Two New Species of the Genus Philanthaxia Deyrolle, 1864 from Hainan Province, China (Coleptera, Buprestidae, Thomassetiini)

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Article

Two New Species of the Genus *Philanthaxia* Deyrolle, 1864 from Hainan Province, China (Coleptera, Buprestidae, Thomassetiini)

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Simple Summary: Two new species of the genus *Philanthaxia* were identified in Hainan, China. Morphological comparisons with existing species demonstrated significant taxonomic distinctions, confirming their status as new taxa. The nomenclature reflects either key diagnostic traits or commemorates notable contributors to entomology.

Abstract: In this paper, we describe two new species of *Philanthaxia* Deyrolle, 1864, from Hainan, China: *P. longicorna* Ni & Song, sp. n. and *P. lui* Ni & Song, sp. n. The characters of the new species are described with illustrations, and comparisons are made with the most similar species.

Keywords: Taxonomy; Buprestinae; *Philanthaxia*; new species; Hainan

1. Introduction

The genus *Philanthaxia* Deyrolle, 1864 belongs to the tribe Thomassetiini Bellamy, 1987, and was first described by Deyrolle (1864) with *Philantahxia curta* Deyrolle, 1864 as the type species [1]. Species of the genus *Philanthaxia* are characterized by smaller, more oval-shaped eyes and more convex vertex, which is typically 4.5-6 times wider than the eye width; the pronotum widest at base, with dense reticulate or punctate striations; the pygidium regularly rounded, with a circular cross-section or occasionally slight apical distortion [2].

Before Bílý (1993) first revision of the species, *Philanthaxia* was mainly described as being distributed in Southeast Asia and the Greater Sunda Islands. Subsequently, the distribution of this genus expanded, with new records from the Maluku Islands and Papua New Guinea [3-4]. Additionally, Bellamy (2008) described seven new species of the genus from the Philippines [5], while Bílý (2016) reported three new species from the Philippines and one from Vietnam, indicating the broad distribution of *Philantahxia* species in Asia [6]. In China, two species of the genus have been recorded in Taiwan region: *Philanthaxia sauteri* Kerremans, 1912 [7] and *Philanthaxia convexifron*s Kurosawa, 1954 [8], so this paper provides a diagnosis comparative between these two known insect species and the two novel species.

At present, records of the biological habits of the genus *Philanthaxia* are scarce. The existing records mainly report that the adult of the *Philanthaxia* species which are found on the *Castanopsis* sp., primarily in the elevated layers of the canopy, and larvae of this genus are still unknown [9].

According to the four new species reported by Bílý & Nakládal (2011), as well as the four new species reported by Bílý (2016), combined with the two new species described in this article discovered in Hainan, China, the total number of insect species in this genus has increased to 71 worldwide, including one fossil species [10].

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2. Materials and Methods

Body length: length between the top of the head to the tip of the elytra.

Body width: widest part of the body.

Aedeagus length: length between the base to the tip of the aedeagus.

Aedeagus width: the widest part of parameres.

Figures 1-3 were photographed using a Keyence VHX-5000 digital microscope with VH-Z20R zoom lens. Images were processed and combined into figures by using Adobe Photoshop CC 2018.

3. Results

Taxonomy

Family Buprestidae Leach, 1815

Subfamily Buprestinae Leach, 1815

Tribe Thomassetiini Bellamy, 1987

Genus *Philanthaxia* Deyrolle, 1864

Type species: *Philanthaxia curta* Deyrolle, 1864.

3.1. Philanthaxia longicorna Ni & Song, sp. nov.

(Fig. 1)

Type locality: Mt. Lizhiling, Sanya City, Hainan Province, China.

Type specimen. Holotype (male, FAF): Southern Hainan Province, Sanya City, Mt. Lizhiling, 18°21'21"N 109°27'20"E, alt. 390m, 2021-VI-19, Haitian Song leg.; paratypes (14 males, 15 females, FAF): same data as holotype.

Description of holotype. Length 6.9 mm, width 2.6 mm; the aedeagus measures around 2.4 mm in length and 0.4 mm in width. Spindle-shaped, entirely gold-green with metallic luster.

Head (Fig. 3A) golden-green, broader than the lateral side of pronotum, covered with evenly small, reticulate, irregular polygonal sculpturing. Fine white setae present at the frons. The vertex relatively flat, 5.1 times wider than eye. The eyes large, nearly oval, and laterally convex. The antennae (Fig. 3E) very slender and elongated, consisting of 11 segments, with white setae. The scape rod-shaped, 6.0 times longer than wide. The pedicel short and ovoid, 2.0 times as long as wide. The antennomere 3 almost cylindrical, 2.4 times as long as wide. Antennomeres 4–10 slender and triangular, with a length-to-width ratio of 2.1–3.5; the antennomeres 4 and 5 longer, while the final two shorter. The terminal antennomere nearly triangular, 1.5 times longer than wide.

Pronotum (Fig. 3A) nearly trapezoidal, about 1.6 times wider than long, featuring sculpturing and patterns similar to those on the head. Overall golden-green with a metallic sheen. The anterior edge curved, slightly convex in the middle; the posterior edge nearly straight, with the sides normally curved. The scutellum wide, 2.0 times as wide as long, dark green, subcordiform, and depressed near the base of the pronotum.

Elytra (Fig. 3C) 1.8 times longer than wide, with yellow coloration on both sides of the elytral suture, tapers sharply near the distal third. Each elytron has 8 distinct striae with fine transverse lines between them. The lateral margins with fine serrations near apical third. The humeral callosities do not prominently protrude beyond the elytral lateral edges.

Legs (Fig. 1) slender, covered with setae; fore tibiae slightly bent outward, without serrations, and the tarsal segments 2–4 enlarged. The tarsal segments covered with setae.

Ventral side (Fig. 1B) The abdomen sparsely covered with short white setae. Prosternal process (Fig. 3B) elongated, forming an inverted tower shape, tapering directly at the top to a near-conical form. Abdominal apex lighter, transitioning from green to gold, with darker sides shifting from green to black. The ventral surface of the last visible ventrite (Fig. 3D) more or less black, covered with relatively denser and longer white setae, apex rounded.

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Aedeagus (Fig. 3F) widest at the middle, tapering at the posterior; apices of parameres sharp, not distinctly expansion, the sides of the terminal portion covered with setae; apex of median lobe sharp.

Sexual dimorphism. Female (Fig. 1C) differs from male easily by the extra shorter antennae and somewhat more robust body.

Etymology. This species is named after the morphological features of long antennae.

Distribution. China (Hainan).

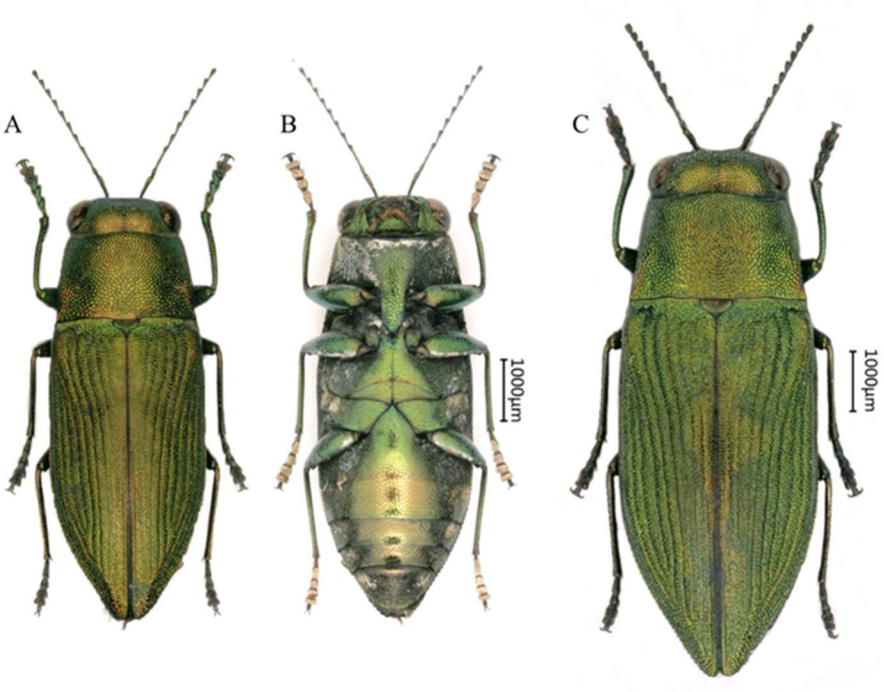

Figure 1. Habitus of *Philanthaxia longicorna* Ni & Song, sp. nov. **(A–B)** male, holotype, 6.9 mm, from Sanya, Hainan **(C)** female, paratype, 8.4 mm, from Sanya, Hainan **(A, C)** dorsal view **(B)** ventral view. Scale bar = 1.0 mm.

3.2. Philanthaxia lui Ni & Song, sp. nov.

(Fig. 2)

Type locality. Mt. Lizhiling, Sanya City, Hainan Province, China.

Type specimen. Holotype (male, FAF): Southern Hainan Province, Sanya City, Mt. Lizhiling, 18°21'21"N 109°27'20"E, alt. 390m, 2021-VI-19, Haitian Song leg.; paratypes (1 male, 1 female, FAF): same data as holotype.

Description of holotype. Length 5.6 mm, width 2.1 mm; the aedeagus measures around 2.2 mm in length and 0.3 mm in width, fusiform with most of the anterior body copper-colored; with metallic luster.

Head (Fig. 3G) large and broad, significantly wider than the pronotum. Vertex flat without noticeable convex, and width about 4.8 times than the eye width. Eyes large, oval and prominently protrude beyond the body sides. Antennae (Fig. 3K) long, horizontally positioned, almost reaching the base of pronotum; scape nearly clavate, slightly curved, and 5.7 times longer than wide; pedice ovoid, about twice as long as wide. The antennomere 3 slender and ovoid, about 5.0 times as long as wide. The 4-10 antennomeres transition from conical to nearly triangular shapes, shorter and thicker, with lengths 2.0–2.4 times their widths. The terminal flagellomere nearly triangular, 2.0 times as long as wide. The sculpture features clearly defined boundaries, consisting of small, irregular polygons

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with a metallic copper-green sheen. A fine groove runs along the middle, and the apex covered with extremely fine white setae.

Pronotum (Fig. 3G) evenly convex, 1.4–1.7 times as wide as long; anterior margin convex at the center, posterior margin slightly curves inward at middle, lateral margins mostly straight. The lateral margins of the pronotum bear paired symmetrical shallow depressions. The posterolateral edges slightly expand outward, marking the widest point of the pronotum. The pronotum sculpture resembles that of the head but with larger individual sculptural cells. Scutellum large, darker in color than the pronotum, subcordiform, depressed at the anterior, 1.6 times as wide as long.

Elytra (Fig. 3I) flat, slightly raised along the suture, 2.0 times as long as wide; two-thirds of anterior nearly parallel, with fine serrations along the sides, while the posterior third tapers sharply, with serrations larger than those on the anterior two-thirds. The humeral callosities distinct, with the apex slightly projecting beyond the sides of the elytra. The basal transverse area broadly and shallowly depressed, almost connecting with the scutellum, and aligns with the pronotum without notable indentations or protrusions. Each elytron has eight deep and distinct longitudinal striae, with fine transverse lines between the striae.

Ventral side (Fig. 2E) overall dark green, with the abdominal ventrite being the lightest in color. The entire abdomen flat and covered with fine setae. Prosternal process (Fig. 3H) broad, nearly parallel, and has an obtusely pointed apex. The anal ventrite (Fig. 3J) nearly circular, lacks serrations, and covered with setae.

Legs (Fig. 2D, E) slender, cover with setae, no serration, fore tibiae with gentle bent outward, and the anterior tarsal claws hooked.

Aedeagus (Fig. 3L) slender, subparallel, parameres middle widest, stir up and connect at two third, with the apex forming a transparent, extremely fine, and sharp area, the sides of the terminal portion protruding with setae.

Sexual dimorphism. Female differs from male by much larger and reddish in frons and lateral sides of pronotum.

Etymology. This new species is named after Mr. Jiasheng Lu (陆嘉胜) (Sanya, Hainan), who is butterfly lover, leading the way for us during the collection.

Distribution. China (Hainan).

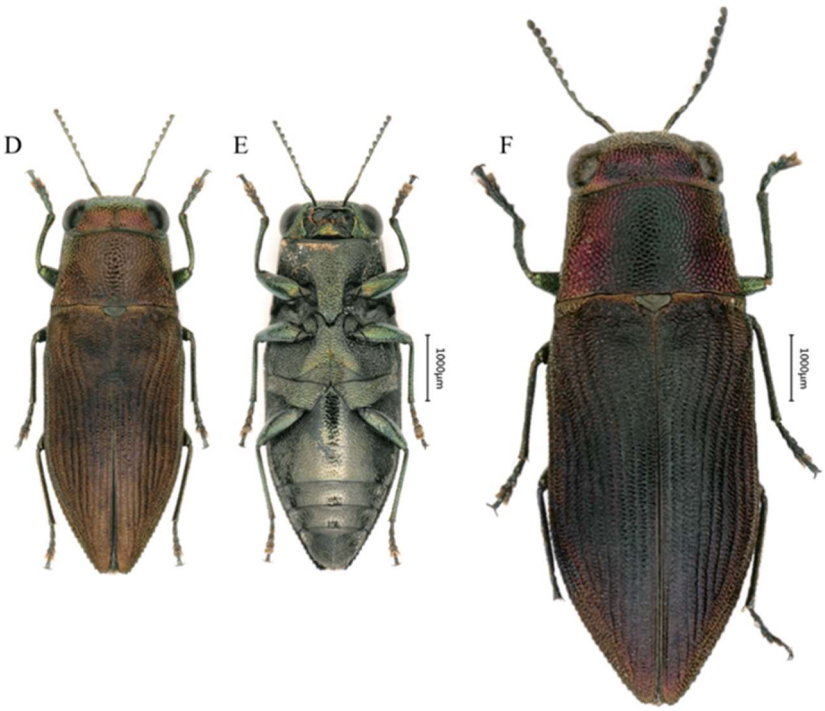

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Figure 2. Habitus of *Philanthaxia lui* Ni & Song, sp. nov. **(D–E)** male, holotype, 5.6 mm, from Sanya, Hainan **(F)** female, paratype, 8.5 mm, from Sanya, Hainan **(D, F)** dorsal view **(E)** ventral view. Scale bar = 1.0 mm.

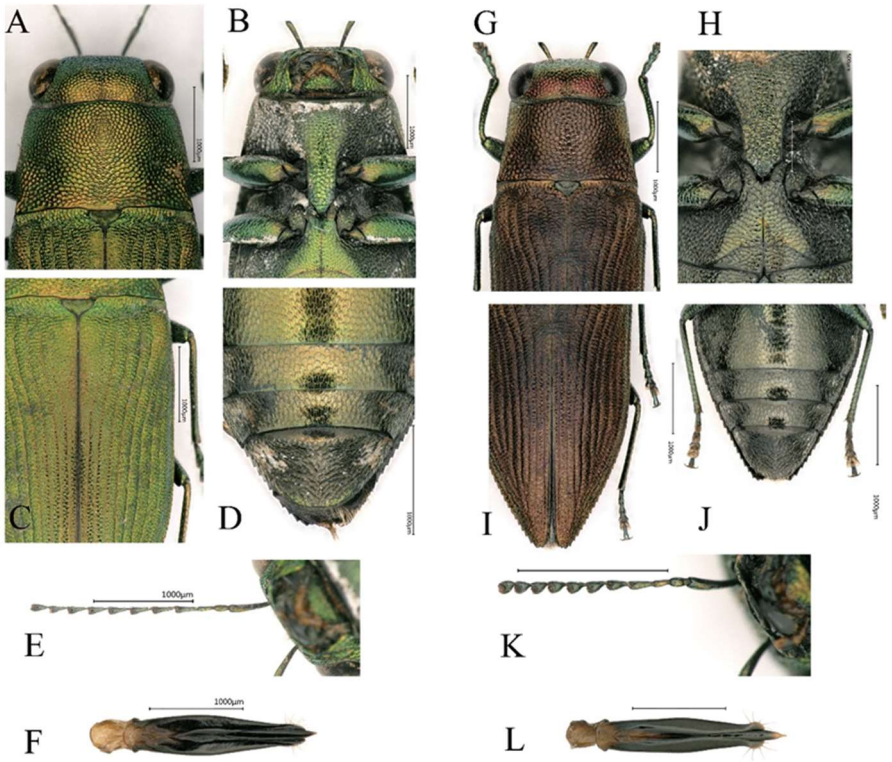

Figure 3. (A-F) *Philanthaxia longicorna* Ni & Song, sp. nov. (holotype) **(G-L)** *Philanthaxia lui* Ni & Song, sp. nov. (holotype) (**A, G)** Details of pronotum (**B, H)** prosternal process (**C, I)** elytra **(D, J)** abdomen (**E, K)** antennae (**F, L)** aedeagus **(A, C, G, I, F, L)** dorsal view (**B, D, H, J, E, K)** ventral view. Scale bar = 1.0 mm, except scale bar of **(H)** = 0.5 mm.

3.3. The Ecological Environment of These Two New Species

The two new species described in this article were captured from the leaves of *Casearia membranacea* in Lizhiling, Sanya, Hainan (Fig. 4, Fig. 5).

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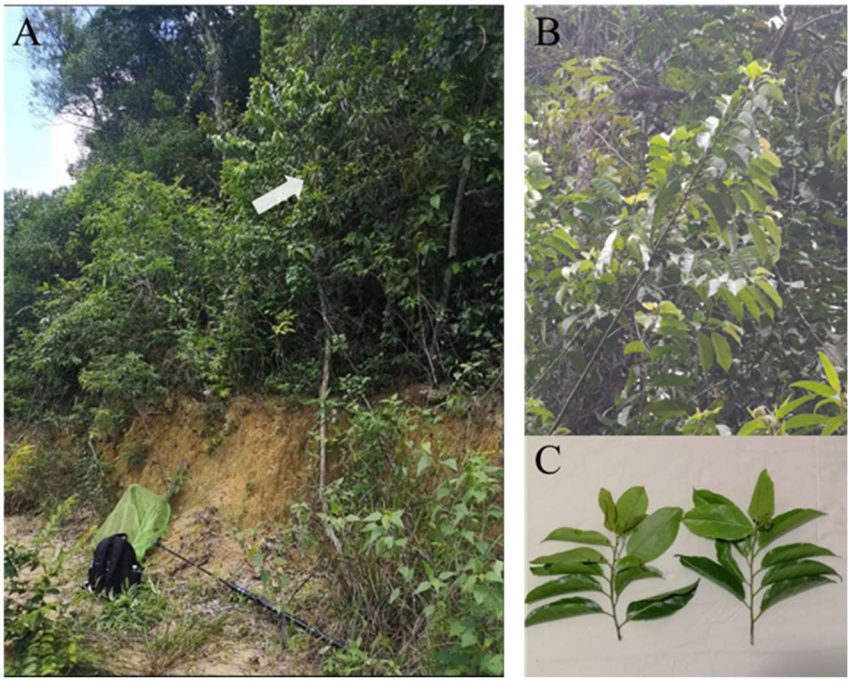

Figure 4. (A) insect capture site photographed at Lizhiling. The arrow indicates the host plant *Casearia membranacea* **(B, C)** Host plant leaves.

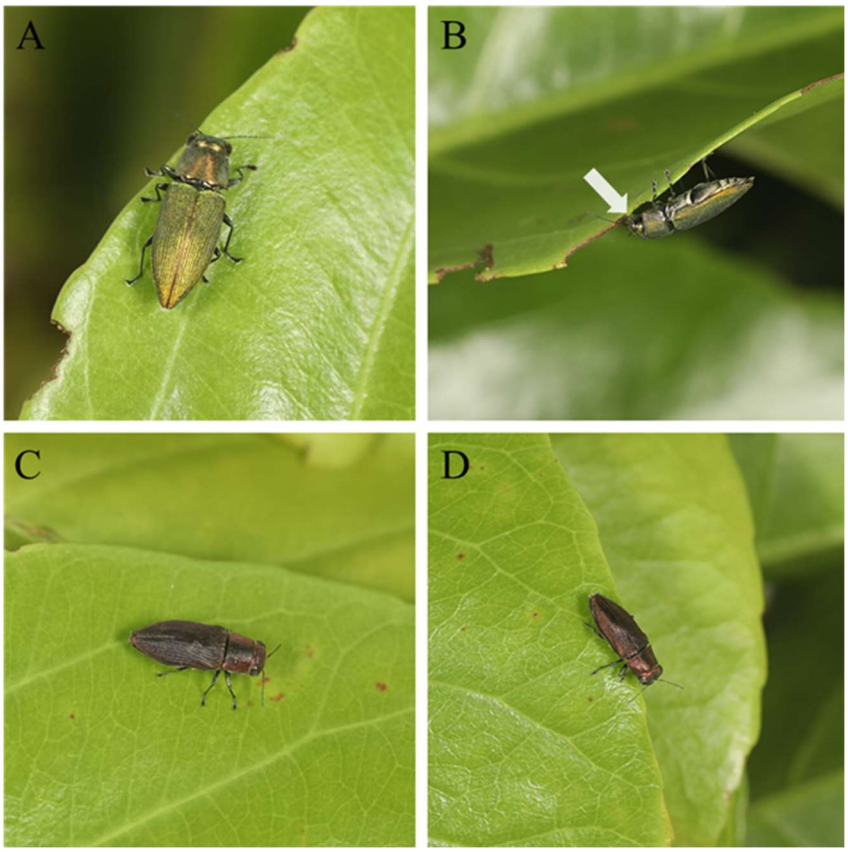

Figure 5. (A, B) *Philanthaxia longicorna* Ni & Song, sp. nov., feeding on leaves, the arrow indicates the specific feeding site; **(C, D)** *Philanthaxia lui* Ni & Song, sp. nov., staying on leaves.

4. Discussion

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Comparative analyses were conducted between the newly identified species and existing taxa, with specific contrasts of the two novel species against two morphologically similar congeners. The corresponding feature comparisons are systematically presented in the table 1 and table 2.

Table 1. Differential Diagnosis of *Philanthaxia longicorna* Ni & Song, sp. nov. with two morphologically similar congeners.

	***Philanthaxia splendida*, Van De Poll, 1892 (Vietnam)**	***Philanthaxia sauteri* Kerremans, 1912 (Taiwan)**	***Philanthaxia longicorna* Ni & Song, sp. nov. (Hainan)**
Size	5.0-7.2 mm	8.0-10.0 mm	6.7-7.9 mm
Color	bright golden green; no record of ventral side color	dark color, mainly green, with red or black; ventral side green or reddish	bright golden green, same with ventral side
Head	frons less convex, larger head and eyes,	frons slightly depressed, smaller head and eyes	frons evenly convex, larger head and eyes
Antenna	antennae reach two third of pronotum horizontally; length-width ratio: scape 3.3, pedicel 1.7, antennae 3-10 1.4-2.8, terminal 1.6	antennae reach half of pronotum horizontally; length-width ratio: scape 2.8, pedicel 1.9, antennae 3-10 1.2-1.5, terminal 1.3	antennae extremely long, reach elytra and over scutellum horizontally; length-width ratio: scape 6, pedicel 2.0, antennae 3-10 2.1-3.5, terminal 1.5
Pronotum	general evenly convex on both sides; sculpture regular, dense near the base	depressed laterally near posterior angle; sculpture irregular horizontal pattern	both sides of basal slightly depressed; sculpture regular polygon, dense near the base
Elytra	golden-green, monochrome	golden-green along suture, but changing color toward sides	golden-green, monochrome
Aedeagus	relatively short; parameres separated in sixth with apical portion slightly raised; apex not processing out of parameres	relatively robust; parameres separated in posterior half with no obvious raise; apex robust and not processing out of parameres	relatively slender; parameres without separation, slightly raised; apex sharp and processing out of parameres

Table 2. Differential Diagnosis of *Philanthaxia lui* Ni & Song, sp. nov. with two morphologically similar congeners.

	***Philanthaxia convexifrons* Kurosawa, 1954 (Taiwan)**	***Philanthaxia iriei* Kurosawa, 1985 (Ryu Kyu)**	***Philanthaxia lui* Ni & Song sp. nov. (Hainan)**		***Philanthaxia splendida*, Van De Poll, 1892 (Vietnam)**	***Philanthaxia sauteri* Kerremans, 1912 (Taiwan)**	***Philanthaxia longicorna* Ni & Song, sp. nov. (Hainan)**
Size	6.9-7.0mm	6.8-8.0 mm	5.6-8.6 mm	Size	5.0-7.2 mm	8.0-10.0 mm	6.7-7.9 mm
Color	bronze-black; ventral side bronze-black	bronze-black or reddish-bronze; no record of ventral side color	bronze-black; ventral side dark green	Color	bright golden green; no record of ventral side color	dark color, mainly green, with red or black; ventral side green or reddish	bright golden green, same with ventral side
Head	frons evenly convex without any depressions or reliefs, same color for genders; smaller eyes with slightly raised	frons slightly convex between eyes, female frons bronze or reddish, male frons green; larger eyes and strongly projecting	frons evenly convex, female frons reddish, male frons green; eyes large and projecting beyond outline of head	Head	frons less convex, larger head and eyes,	frons slightly depressed, smaller head and eyes	frons evenly convex, larger head and eyes

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		beyond outline of head					
Pronotum	general evenly convex, regular and small sculpture	general evenly convex, sculpture horizontally irregular, dense near the base	both sides of basal slightly depressed, with more regular and large polygon sculpture	Antenna	antennae reach two third of pronotum horizontally; length-width ratio: scape 3.3, pedicel 1.7, antennae 3-10 1.4-2.8, terminal 1.6	antennae reach half of pronotum horizontally; length-width ratio: scape 2.8, pedicel 1.9, antennae 3-10 1.2-1.5, terminal 1.3	antennae extremely long, reach elytra and over scutellum horizontally; length-width ratio: scape 6, pedicel 2.0, antennae 3-10 2.1-3.5, terminal 1.5
Elytra	black, slight violet, monochrome	bronze-black and reddish, luster, with serrations of lateral sides	bronze-black, monochrome, with serrations of one third lateral sides	Pronotum	general evenly convex on both sides; sculpture regular, dense near the base	depressed laterally near posterior angle; sculpture irregular horizontal pattern	both sides of basal slightly depressed; sculpture regular polygon, dense near the base

Author Contributions: Conceptualization, H. S.; methodology, R.W., H.S.; software, T.N.; formal analysis, T.N.; Z. Q.; investigation, T.N., Z.Q., X.P.; writing—original draft preparation, T.N.; writing—review and editing, T.N., Z.Q., H.S., R.W.; supervision, H.S. and R.W.; funding acquisition, R.W. All authors have read and agreed to the published version of the manuscript.

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Data Availability Statement: The data presented in this study are available upon request from the corresponding author.

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Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviation

The following abbreviation is used in this manuscript:

FAF Fujian Academy of Forestry, Fuzhou, China

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