in dorsolateral region.

Mesonotum (Fig. 44) obtusely pentagonal, finely setose, 0.5 times as large as pronotum in width and length; anterior margin continuous medially with longitudinal mesothoracic suture; axillary cord finely wrinkled, marginate. *Scutellum* with exposed portion triangular, convex posteriorly; frontal margin covered by pronotum; apical margin acute. *Mesosternum* (Fig. 46) deeply notched, receiving procoxal process; exposed portion generally U-shaped; mesosternal process thickened, well sclerotized. *Mesepisternum* pale to dark colored, somewhat triangular, with narrow side towards mesocoxa; mesepisternal ridge well defined, with transverse groove on posterior side. *Mesepimeron* with exposed portion trapezoidal; anterolateral corner triangularly expanded, anterolaterally forming tubercle, with tubercle hidden by elytra in intact specimens (in ventral aspect); ventral surface microreticulate.

Metasternum (Fig. 46) dark, smooth, shiny, medially flat; anterolateral area declivous; posterolateral portion projected, with projection sharply angular; median longitudinal groove faint. Anterior margin in intact specimens deeply fused with mesosternum. Anterior metacoxal process deeply grooved and bilobed. Metepisternum densely punctate.

Elytra (Figs. 47–56), together with pronotum, oval in dorsal view, widest near mid-length, explanate laterad and posteriorly; surface shining and punctate; punctures only on black colored surface, deep and coarse, especially at junction of disc and lateral margin area basal margin black, sinuate, weakly denticulate from scutellar angle to area in front of humeral callus; disc swollen at humeral region and mediolateral region; explanate margin distinct from disc, tanned to reddish brown, narrower posteriorly, translucent with internal netted pattern in some specimens. In



FIGURES 4–6. *Asteriza tainosa*, new species: 4, male, dorsal view; 5, female, dorsal view; 6, male, ventral view. Figs. 7–9. *Asteriza blakeae*, new species: 7, male, dorsal view; 8, female, dorsal view; 9, male, ventral view. Figs. 10–12. *Asteriza flavicornis*: 10, male, dorsal view; 11, female, dorsal view; 12, male, ventral view. Figs. 13–15. *Asteriza darlingtoni*: 13, male, dorsal view; 14, female, dorsal view; 15, male, ventral view. Scale bar = 1.0 mm.



FIGURES 16–23. Lateral view: *Asteriza tainosa*, new species, 16, male; 17, female; *Asteriza blakeae*, new species, 18, male; 19, female; *Asteriza flavicornis*, 20, male; 21, female; *Asteriza darlingtoni*, 22, male; 23, female. Scale bar = 1.0 mm.

ventral view of disarticulated specimens, anterior margin of elytra finely setose; sutural margin slightly explanate in scutellar area; brace forming distinct swelling at posterior humeral region; longitudinal carina present lateromedially, partly connected to brace; humeral and external brace-longitudinal carina region with patches of very short setae; dorsal black punctures indicated ventrally by minute denticles set in annulate depressions; posterolateral portion of epipleuron setose along internal margin.

Hind wing (Figs. 57–58) well developed; coloration varying across wing; radial cell small, irregularly triangular.

Legs slender, long, shiny, sparsely and finely setose except densely setose at tibial apex and ventral portion of tarsi; apex of mid- and hind femora fitting into epipleural concavities when at rest. Visible portion of procoxae and especially metacoxae transverse, mesocoxae less so, all laterally angulate. Trochanters triangular in ventral view, with posterior surface convexly rounded. Each femur 6 times as long as each trochanter, with external surface slightly curved. Each tibia long and slender, 5 times as long as each trochanter, broader distally, with apical third

densely setose and with dorsodistal surface broadly notched to receive tarsus. Tarsi 4-4-4; tarsomeres I, II, III, and IV (= tarsomere V of most Chrysomelidae) dorsally convex with sparse, long setae, with ventral surfaces densely setose; tarsomere I small, as long as broad; tarsomere II shallowly bilobed, base as long as tarsomere I, lobes as long as base, distal half finely setose; tarsomere III deeply bilobed, 3 times as long as tarsomere I; tarsomere IV 4 times as long as tarsomere I, distally setose and covering base of claws; claws evenly curved, tapered, with inner face smooth.

Abdomen completely covered by elytra, broadly rounded; ventrite I dark brown to black, shiny, with well sclerotized hind coxal process; ventrite II as long as I (except for hind coxal process length), longer than III, IV or V; ventrites I–IV with medial regions slightly convex, with oval depression laterally; ventrites II–V sparsely and finely setose laterally; posterior 1/3 of ventrite V sparsely punctate, with setae; spiracles on dorsolateral margins; spiracle openings oval, internal surface smooth; peritremes well sclerotized. Pygidium semicircular, densely punctate, densely and finely setose.

Male genitalia (Figs. 59–63): Testes located near each side of aedeagal base; vasa deferentia loosely coiled, confluent and connected to seminal vesicle; aedeagus long with apex acute, normally laying on side within abdomen, curved from left to right in dorsal view; spicules (Fig. 64) sclerotized, slightly broader distally, 0.5 times as long as basal part of aedeagus; ejaculatory duct long, loosely coiled, weakly sclerotized, connected to aedeagus internally, more sclerotized in opening of seminal vesicle.

Female genitalia (Figs. 62–67): Spermatheca well sclerotized, falcate, with two openings and muscles on inner margin; spermathecal duct sclerotized, coiled and entwined on common oviduct, connected to common oviduct; paired accessory glands laid side by side; accessory gland duct extended posteriad and connected to paired reservoir organs.

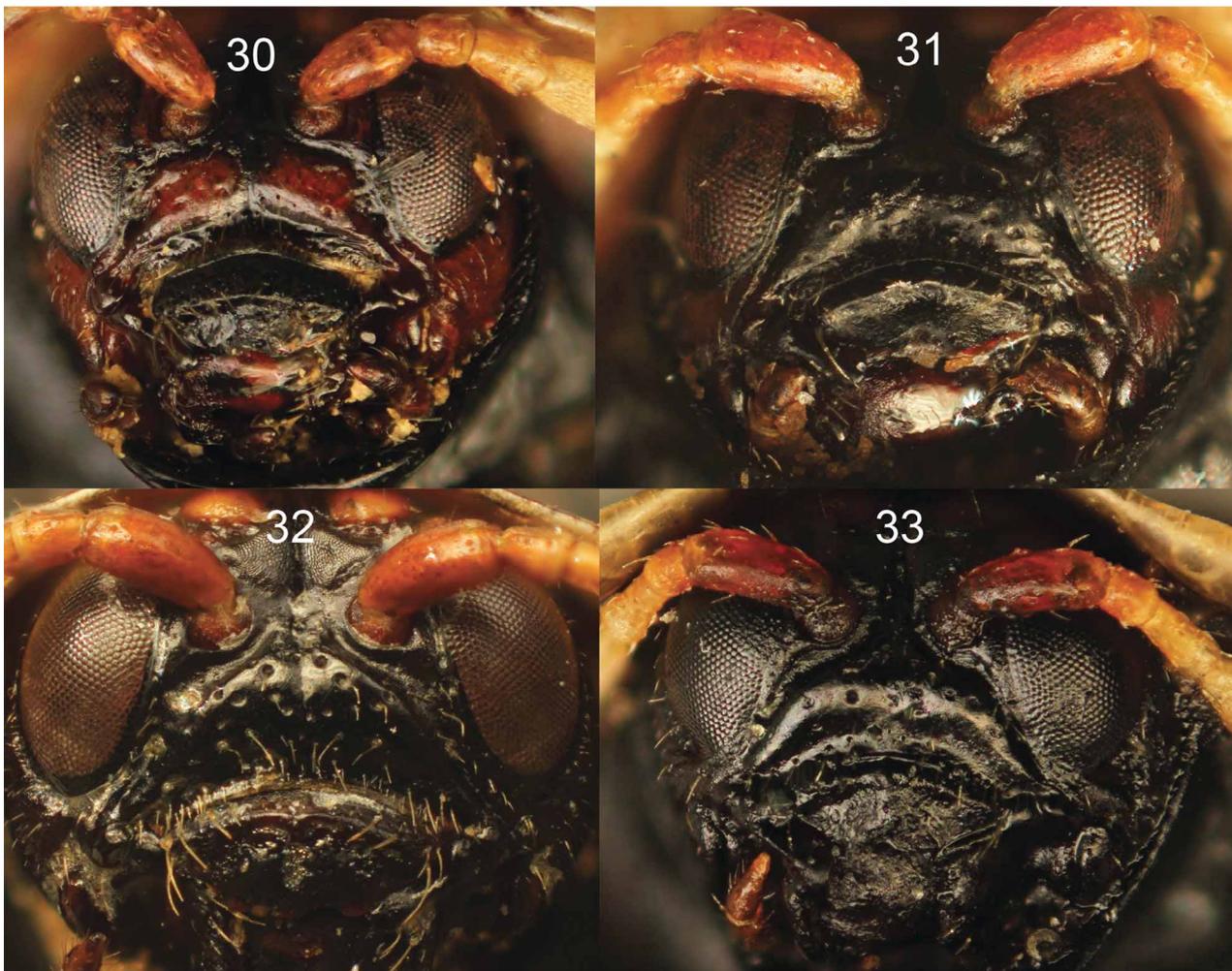
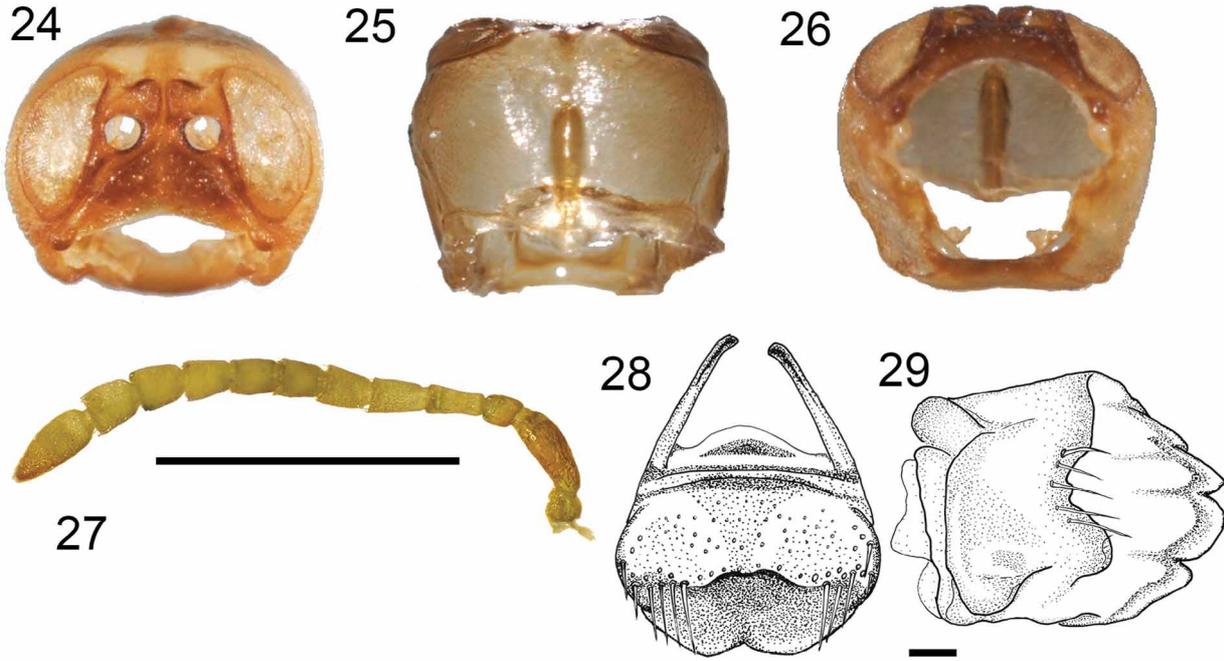
Sexual dimorphism. Male (Figs 4, 7, 10, 13) often smaller in overall size and slightly rounded relative to more oval shaped female (Figs. 5, 8, 11, 14). Often, male elytral explanate margin broader; elytral anterolateral region slightly more explanate and angled; profile continuous between pronotum and elytra at scutellum (Figs. 16, 18, 20, 22).

Remarks. The male genitalia are positioned on its side in the abdomen, such that the morphological dorsal and ventral surfaces are oriented laterally. Because of this positioning, the genitalia are rotated in a counterclockwise direction for copulation, which is described by the term deversement (Jeannel 1955; Verma 2009). The apical part of the aedeagus is surrounded by membrane and the pair of spicules are attached to the membrane.

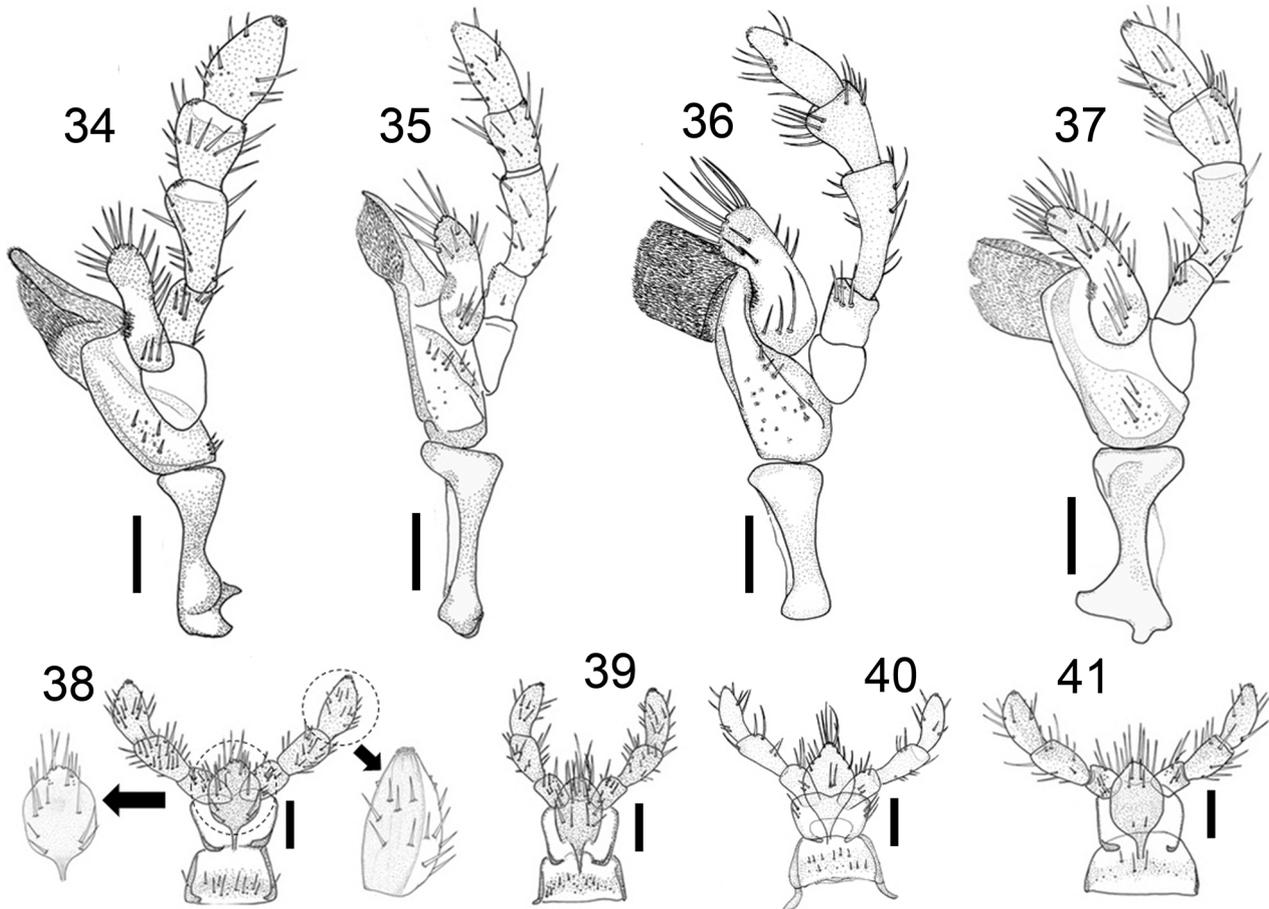
In some specimens, the thickening on the inner surface of the cervical cavity (anterior prothoracic cavity) is developed into an articulating ridge, which is probably the scraper with the stridulatory file as in *Physonota* species (CWS, personal observation).

Key to species

1. Pronotum moderately narrower than elytral base (Figs. 13, 14), in dorsal view not forming nearly regular oval together with elytra; elytral punctures more sparsely, irregularly arranged; discal pale markings of elytra in form of numerous, irregularly shaped blotches, in most specimens much larger than those of pronotal disc; each femur black, with apex pale (Fig. 15) *Asteriza darlingtoni* Blake
- Pronotum nearly as wide as elytral base (Figs. 4–12), in dorsal view forming nearly regular oval together with elytra; elytral punctures more closely and regularly arranged; elytral disc either pale with black speckles, or black with pale markings subequal in size to those of pronotal disc; femora variable in color. 2
2. Elytral explanate area (Figs. 7–8) broadly impunctate, translucent without black coloration; pronotal lateral edges reddish, same coloration as on elytral lateral edge; femora unicolorous, reddish brown *Asteriza blakeae*, n. sp.
- Elytral explanate area (Figs. 4–5, 10–11) closely punctate, with black coloration; pronotal lateral edges pale; each femora black, with apex pale (Figs. 6, 12) 3
3. Elytra pale, with black speckles largely confined to punctures and immediately surrounding areas (Figs. 4–5); frontoclypeus (Fig. 30) brown, finely or shallowly punctuate, maxillary palpomeres III–IV (Fig. 34) and labial palpomere III (Figs. 38) swollen *Asteriza tainosa*, n. sp.
- Elytral disc black, with numerous small, irregularly shaped pale blotches (Figs. 10–11); frontoclypeus (Fig. 32) black, distinctly to moderately punctuate; maxillary palpomeres III–IV (Fig. 36) and labial palpomere III (Fig. 40) not swollen *Asteriza flavicornis* (Olivier)



FIGURES 24–26. *Asteriza tainosa*, new species, head: 24, anterior view; 25, dorsal view; 26, ventral view (mouth fossa), scale bars = 1.0 mm; 27, antenna, scale bars = 1.0 mm; 28, labrum; 29, mandible, scale bars = 0.1 mm. Figs 30–33. Head (anterior view): 30, *Asteriza tainosa*, new species; 31, *Asteriza blakeae*, new species; 32, *Asteriza flavicornis*; 33, *Asteriza darlingtoni*.



FIGURES 34–37. Maxillae: 34, *Asteriza tainosa*, new species; 35, *Asteriza blakeae*, new species; 36, *Asteriza flavicornis*; 37, *Asteriza darlingtoni*. Figs. 38–41. Labium. 38, *Asteriza tainosa*, new species, 39, *Asteriza blakeae*, new species, 40, *Asteriza flavicornis* 41, *Asteriza darlingtoni*. Scale bars = 0.1 mm.

Asteriza flavicornis (Olivier, 1790)

Cassida flavicornis Olivier 1790: 393 [original description], 1808: 957 [figure]; Staines & Whittington 2003: 3 [type catalog].
Asteriza flavicornis Chevrolat 1836: 372 [transfer]; Boheman 1854: 496 [description], 1856: 147 [checklist], 1862: 365 [description]; Gemminger & Harold 1876: 3660 [catalog]; Spaeth 1914: 122 [catalog]; Blackwelder 1946: 748 [checklist]; Wilcox 1975: 154 [catalog]; Borowiec 1996: 130 [checklist], 1999: 169 [catalog]; Chaboo 2000: 379 [outgroup in phylogenetic analysis]; Takizawa 2003: 97 [checklist]; Chaboo 2007: 23 [phylogeny]; Perez-Gelabert 2008: 125 [checklist]; Świętojańska & Windsor 2008: 655 [mature larvae, pupa, host plant]; Borowiec & Świętojańska 2011 [catalog].
Asteriza punctatissima Chevrolat 1836: 372 [checklist, cited with Klug as author]; Gemminger & Harold 1876: 3660 (*nomen nudum*).
Asteriza flavicornis var. *retigera* Chevrolat 1836: 372 [checklist; cited with Mannerheim as author]; Gemminger & Harold 1876: 3660 (*nomen nudum*).

Type. Lectotype (Fig. 1) and paralectotype (Fig. 2) in RSME, lacking locality information. Staines & Whittington (2003: 3) indicate the same information.

Diagnosis. *A. flavicornis* (Figs. 10–12) can be distinguished from *A. tainosa* **n. sp.** (Figs. 4–6) by the coloration of the pronotum and elytra that are less tan; from *A. blakeae* **n. sp.** (Figs. 7–8) by the elytral lateral margin that is less explanate, the pale pronotal lateral edges and bicolored femora; and from *A. darlingtoni* (Figs. 13–14) by the coloration and the shape between pronotal and elytral bases. The pronotum is nearly as wide as the elytral base, and together they form a nearly regular oval in dorsal view; the pronotal lateral margin is pale; the elytral punctures are more closely, regularly arranged; the dark markings on the elytra are interconnected, surrounding isolated pale blotches; the pale elytral markings are similar in size to those of the pronotal disc; each femur is black with the apical end reddish.

Redescription. *Adult:* Male (n=50) length 8.5–10.0 mm, width 7.2–8.0 mm; female (n=80) length 9.5–11.0 mm, width 8–10.0 mm. Body (Figs. 10–11) oval, slightly discontinuous between pronotal and elytral base in dorsal view; profile (Figs. 20–21) hemispherical with elytra slightly more extended than pronotum ventrad. Dorsal color mottled, black with irregular brown spots, shiny; pale color ranging from yellowish brown to reddish-brown (Figs. 10–11). Head entirely concealed in dorsal view, black; vertex with paired, tan, swollen regions. Frontoclypeus often divided by mesal sulcus or sulcus obliterated by punctures basally but apparent apically. Gena and subgena black or dark reddish-brown. Maxillary palpomeres III and IV (Fig. 36) occasionally with apical sensilla; III slightly curved, 2 times as long as II; IV 1.1 times longer than wide. Ligula (Fig. 40) apically rounded, coarsely setose; labial palpomere III 2.3 times as long as broad, with sensilla on apex, and with 2 individual sensilla subapically. Pronotum (Figs. 42–43) with anterior margin semicircular; posterolateral and posteromedial angles well developed; maximum width across posteromedial angles; dorsum smooth, without punctation or setation; anterior and lateral margins explanate; explanate portion slightly broader posteriad; anterior margin pale, translucent. Elytra (Figs. 51–52) moderately convex, with margins black with reddish brown edge, translucent in some specimens; explanate margin width less than one third elytron discal width.

Material examined. Lectotype, Dufrasne 1936–50, 236; no data (RSME: male); paralectotype, Dufrasne 1936–50, 235; no data (RSME: female); **Dominican Republic: Prov. Azua:** 8km N.E., Padre Las Casas, Rio Las Cuevas, 18° 46' N., 70° 53' W., Alt. 580 m, Oct 3–4 1991, C. Young, R. Davidson, J. Rawlins, Riparian growth in arid thorn scrub, hand collecting (CMNH: 10 males, 15 females; BYU: 2 females); **Prov. Independencia:** Rd. 47, between Los Pinos & Angel Felix, 760 m, 18° 36' 98.6 N., 71° 45' 55.6 W, 20 VI 2005 (CCC: 4 females); ESE Jiman, La Florida, 18° 14' N., 71° 44' W., 20m, moist site, 13 APR 1993, M. A. Ivie, D. Sikes, W. Lanier (WIBF: 4 males, 4 females); **Prov. Monte Cristi:** 5–9 km. N. Villa Elisa, 26 V 1992, col. M.C. Thomas (FSCA: 1 male, 1 female); 8 km. N. Villa Elisa, 31 V 1994, col. M.C. Thomas (FSCA: 2 males, 2 females); no data (ZMHB: 1 male, 1 female); **Prov. San Juan:** 28 km. S.E., San Juan, August 6, 1979, G. B. Marshall (WIBF: 1 female); St. Domingo, 2446, Gorham col. (USNM: 2 females); **Haiti: Prov. Ouquest:** Diquini, W.M. Mann, F. Monros col. 1959 (USNM: 1 female); Port au Prince, R.J. Crew, Wickman col. 1939 (USNM: 10 males, 15 females); Port au Prince, 2° 27' 98 [no direction is provided on label], E.A. Klages, F. Monros col. 1959 (USNM: 3 males, 11 females; CUIC: 3 males, 2 females); Port au Prince [no direction is provided on label] (ZMHB: 1 male, 6 females); W.A. Hoffmann, Apr 16 1925, ex *Cordia mariani* (USNM: 4 males, 2 females); Coll. E. Friv. (HNHM: 1 female); no data (ZMHB: 9 males, 10 females).

Distribution. **Dominican Republic:** St. Domingo (Gemminger & Harold 1876), Azua (**range extension**), Independencia (**range extension**); **Haiti:** Port au Prince (Borowiec & Świętojańska 2011). Boheman (1854) indicated the locality Guyana, which Blake (1939) cited as the country of Guiana; Chaboo (2007: 234) also listed Guyana. Olivier (1790: 393) indicated the locality as “l'Amérique méridionale [South America], which referred to all of South America in the past. Based on the specimens we examined, *Asteriza* appears to be confined to Hispaniola. Olivier's two type specimens (Figs. 1–2; RSME) lack locality labels (Olivier 1790).

Host plant. Boraginaceae: *Cordia* species (Świętojańska & Windsor 2008). One USNM specimen has a label with the host plant, *Cordia mariani*, but this is not an accepted name for any *Cordia* species.

Remarks. We hereby designate the male specimen as the lectotype (Fig. 1) from the two syntypes (RSME) because it is intact. The other syntype becomes the paralectotype; it is a female specimen (Fig. 2) lacking the abdomen.

Asteriza darlingtoni Blake, 1939

Asteriza darlingtoni Blake 1939: 238 [original description with figure]; Blackwelder 1946: 748 [checklist]; Wilcox 1975: 154 [catalog]; Borowiec 1996: 129 [checklist], 1999: 169 [catalog]; Takizawa 2003: 97 [checklist]; Perez-Gelabert 2008: 125 [checklist]; Borowiec & Świętojańska 2011 [catalog].

Type. Holotype (male, type number: MCZT_23637) and 2 paratypes in MCZ, url: <http://insects.oeb.harvard.edu>; 2 paratypes in USNM.

Diagnosis. This species is distinguished from the other three *Asteriza* species by the coloration and by the shape of the pronotal and elytral bases. The pronotum in dorsal view is moderately narrower than the elytral base (Figs. 13–14), not forming a nearly regular oval together with the elytra. The elytral punctures (Figs. 53–54) are

more sparsely and irregularly arranged; the pale markings of the elytral disc form numerous, irregularly shaped blotches, which are much larger than those of the pronotal disc in most specimens. Each femur is black, with the apex pale, similar to *A. flavicornis*; *A. blakeae* has pale reddish femora and (Fig. 15). The frontoclypeus (Fig. 33) is coarsely to moderately punctate and not divided by a mesal sulcus.

Redescription. *Adult:* Male (n=13) length 8.5–9.0 mm, width 7.5–8.0 mm; female (n=17) length 9.5–10.0 mm, width 8.0–8.5 mm. Body oval in dorsal view; pronotum and elytra slightly to moderately discontinuous, often more distinctly so in male (Figs. 13–14); profile hemispherical (Figs. 22–23), highest at middle of elytra. Head entirely concealed in dorsal view; gena and subgena black or dark reddish brown. Ligula with anterior margin slightly angled (Fig. 41). Pronotal disc slightly convex, black with brown blotches; anterior margin and edge slightly convex, translucent; lateral margin slightly depressed with edges curved upward, translucent and reddish. Elytra (Figs. 53–54) with brown spots larger and with punctures more sparse than in *A. flavicornis* (Figs. 51–52); brown spots often opalescent with small black spots; lateral reddish edge broader than in *A. tainosa*, **n. sp.** (Figs. 47–48) and *A. flavicornis* (Figs. 51–52) and narrower than in *A. blakeae*, **n. sp.** (Figs. 49–50). Legs shiny and reddish brown with coxae and proximal half of femora black. Spermatheca falcate, with inner margin slightly longer and broader than in other *Asteriza* species (Fig. 70).

Material examined. Dominican Republic: Prov. La Vega: Constanza, 3–4,000 ft. VIII. 1938, Darlington (MCZ: 1 male, holotype; USNM: 1 female, paratype); Constanza to Jarabacoa 2–4,000 ft. Darlington (USNM: 1 male); 10 km. N.E. Constanza, May 25, 1978 C.W. & L.B., O'Brien & Marshall (WIBF: 1 female); 18 km. S.E. Constanza, August 4, 1979, C. W. O'Brien (WIBF: 1 female); Jarabacoa PN Armando Bermudez Los Tablones N 19° 3' 308, W 70° 53' 49 W, 20 VII 2002, col. Sardis Medrano (MHND: 1 male); Constanza Pinar Parejo, Valle Nuevo 10–12 VII 1998, S. Navarro y D. Veloz (MHND: 1 male, 1 female); Cordillera Central 4.1 km, SW El Convento, 18° 50' 37 N, 70° 42' 48 W, Alt. 1730m, V 31 2003, J. Rawlins, R. Davidson, C. Young, C. Nunez, P. Acevedo, dense secondary evergreen forest with pine, hand collecting (CMNH: 5 males, 2 females; BYU: 1 male, 2 females); Vic. Salta de Aguas Blancas, 19 VII 1996, M.C. Thomas (FSCA: 2 females); **Prov. Pedernales:** N. of Pedernales, border rd, Rio Banana, S. of Arroyos, 18°09'291N, 71°45'540 W, 21 JUL 1999, Ivie & Guerrero (WIBF: 3 males, 6 females); **Prov. San Cristóbal:** El Convento, *Pinus* forest on steep slopes above El Convento village, 1,700–1730 m, N 18° 50' 574, W. 70° 42' 189", 20 XI 2003, leg. T. Szűts (HNHM: 1 female).

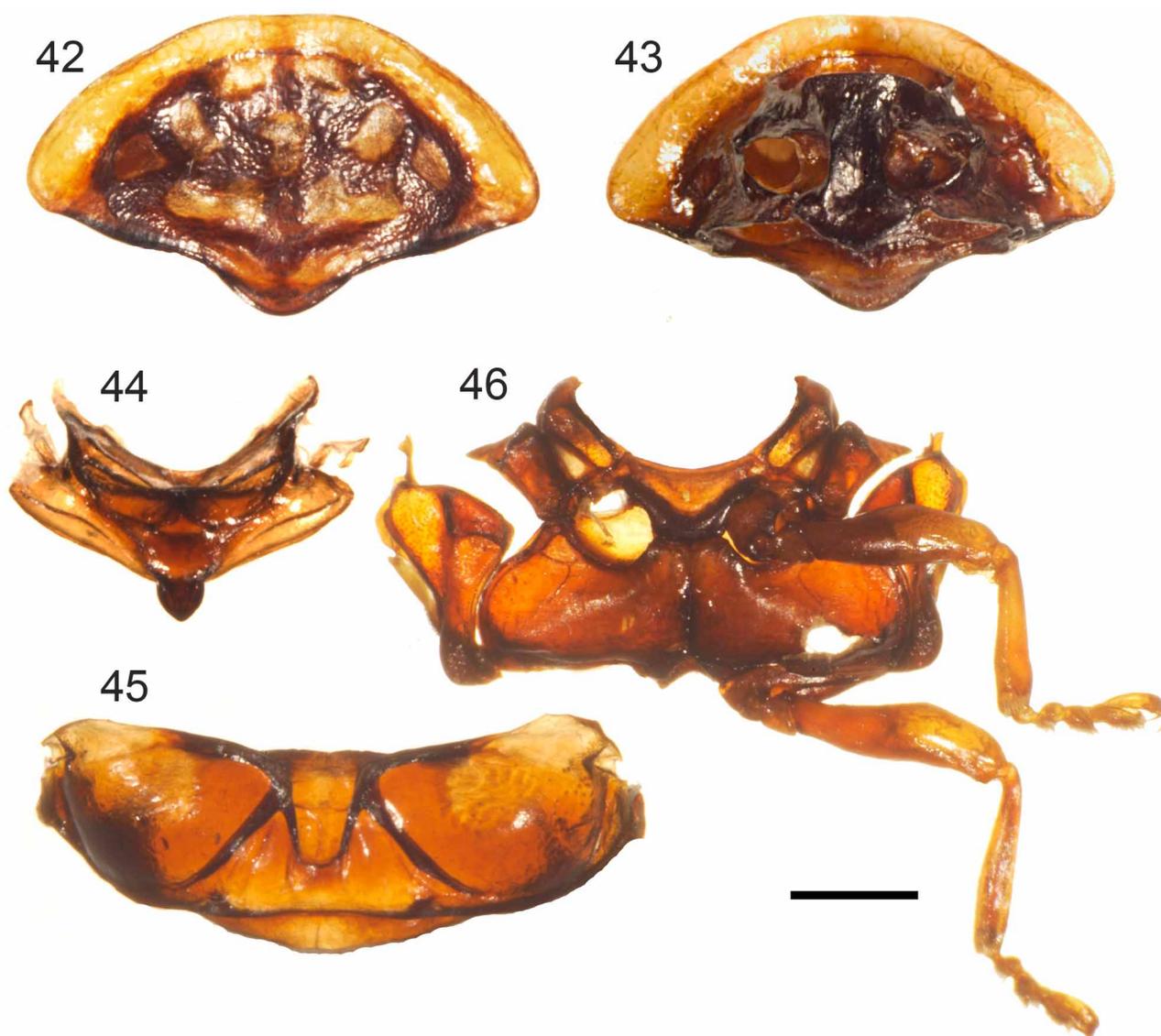
Distribution. Dominican Republic: Prov. Pedernales and Prov. La Vega. Blake (1939) indicated two localities in La Vega—Constanza to Jarabacoa and Constanza; Borowiec (1999) indicated La Vega.

Remark. In contrast to Blake (1939), we found no consistent pattern of elytral brown spots and no significant difference in the aedeagus from the other *Asteriza* species.

Asteriza tainosa Shin, Chaboo & Clark, new species

Diagnosis. This species is distinguished by the coloration and swollen maxillary and labial palpi. The elytra (Figs. 4–5, 47–48) are mainly tan with black punctures and the anterolateral angle of the male elytra is less acute than in other species. Maxillary palpomeres III–IV (Fig. 34) and labial palpomere III (Fig. 38) are more swollen than in other *Asteriza* species. The frontoclypeus (Fig. 30) is finely and shallowly punctate, brown, and usually divided by a mesal sulcus.

Description. *Adult:* Male (n=85) length 9.0–9.5 mm, width 7.0–8.0 mm; female (n=110) length 10.0–11.5 mm, width 8.0–9.0 mm. Body oval, slightly discontinuous between pronotum and elytra, broadest at middle bulging area of elytra; profile (Figs. 16–17) hemispherical, highest at middle of elytra. Head entirely concealed in dorsal view; gena and subgena (Fig. 30) pale brown to brown. Maxillary palpomere III as long as broad; palpomere IV swollen, 1.5 times broader than long (Fig. 34). Labial palpomere III 1.5 times as long as broad; ligula with apex slightly angled (Fig. 38). Frontoclypeus finely and shallowly punctate, brown, usually divided by mesal sulcus (Fig. 30). Pronotum (Figs. 42–43) hemispherical in dorsal view with postero-medial angle; dorsum smooth and shiny; anterior margin slightly convex, translucent; lateral margin broader posteriad, slightly depressed with edges curved upward; yellow blotch pattern of pronotum more extensive than in other species. Thoracic sternum (Figs. 43, 46) shiny, black, medially flattened. Elytra tan, with each puncture and closely surrounding area black (Figs. 47–48). Legs shiny, reddish brown, with trochanters and proximal half of femora black (Fig. 6). Spermatheca falcate with inner margin curved; part near opening more sclerotized than in other *Asteriza* species (Fig. 67).



FIGURES 42–46. *Asteriza tainosa*, new species, thorax. 42, pronotum, 43, prosternum, 44, mesonotum, 45, metanotum, 46, meso-metasternum. Scale bars = 1.0 mm.

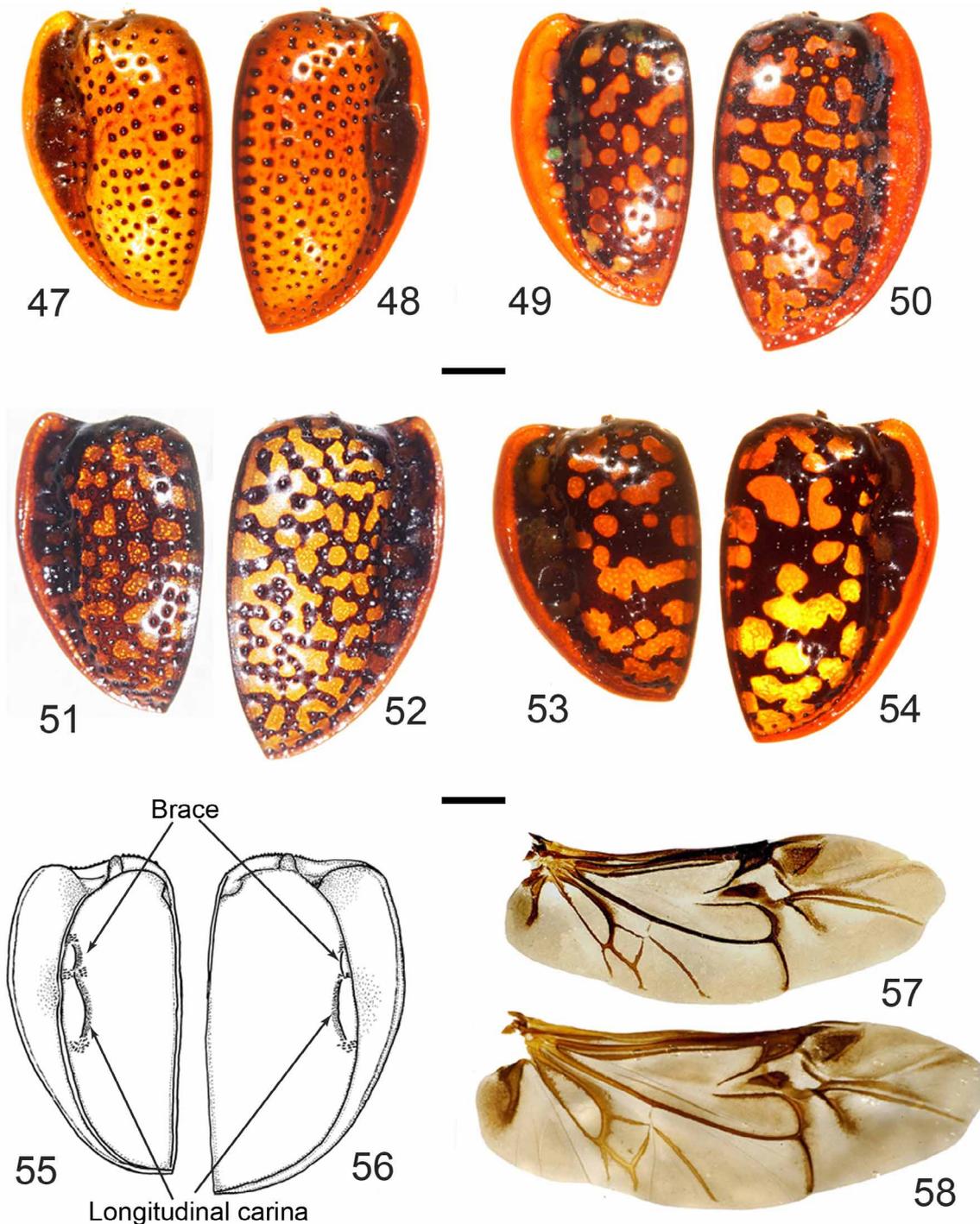
Type material. Holotype: Male. **Dominican Republic: Prov. Independencia:** Sierra de Bahoruco, North Slope, 13.5 km S.E. Puerto Escondido, N 18°12'18, W 71°31'08 W, Alt 1807 m, May 22–23 2004, C. Young, J. Fetzner, J. Rawlins, C. Nunez, Broadleaf *Pinus*, dense woodland, hand collecting (CMNH). Paratypes (192 specimens): **Dominican Republic: Prov. Independencia:** Rd191 Around Caseta No. 1, Parque Nacional Sierra de Bahoruco, 1,239 m, 18° 16' 038 N, 71° 32' 691 W. 11–12 XII 2003, D. Perez, R. Bastardo, B. Hierro (AMNH: 1 male, 2 females); Sierra de Bahoruco, North Slope, 13.5 km SE, Puerto Escondido, 18°12'18 N, 71°31'08 W, Alt 1807 m, May 22–23 2004, C. Young, J. Fetzner, J. Rawlins, C. Nunez, Broadleaf *Pinus*, dense woodland, hand collecting (CMNH: 11 males, 16 females); **Prov. Moncion Prov.:** Manoncito, Santiago Rodriguez, R.D. 25 V 1980 (MHND: 41 males, 49 females); **Prov. Monte Cristi:** 5–9 km N. Villa Elisa 26 V 1992, col. M.C. Thomas (MHND: 2 males; FSCA: 1 male, 2 females); 5 km N. Villa Elisa 3 VI 1994, col. M.C. Thomas, (FSCA: 1 male); **Prov. Puerto Plata:** La Ceiba, Luperon, Rd. 21 XI 1981, col. Marcano (MHND: 1 male); **Prov. Sabaneta:** Los Ingenitos, Santiago Rodriguez r. d. 6 VII 1980 (MHND: 5 males, 8 females); Rio Gurabo Stgo Rdguez R.D. 5 VII 1980, col. Marcano (MHND: 1 male); Gurabo, Santiago Rodriguez, R.D. 5 VII 1980, col. Mota-Aquino (MHND: 5 males, 8 females); Sabana Las Caobas, STGO, R. D. 25 V 1980, col. Marcano, Abud-Mota and Reaynoso-Aquino (MHND: 7 males, 10 females); Sabana Las Caobas, STGO, R. D. 6 VII 1980, col. Marcano, Abud-Mota and Reaynoso-Aquino (MHND: 2 female); **Prov. Santiago:**D: 1 male); Gurabo, Santiago Rodriguez, R.D. 5 VII 1980, col. Mota-Aquino (MHND: 5 males, 8 females); Sabana Las Caobas, STGO, R. D. 25 V 1980, col. Marcano, Abud-Mota and Reaynoso-Aquino (MHND: 7 males, 10 females); Sabana Las Caobas, STGO, R. D. 6 VII 1980,

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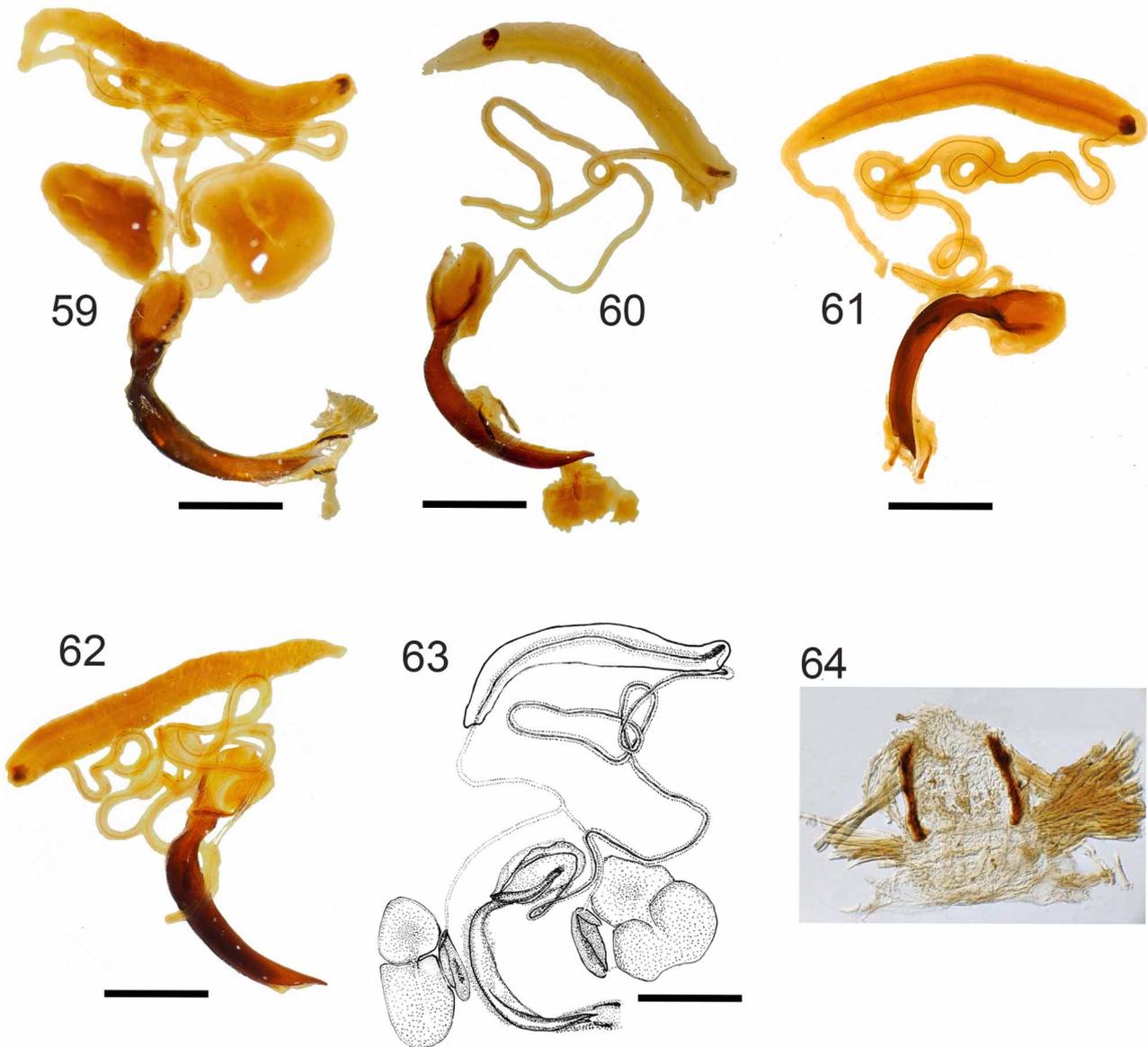
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col. Marcano, Abud-Mota and Reaynoso-Aquino (MHND: 2 female); **Prov. Santiago:** S.J. Matas, Canafistol, Rd 25 V 1980, col. Marcano (MHND: 1 male); La Celestina S.J. Matas, , Rd. 30 VIII 1980 col. Marcano (MHND: 1 female); **Prov. Valverde:** El Cereado, Valverde, R.D. 2 I 1982, col. Marcano (MHND: 2 males, 2 females); **Haiti:** Prov. Sud-Est Massif de La Selle Morne d'Enfer 1850 m, 15 V 1984, M.C. Thomas (FSCA; 1 male, 1 female); Parc National La Visite vicinity park headquarter, 1880 m, 23 V 1984, col. M.C. Thomas (FSCA: 3 males, 8 females); Parc National La Visite between Park headquarter & Morne d'Enfer, 14 V 1984, M.C. Thomas (FSCA: 1 female).

Etymology. The species epithet is derived from the name Taínos, the original tribal inhabitants of Hispaniola before the arrival of Christopher Columbus in the New World (Saunders 2005).



FIGURES 47–54. Elytra, dorsal view: *Asteriza tainosa*, new species, 47, male; 48, female; *Asteriza blakeae*, new species, 49, male; 50, female; *Asteriza flavicornis*, 51, male; 52, female; *Asteriza darlingtoni*, 53, male; 54, female. Figs. 55–56. Elytra, ventral view;: *Asteriza tainosa*, new species, 55, male; 56, female. Figs. 57–58. Hind-wings: *Asteriza tainosa*, new species, 57, male; 58, female. Scale bar = 1.0 mm.



FIGURES 59–63. Male genitalia: 59, *Asteriza tainosa*, new species; 60, *Asteriza blakeae*, new species; 61, *Asteriza flavicornis*; 62, *Asteriza darlingtoni*; 63, *Asteriza tainosa*, new species, scale bars = 0.1 mm. Fig. 64. Spicules: *Asteriza tainosa*, new species.

Asteriza blakeae Shin, Chaboo & Clark, new species

Diagnosis. This species differs from the other three species by its coloration of the pronotal lateral margin, the elytral lateral margin and the femora. The pronotum (Figs. 7–8) is nearly as wide as the elytral base; in dorsal view it forms a nearly regular oval together with the elytra. The pronotal lateral margin is reddish brown and translucent; the elytral margin (Figs. 49–50) is also reddish and translucent without black coloration. The femora (Fig. 9) are mostly or entirely reddish brown.

Description. *Adult:* Male (n=3) length 9.0–9.5 mm, width 7.0–8.0 mm; female (n=7) length 9.8–11.3 mm, width 8.2–9.0 mm. Body (Figs. 7–8), oval or slightly discontinuous between pronotum and elytra, broadest at middle in dorsal view; profile hemispherical, highest at middle (Figs. 18–19). Head entirely concealed in dorsal view; gena and subgena black or dark reddish-brown (Fig. 31). Pronotum (Figs. 7–8) hemispherical with posteromedial angle in dorsal view; blotch pattern same as in *A. flavicornis*; lateral edges reddish, often translucent. Thoracic sterna shiny, black, flattened medially. Elytra (Figs. 7–8, 49–50) color mottled, black with irregular brown spots, shiny, punctate, with distinct lateral bulging areas; pale color ranging from yellowish-brown to red-

dish-brown; lateral margin reddish and transparent without black coloration. Legs (Fig. 9) shiny, reddish with coxae black. Spermatheca (Fig. 68) with inner margin long and narrow.

Type material. Holotype: Male. **Dominican Republic: Prov. Barahona:** Eastern Sierra Bahoruco, Reserva Cachote 12.8 km NE, Paraiso, 18° 05' 54"N, 71° 11' 21' W, Alt. 1230m, 12 21 2004, C. Young, C. Nunez, J. Rawlins, J. Fetzner, Cloud forest with tree ferns, yellow pan trap (CMNH). Paratypes (7 specimens): **Dominican Republic: Prov. Barahona:** Eastern Sierra Bahoruco, Reserva Cachote 12.8 km NE, Paraiso, 18° 05' 54"N, 71° 11' 21' W, Alt. 1230m, 12 21 2004, C. Young, C. Nunez, J. Rawlins, J. Fetzner, Cloud forest with tree ferns, yellow pan trap (CMNH: male, 3 females; BYU: 1 female); Eastern Sierra Bahoruco, Reserva Cachote 12.8 km NE, Paraiso, 18° 05' 52' N, 71° 11' 19' W, 1198 m, 19–21 V 2004, C. Young, C. Nunez, J. Rawlins, J. Fetzner, semi-disturbed wet broadleaf, UV light (CMNH: 3 females); ca. 35 km N. Cabo Rojo, Las Abejas, 1250 m, 09 Sep 1988, M. Ivie, Philips & Johnson (WIBF: 1 male).

Etymology. The species epithet honors Doris H. Blake (1892–1978) for her valuable contributions on Caribbean Chrysomelidae (Froeschner *et al.* 1981; Bevelheimer 2007).

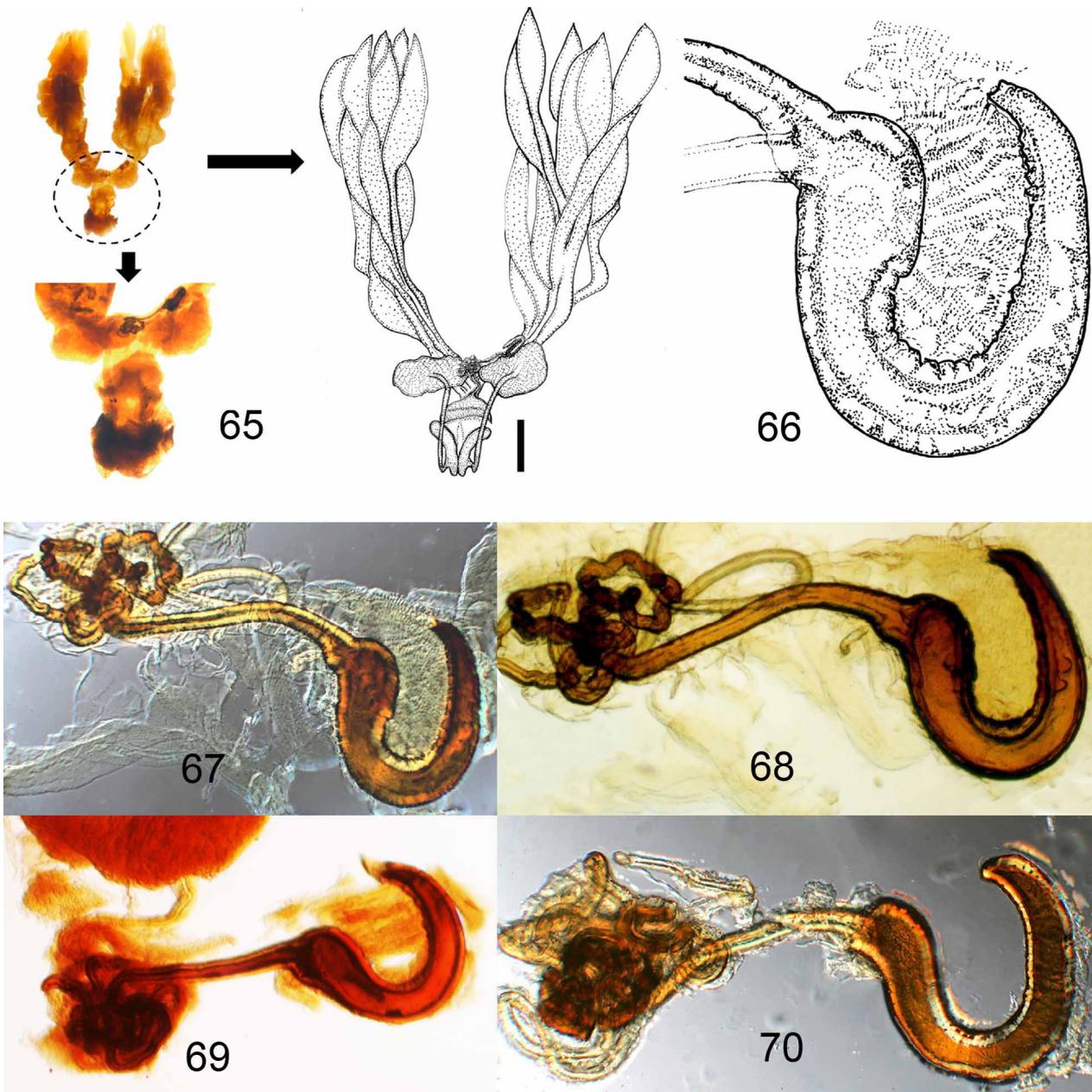


FIGURE 65. Female genitalia, *Asteriza blakeae*, new species, scale bar = 1.0 mm; Figs. 66–70, spermathecae: 66, *Asteriza blakeae*, new species; 67, *Asteriza tainosa*, new species; 68, *Asteriza blakeae*, new species; 69, *Asteriza flavicornis*; 70, *Asteriza darlingtoni*.

elytra basal margin, irregular elytral punctation (absence of regular striae and intervals), and long tarsomere IV, show that *Asteriza* is a derived cassidine.

The internal relationship among the four *Asteriza* species is weakly defined by the frontoclypeal and spermathecal characters. We identified absent and present as two states for the character of frontoclypeal mesal sulcus, and scored the state as present in *A. flavicornis* and *A. tainosa* **n. sp.** The sulcus is complete in *A. tainosa* **n. sp.** but in *A. flavicornis* the apical part is well defined and the basal part is sometimes disturbed basally by the punctation. The other characters for the species identification are mostly autapomorphies and do not resolve phylogenetic relationships. In contrast to the female genitalia, we found that the male genitalia in *Asteriza* do not offer any significant features for identification and the phylogenetic analysis.

TABLE 2. Characters used in the phylogenetic analysis of *Asteriza*.

Vertex, stridulatory file: 0, absent (Fig. 72); 1, present (Figs. 24–26).
 Vertex, pair of bulging areas: 0, absent (Fig. 72); 1, present (Figs. 24, 30–33).
 Frons: 0, depressed (Fig. 72); 1, not depressed (Figs. 24, 30–33).
 Frontoclypeus, mesal sulcus: 0, absent (Fig. 72); 1, present (Figs. 30–33).
 Antennomere I (scape): 0, rounded (Fig. 73); 1, elongate (Fig. 27).
 Mouth fossa: 0, irregularly triangular (Fig. 73); 1, irregularly pentagonal (Fig. 26).
 Mandible, number of teeth: 0, one (Fig. 74); 1, five (Fig. 29).
 Lacinia shape: 0, oval (Fig. 75); 1, thin and extended (Figs. 34–37).
 Ligula shape: 0, broad (Fig. 76); 1, oval (Figs. 38–41).
 Ligula apical margin, sensilla: 0, absent (Fig. 76); 1, present (Figs. 38–41).
 Pronotum, anterior margin: 0, discontinuous (Fig. 77); 1, continuous (Figs. 42, 79).
 Pronotal and elytral base: 0, continuous (Figs. 4–5, 7–8, 10–11, 71, 79); 1, discontinuous (Figs. 13–14).
 Elytra, punctures: 0, striate (Fig. 71); 1, irregular (Figs. 47–54, 79).
 Elytra, margin: 0, thin (Figs. 71, 79); 1, thickened (Figs. 47–54).
 Elytra, ratio (of lateral margin/disc) at between lateral bulging areas: 0, broad (over 0.5) (Figs. 78, 80); 1, narrow (less than 0.33) (Figs. 6, 12); 2, slightly explanate (between 0.5 and 0.33) (Figs. 9, 15).
 Elytra, brace: 0, present (Figs. 55–56, 78); 1, absent (Fig. 80).
 Spermatheca, inner surface curve: 0, short and round; 1, long and round (Figs. 67, 69); 2, elongate (Figs. 68, 70).

TABLE 3. Character matrix of 17 morphological characters for four ingroup and two outgroup taxa. Character numbers correspond to characters discussed in Table 2.

Taxa	Characters																
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Spaethiella</i> sp.	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Physonota attenuata</i>	1	1	0	0	1	1	1	1	1	1	1	0	1	0	0	1	0
<i>Asteriza flavicornis</i>	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	0	1
<i>Asteriza darlingtoni</i>	1	1	0	0	1	1	1	1	1	1	1	1	1	1	2	0	2
<i>Asteriza tainosa</i>	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	0	1
<i>Asteriza blakeae</i>	1	1	0	0	1	1	1	1	1	1	1	0	1	1	2	0	2

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