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Lanyualtica hsui Lee and Konstantinov, a New Genus and Species of Flea Beetles (Coleoptera: Chrysomelidae: Galerucinae: Alticini) from Lanyu Island, Taiwan

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Abstract

Lanyualtica hsui Lee and Konstantinov, **new genus and species**, is described from Lanyu Island, Taiwan. It belongs to the *Tegyrius* genus group and is most similar to *Parategyrius* Kimoto and Gressitt.

Keywords: flea beetles, *Tegyrius*, *Chionanthus ramiflorus*, Oleaceae

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Introduction

Lanyu Island, a small, volcanic island off the southeastern coast of Taiwan, is home to a number of endemic plants and animals, including leaf beetles. Among Chrysomelidae, three galerucines, *Aulacophora kotoensis* Chûjô, 1962 (Lee and Beenen 2015; Reid *et al*. 2021), *Lanolepta fulva* Kimoto, 1991, and *Monolepta ongi* Lee and Staines, 2010; two eumolpines, *Rhyparida formosana* Aslam, 1968 (a replacement name for *Rhyparida basileptoides* Chûjô, 1956) and *Rhyparida kotoensis* Chûjô, 1956; and one cryptocephaline, *Coenobius yosionis* Chûjô, 1954, are endemic to Lanyu Island.

The *Tegyrius* genus group was defined by Prathapan and Konstantinov (2001) and is composed of the following genera: *Bikasha* Maulik, *Dentilabra* Medvedev, *Lanka* Maulik, *Neorthana* Medvedev, *Parategyrius* Kimoto and Gressitt, *Philogeus* Jacoby, *Sahyadrialtica* Prathapan and Konstantinov, *Sphaeraltica* Ohno, *Tegyrius* Jacoby, and *Tribolia* Chen. Six members of this genus group occur in Taiwan: *Bikasha collaris* (Baly), *Lanka bicolor* (Chûjô), *Lanka fulva* (Chûjô), *Lanka minor* (Chûjô), *Lanka nigra* (Chûjô), and *Sphaeraltica flavicornis* (Baly). One previously unknown species belonging to this genus group was collected on Lanyu Island and is described herein as a new genus and new species.

Material and Methods

Terminology for morphological structures follows Duckett and Daza (2004). To prepare drawings of the genitalia, the abdomens of adults were separated and boiled in a 10% KOH solution, cleared in distilled water, then mounted on microscope slides in glycerin for observation. Drawings were made using a Leica M165 stereomicroscope. Microscope slides were illustrated using a Nikon ECLIPSE 50i microscope. Digital images for Figs. 1G and 2 were taken with Macropod Pro photomacrography system (Macroscopic Solutions, LLC, Tolland, CT, USA), processed with Zerene Stacker, version 1.04, and edited with Adobe Photoshop Elements 2020.

Specimens were examined from the following collections: Natural History Museum, London, UK (BMNH), Taiwan Agricultural Research Institute,

Taichung, Taiwan (TARI), and National Museum of Natural History, Smithsonian Institution, Washington, DC, USA (USNM).

Results

Tegyrius Genus Group (*sensu* Prathapan and Konstantinov 2021)

Remarks. Members of this genus group possess the following characters: a pair of subparallel ridges present on the intercoxal part of the first abdominal ventrite (Fig. 1G), ridges fused anteriorly and open towards the posterior, presenting the appearance of an upturned "U"; the metatibia characteristically curved in dorsal view, with its distal region curving away from the long axis of the body, its dorsal surface rather flat, with lateral and mesal margins armed with bristles towards the apex; general habitus oblong in dorsal view and convex in lateral view, resembling that of *Longitarsus* Latreille, *Psylliodes* Latreille, or *Aphthona* Chevrolat; length ranging from 1.5–3.5 mm; procoxal cavities open behind; penultimate maxillary palpomere thicker than preceding or apical palpomere; posterior margin of metaventrite bisinuate, raised on either side of middle forming a pair of protuberances distally; metatarsomere I articulated on a callosity, visible in lateral view, on apex of metatibia, as in *Longitarsus*; metatarsomere I forming an inverted L-shape in relation to remaining tarsomeres in dry specimens; vaginal palpi elongate, joined mesally in proximal half, with elongate sclerotizations anteriorly and posteriorly and with long apical setae, generally resembling those of *Longitarsus* or *Aphthona*; spermatheca with a distinct receptacle, pump, and gland duct.

These characters undoubtedly place the beetles in question into the *Tegyrius* genus group. However, they do not fit within any of the known generic concepts and are described herein as a new genus and new species.

Lanyualtica Lee and Konstantinov, new genus

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(Figs. 1–3)

Description. Small, elongate-ovate, convex in lateral view, length 2.73–3.27 mm, width 1.39–1.64 mm. Color black, non-metallic, appendages brown (Figs. 1A–F).

Head hypognathous. Vertex and frons together in lateral view forming a convex line, slightly arched between eyes and antennal sockets. In frontal view (Fig. 2A), vertex convex with scarce fine punctures and weak transverse wrinkles. Supraorbital pore situated dorsad of orbital sulcus, with a long seta. Antennal calli poorly developed, supracallinal sulci absent, without midfrontal sulcus, transverse-oblique, wider than long, spindle-shaped; at a lower level than vertex and not entering interantennal space. Antennal calli and frontal ridge meeting at a single point, forming a pit. Orbit narrow, supraorbital sulcus narrow and deep, continuing anteriad as a broad, deep orbital sulcus. Subgenal suture well developed along base of mandible. Eyes diverging slightly basally, not emarginate near antennal socket, vertical diameter 1.3–1.4 times transverse diameter. Distance between eyes 3.2–3.4 times diameter of a socket, 1.0–1.1 times transverse diameter of one eye. Diameter of antennal socket 2.0 times distance between eye and adjacent socket. Distance between antennal sockets 1.2–1.5 times diameter of a socket. Frontal ridge narrow, its base triangular, well-defined with raised lateral margin, forming a shallow groove between eye and frontal triangle. Frontal ridge surface rugose. Frontoclypeal suture with three pairs of long setae. Antenna filiform, reaching middle of elytron when laid over pronotum. Labrum broader than long, with three pair of setiferous pores arranged in a transverse row. Maxilla with apical palpomere acute, longer and narrower than penultimate palpomere. Labial palpus with three palpomeres, I shortest, II and III equal in length.

Pronotum convex, 1.4–1.5 times wider than long; lacking obvious antebasal impression, but slightly flattened basally; parallel-sided; anterolateral callosity slender, more than 4.0 times longer than wide, oblique in dorsal view, pore situated posterior and dorsal face of callosity and associated with an obtuse denticle; posterolateral callosity slightly protruding laterally, with laterally situated pore; posterior margin bisinuate, forming an indistinct median lobe; pronotal punctures coarse, more distinct than those on vertex; disc with reticulate microsculpture. Procoxal cavities open behind. Prosternal intercoxal process reaching same level as procoxae, widening, apical margin convex and covered with long setae, disc with dense and coarse punctures, each bearing one long seta; narrowest width of prosternal intercoxal process 2.8 times smaller than distance between anterior margin and coxal cavity; 0.5 times length of prosternum. Mesosternal intercoxal process parallel-sided, with concave posterior margin, disc with extremely coarse punctures in one transverse row along posterior margin; distance from anterior margin of mesoventrite to end of mesoventral intercoxal process 1.5 times width of mesoventral intercoxal process; width of mesoventral intercoxal process 1.7–1.8 times minimum distance from anterior margin of mesoventrite to coxal cavity.

Elytra as broad as pronotum basally, broadening at basal one-third, without basal callus but with depression at apical one-third, humeral callus well

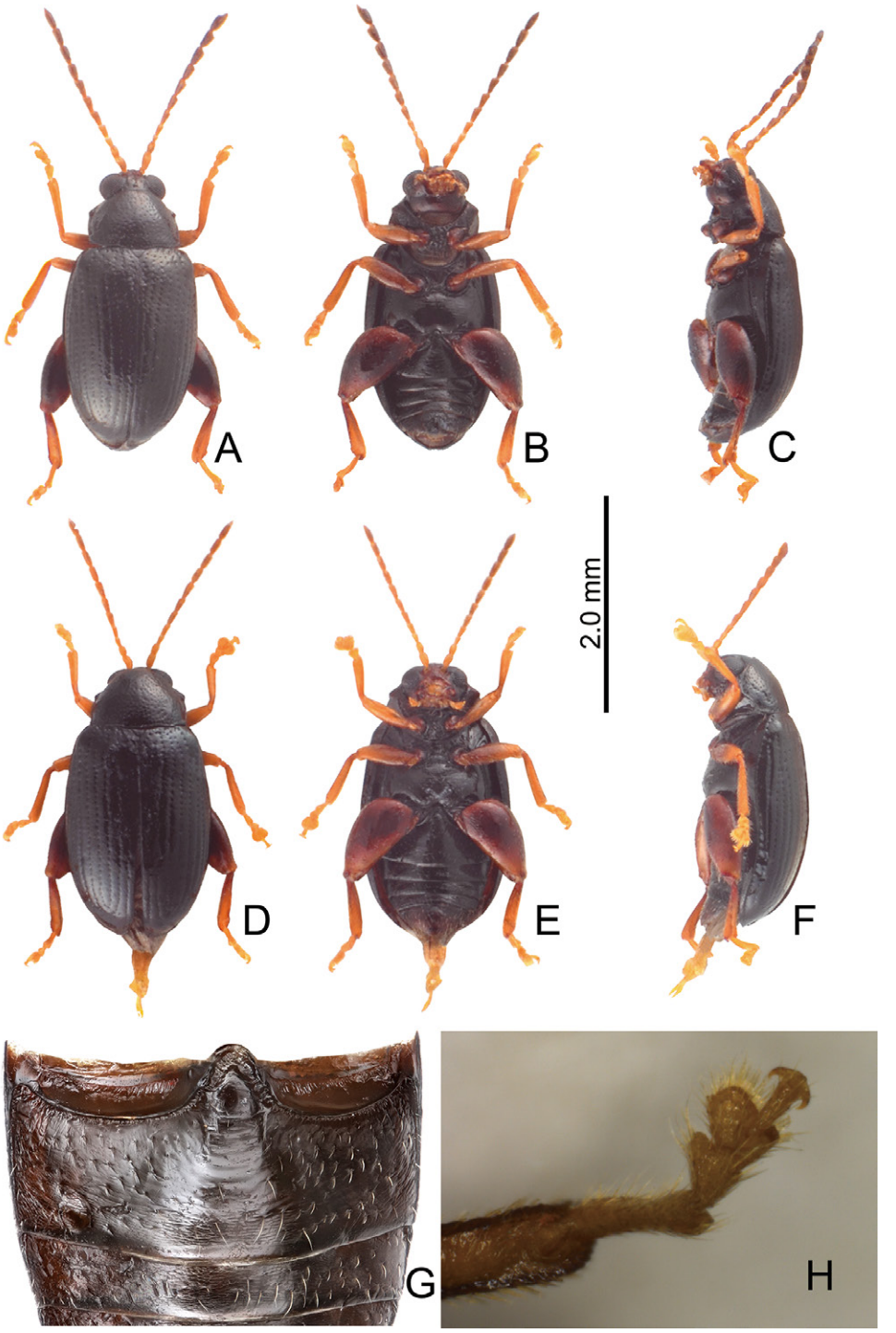

Fig. 1. *Lanyualtica hsui*, **new genus and species**. A) Male, dorsal view, B) Ditto, ventral view, C) Ditto, lateral view, D) Female, dorsal view, E) Ditto, ventral view, F) Ditto, lateral view, G) Abdominal ventrites 1 and 2, H) Metatarsi, dorsal view.

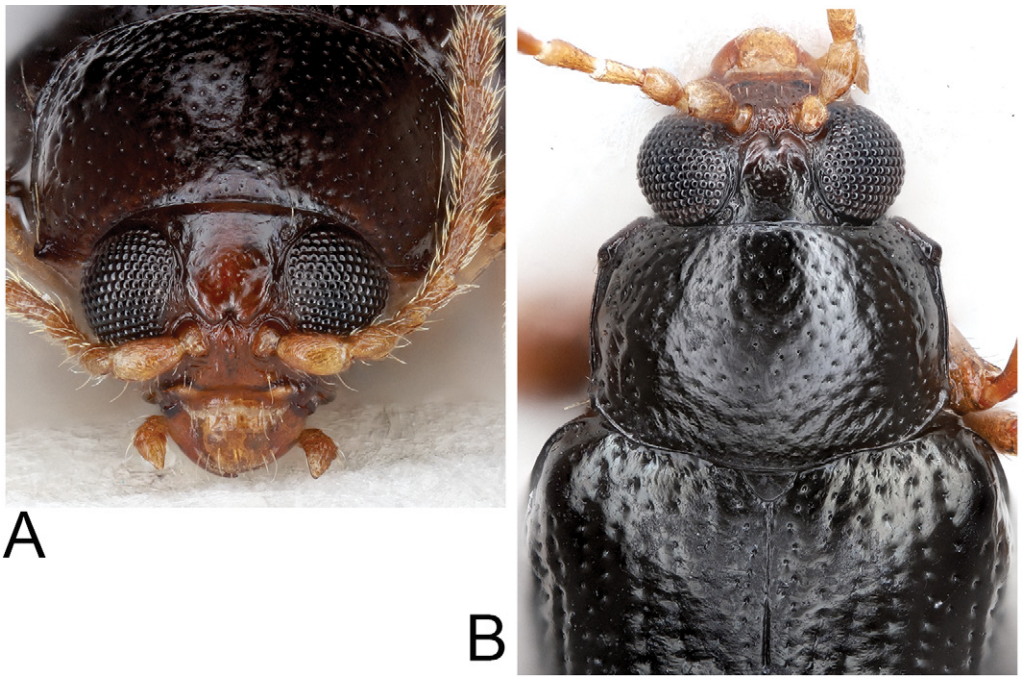

Fig. 2. *Lanyualtica hsui*, **new genus and species**. A) Head, frontal view, B) Pronotum, dorsal view.

developed; disc with coarse punctures, slightly smaller than those on pronotum (Fig. 2B), arranged into 11 longitudinal rows; with much smaller punctures in between. Elytral epipleuron extending nine-tenths of elytron, almost reaching apex, outwardly oblique with maximum width less than that of mesofemur. Hind wings fully developed. Metaventrite with anterior margin raised, convex towards posterior, forming paired tubercles distinctly raised above level of metacoxa.

Pro- and mesotibiae convex dorsally, with no apical spine. Metafemur robust with anterior margin distinctly more convex than posterior margin. Metatibia characteristically curved in dorsal view, distal region curving away from the long axis of the body, widening gradually towards distal end, preapically narrowing; convex dorsally in proximal one-third, flat medially and distally; distinctly margined laterally with row of bristles in distal one-fourth; gradually broadening apically in lateral view; mesal margin indistinct in proximal one-fourth, appearing distally with row of acute bristles at distal one-fourth, these bristles similar to those on lateral margin. Metatibial spur articulated in middle of tibial apex, acute. Metatarsomere I longer than half length of metatibia, longer than length of metatarsomeres II to IV combined; densely covered with long setae ventrally. Metatarsomeres II and III subequal in length, asymmetrical, apex extending laterally. Metatarsomere III bilobed, asymmetrical (Fig. 1H), mesal lobe smaller than lateral lobe.

Intercoxal part of abdominal ventrite 1 raised, with well-developed subparallel ridges (Fig. 1G). Aedeagus (Figs. 3C, D) elongate; rectum membranous; endophallus with apical sclerite slender, recurved inwards, followed by a pair of longitudinal rows of short setae, then a pair of longitudinal rows of short teeth, and with one elongate and laterally flattened basal sclerite. Spermatheca (Fig. 3G) with distinct pump, receptacle, and duct. Duct not coiled. Vaginal palpi (Fig. 3E) elongate, slightly fused medially, with a few long apical setae. Abdominal sternite VIII (Fig. 3F) in females weakly sclerotized but with well-sclerotized spiculum.

Sexual Dimorphism. Posterior margin of last abdominal ventrite in males bisinuate, with a median lobe. In females, posterior margin of last abdominal ventrite widely rounded, with a shallow incision at middle.

Type Species. *Lanyualtica hsui* Lee and Konstantinov, **new species**.

Etymology. *Lanyualtica* is derived from two words, namely Lanyu, referring to Lanyu Island, the type locality of the type species, and *Altica* Geoffroy, the type genus for the tribe. The gender is feminine.

Diagnosis. Among genera in the *Tegyrius* group, *Lanyualtica* is closest to *Parategyrius* by possessing the following characters: metatibial spine acute;

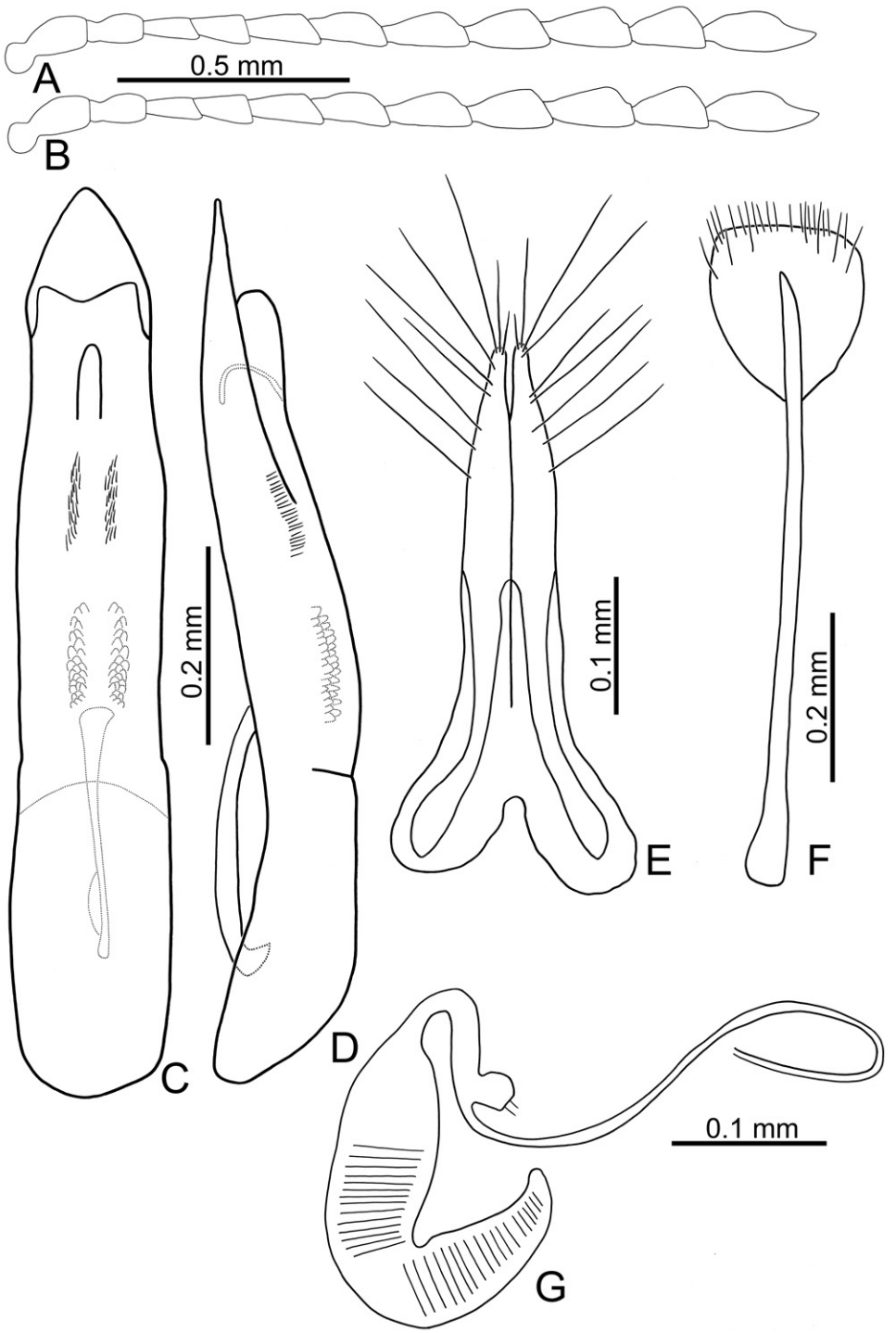

Fig. 3. *Lanyualtica hsui*, **new genus and species**. A) Antenna, male, B) Antenna, female, C) Aedeagus, dorsal view, D) Ditto, lateral view, E) Vaginal palpi, F) Abdominal sternite VIII, female, G) Spermatheca.

anterofrontal ridge not abruptly raised above clypeus, not forming right angle in lateral view; antennal calli not depressed, at same level as adjoining area of vertex; frontal ridge more-or-less separated from vertex by antennal calli; metatarsomere I half the length of the metatibia; and antennal calli reaching but not entering deeply into the interantennal space. *Lanyualtica* can be differentiated from *Parategyrius* by the head lacking supracallinal sulci, pronotum without transverse antebasal impression and with coarser punctures, and elytral punctures arranged in regular rows, some of which are strongly depressed. This last character together with asymmetrical metatarsomeres II and III separate *Lanyualtica* from all other genera in the *Tegyrius* group.

This genus also resembles *Psylliodes* by the similar body color, similar shape of the body and pronotum, and lacking supraantennal calli but is easily distinguished by its antenna with 10 antennomeres.

Distribution. One species (described herein) known from Taiwan (Lanyu Island).

Lanyualtica hsui Lee and Konstantinov, new species

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(Figs. 1–3)

Types. Holotype ♂ (TARI): TAIWAN. Taitung County: Lanyu Island (蘭嶼), Weather Station (氣象站), 20.III.2023, leg. Y.-F. Hsu. Paratypes: 2♂, 7♀ (1♂, 7♀: TARI; 1♂, 2♀: USNM), same data as holotype; 3♀ (TARI), same but with "17.VI.2023"; 1♂, 5♀ (BMNH), same locality, 327 m, N 22º02.238 E 121º33.487, 26.VII.2008, hand collecting, leg. M. V. L. Barclay and H. Mendel; 1♂ (USNM), 1♀ (TARI), same island, East 81 Road, 14.III.2023, leg. Y.-Y. Lu and Y.-F. Hsu.

Description. Color black (Figs. 1A–F), mouthparts and prothoracic venter dark brown, meso- and metathoracic venter and abdominal ventrites blackish brown; antennae and legs brown with darker metafemur. Pronotum convex, with coarse, well-defined punctures; disc with reticulate microsculpture. Elytra 1.5 times longer than wide, disc with punctures larger, but less defined than those on pronotum, arranged into 11 longitudinal rows; with fine punctures in between. Proportionate lengths of metafemur, metatibia, metatarsomere I, metatarsomere II, metatarsomere III, and metatarsomere IV equal to 1:0.63–0.74:0.39–0.42:0.11–0.14:1.10–0.11:0.14–0.25.

Male. Length 2.73–2.83 mm, width 1.39–1.41 mm. Antenna filiform (Fig. 1A), reaching middle of elytron when laid over pronotum; antennomeres I and II broad, III narrowest, III to VIII gradually becoming broader, VIII to XI with same width; antennomere III shortest, III to VII each slightly longer than preceding antennomere, VII to X with same length, XI longest, ratio of length of antennomeres I to XI 1.0:0.6:0.6:0.6:0.8:0.9:0.9:0.9:1.0:0.9:1.3; ratio of length to width of antennomeres I to XI 2.5:1.9:2.5:1.8:2.3:2.4:2.5:2.0:2.2:1.8:2.8. Aedeagus (Figs. 3C, D) elongate, 6.0 times longer than wide, apically narrowed from apical one-ninth, apex narrowly rounded, slightly narrowed at apical one-fourth, parallel sided from apical one-third to base, strongly narrowed at basal one-third, slightly curved in lateral view; rectum membranous; endophallus with an apical sclerite slender, recurved inwards, followed by a pair of longitudinal rows of short setae, then a pair of longitudinal rows of short teeth, and with one elongate and laterally flattened basal sclerite.

Female. Length 2.88–3.27 mm, width 1.48–1.64 mm. Antenna (Fig. 1B) similar to males, ratio of length of antennomeres I to XI 1.0:0.6:0.5:0.6:0.8:0.7:0.8:0.8:0.8:0.7:1.1; ratio of length to width of antennomeres I to XI 2.4:1.9:2.1:2.1:2.8:2.1:2.4:2.3:2.3:1.9:2.3. Sternite VIII (Fig. 1F) weakly sclerotized, transparent, with dense, short setae along apical margin, several setae near apical margin, spiculum extremely long. Spermathecal receptacle (Fig. 3G) less swollen; pump long and strongly curved, apically narrowed and apex narrowly rounded; spermathecal duct with long basal part, ramus rounded, duct long. Vaginal palpi (Fig. 3H) slender and conjoined for short distance at base, each gonocoxa apically narrowed, apex narrowly rounded, with nine pairs of long setae along apex and lateral margin at apical one-fourth.

Etymology. The species is named after Dr. Yu-Feng Hsu (徐堉峰), a Taiwanese butterfly specialist who collected the type series of this species.

Host Plants. *Chionanthus ramiflorus* Roxb. (Oleaceae). Adults of this new species were collected together with another undescribed species of flea beetles (*Argopistes* Motschulsky sp.).

Distribution. Taiwan (Lanyu Island).

Discussion

In addition to the six endemic chrysomelid species listed in the Introduction, 13 additional species have been recorded on Lanyu Island. These include one chrysomeline: *Phola octodecimguttata* (Fabricius, 1775) (Chûjô 1958; Lee and Geiser 2023); three galerucines: *Aulacophora analis* (Weber, 1801), *Aulacophora indica* (Gmelin, 1790), and *Aulacophora lewisii* Baly, 1866 (Lee and Beenen 2015); three flea beetles: *Altica birmanensis* (Jacoby, 1896) (= *Haltica cyanea* Weber, 1801, recorded by Chûjô 1936; Suenaga and Lee 2023),

Nonarthra chengi Lee, 2014 (= *Nonarthra variabilis* Baly, 1862, recorded by Chûjô 1935a; Lee 2014), and *Sinocrepis obscurofasciata* (Jacoby, 1892) (= *Sinocrepis micans* Chen, 1933, recorded by Chûjô 1935b); three eumolpines: *Chrysopida murina* Baly, 1867 (Chûjô 1956), *Colasposoma viridicoeruleum* Motschulsky, 1860 (= *Colasposoma oberthueri* Jacoby, 1896, recorded by Chûjô 1956), and *Rhyparida sakisimensis* Yuasa, 1930 (Kimoto 1974); one criocerine: *Lema trivittata* Say, 1824 (Lee and Matsumura 2013); and two cassidines: *Aspidimorpha furcata* (Thunberg, 1789) and *Cassida circumdata* Herbst, 1790 [= *Metriona trivittata* (Fabricius, 1801)] (both species recorded by Chûjô 1934). In this study, two species, neither of which have been previously recorded from the island, were collected from a single plant species, *C. ramiflorus*. This suggests that the true species richness on Lanyu Island may be underestimated.

Acknowledgments

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