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TWO NEW SPECIES OF *CHUJOCHILUS* SASAJI, 2005 (COLEOPTERA: COCCINELLIDAE) FROM CHINA

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Abstract.— The genus *Chujochilus* Sasaji from China is reviewed. The following two species are described as new to science: *C. sagittatus* **sp. nov.** and *C. parisensis* **sp. nov.** A diagnosis of the genus and a key to known species are provided.

Key words.— Coleoptera, Coccinellidae, Chilocorinae, Chujochilus, new species, China.

INTRODUCTION

The genus *Chujochilus* (Coccinellidae: Chilocorini) was erected by Sasaji (2005) with *Exochomus isensis* Kamiya, 1966 from Honshu, Japan as the type-species. *E. isensis* was originally described by Kamiya as a new species of the genus *Exochomus* Redtenbacher, 1843 and was subsequently transferred to the genus *Arawana* Leng, 1908 by the same author, as Sasaji (1971). Kovář (1995) argued that *A. isensis* was separable from the Nearctic species of *Arawana* at the generic level by comparing the form of pronotum, the first visible abdominal sternum, cuticular structures and other characters of the American representatives of the genus *Arawana*, but he did not give the detailed treatment of this problem and did not take any actions to recognize them as separate. Sasaji (2005) adopted Kovář's opinion and erected a new monotypic genus for *isensis*: *Chujochilus*. This genus is distinguished from *Arawana* by 9-segmented antennae and lacking finger-like processes at the parameres of the tegmen.

The genus *Chujochilus* was monotypic until recently. In this paper two new species, collected by the authors from China are described. A diagnosis of the genus and a key to the known species are also given.

MATERIALS AND METHODS

The specimens examined were collected from China. All materials were preserved in 85% ethanol. External morphology was observed with a dissecting stereoscope (Zeiss Stemi 2000-cs). The measurements made with an ocular micrometer are as follows: Length from apical margin of clypeus to apex of elytra (TL); width across both elytra at widest part (TW); height at highest elytral part (TH); head width at widest part (HW); pronotal length at longest part (PL); pronotal width at widest part (PW); elytral length along suture, including scutellum (EL); elytral width across both elytra at widest part (EW). Male and female genitalia were dissected, cleared in 10% solution of KOH by boiling for several minutes, and examined with an Olympus BX51 compound microscope.

Images were photographed with digital cameras (Qimagin 5.0 RTV and Coolsnap-Pro*cf* & CRI Micro* Color), connected to the dissecting microscope. The software Image-Pro Plus 5.1 was used to capture images from both cameras, and photos were cleaned up and laid out in plates with Adobe Photoshop CS 8.0.

Type specimens designated in the present paper are deposited at the Department of Entomology, South

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TAXONOMY

Chujochilus Sasaji, 2005

Chujochilus Sasaji, 2005: 61. Type species: *Exochomus isensis* Kamiya, 1966.

Diagnosis. Body nearly hemispherical, strongly convex, dorsal surface glabrous; antennae 9-segmented; elytral margin not reflexed, and elytral epipleuron moderately broad, strongly inclined and distinctly foveate to receive femoral tips; abdominal postcoxal lines incomplete, each nearly reaching or reaching the posterior margin of the first abdominal ventrite, recurving apically; mid and hind tibiae each with an apical spur.

This genus is close to *Arawana* (Chapin 1965; Gordon 1985) in morphological characters and male genitalia, but *Arawana* has 10-segmented antennae and the male genitalia have finger-like processes on the parameres. *Chujochilus* is distinguished from *Arawana* by having the 9-segmented antennae and the parameres without finger-like processes.

Description. Body nearly hemispherical, strongly convex, dorsal surface glabrous (Figs 9–11). Head broader than half of the pronotal width; eyes rather large, each about $^1/_4$ of head width; medial margin straight and strongly convergent anteriorly, interocular distance about half as wide as head; apical corner of eye rather feebly rounded; frons punctate and shagreened; clypeus short with long hairs, anterior margin of clypeus moderately emarginate medially, slightly reflexed; antennae 9-segmented (Fig. 1): 1st antennomere short and stout, slightly bent; 2nd moderately stout, a little wider at base than at apex; 3rd wedge-shaped, moderately narrower at base than at apex; 4th to 7th similar in shape; 4th slightly longer than 5th, and 5th to 7th each slightly wider and longer than the preceding antennomere; 8th one-half longer and slightly wider than 7th, 9th twice as long, and as wide as 8th, its apex strongly oblique, terminal three antennomeres forming distinct club; terminal maxillary palpomere relatively slender, parallel-sided with an obliquely truncate apex (Fig. 3); terminal segment of labial palp slender, tapering to blunt apex (Fig. 4).

Pronotum rather small, trapezoidal with anterior margin deeply emarginate, lateral margins nearly straight. Scutellum small, about $^1/_{14}$ as wide as elytra. Elytral margin moderately expanded externally and not reflexed.

Prosternum, meso- and metaventrite as in Figure 5; prosternum moderately long in front of procoxae; prosternal process narrow, without carinae; mesoventrite relatively narrow between coxae; metaventrite moderately elevated with a fine median furrow. Elytral epipleuron moderately broad, distinctly foveate to receive femoral tips. Abdomen with five ventrites; postcoxal lines incomplete, each reaching the posterior margin of first abdominal ventrite, recurving anteriorly, reaching half length of ventrite I (Fig. 6). Legs moderately stout, each femur with groove to receive retracted tibia, front tibia with outer margin expanded into thin keel, mid and hind tibia each with short groove to receive tarsi and with apical spurs (Figs 7–8).

Distribution. China, Japan.

Key to species of *Chujochilus* Sasaji

1. Elytra black with strong metallic bluish sheen. Penis guide with apex sagittate, distinctly longer than parameres. Penis capsule with distinct inner arm and obscure outer one . . . ***sagittatus*** sp. nov.
–. Elytra yellowish brown, no metallic sheen. Penis guide with pointed apex; slightly longer or shorter than parameres. Penis capsule with distinct inner and outer arms **2**
2. Penis guide distinctly shorter than parameres. Basal half of spermatheca less than 2 times as thick as curved apical half . . . . . ***isensis*** (Kamiya)
–. Penis guide slightly longer than parameres. Basal half of spermatheca about 2.5 times as thick as curved apical half . . . . . ***parisensis*** sp. nov.

Chujochilus parisensis sp. nov.
(Figs 1–11, 15–20)

Diagnosis. This species is closely similar to *C. isensis* in coloration, external morphological characters and male genitalia, but based on Kamiya and Sasaji's detailed descriptions and illustrations, it can be distinguished from the latter as follows: basal half of spermatheca about 2.5 times as thick as curved apical half, penis guide in lateral view slightly longer than parameres. In *C. isensis*, basal half of spermatheca less than 2.0 times as thick as curved apical half, and penis guide in lateral view is distinctly shorter than parameres.

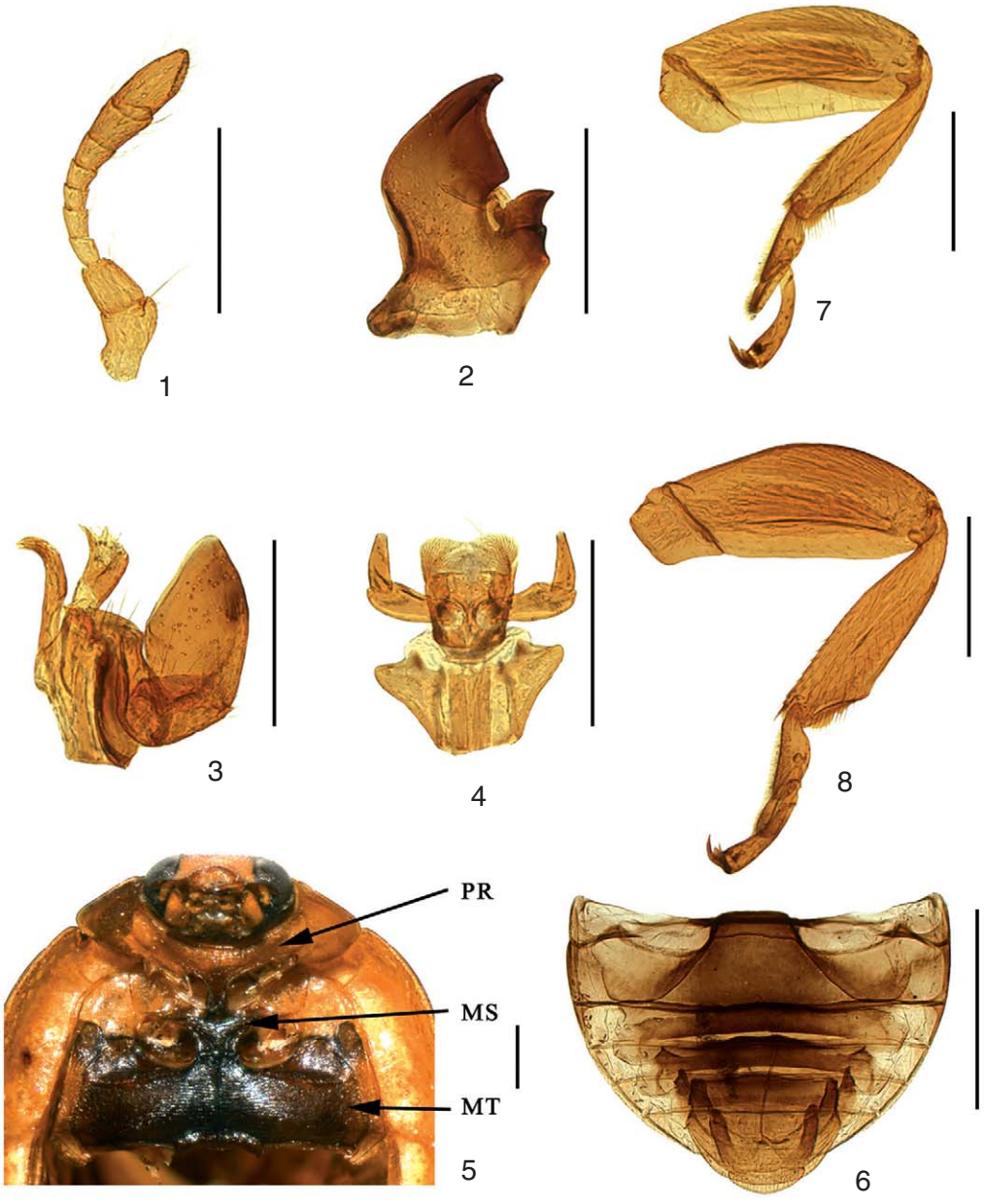
C. isensis was incorrectly identified by Jing (1992) based on six female specimens from Yunnan and Sichuan, China. After re-examination of Jing's specimens, as well as examination of six additional male and female specimens from Yunnan and Sichuan, and compared with *C. isensis* description based on Kamiya and Sasaji's detailed description and illustration, we find that Jing's specimens and the specimens collected from Yunnan and Sichuan are distinctly different from *C. isensis* in morphological characters of male

genitalia, and they belong to the same species: *C. parisensis* sp. nov.

Description. TL: 3.7–3.9 mm, TW: 3.3–3.5 mm, TH: 1.8–1.9 mm, TL/TW: 1.11–1.12; PL/PW: 0.44–0.46; EL/EW: 0.93–0.97.

Body color pale yellowish brown, without any spots (Figs 9–11); vertex and posterior half of frons blackish brown, ocular margin of clypeus narrowly darkened. Legs yellowish brown.

Head small, about 0.33× of elytral width (HW/EW =1: 3.05); surface of head coarsely punctate, and separated by about 1.0–2.0 times a diameter, with very short setae in punctures. Pronotum about 0.63× of elytral width (HW/EW=1: 1.60), with fine and sparse punctures much smaller than those on head, separated by about 2.0–5.0 times a diameter. Surface of elytra shining, with fine punctures slightly larger than those on pronotum, separated by 1.0–3.0 times a diameter, rather deep and larger on either side of suture and lateral margins of elytra. Surface of prosternum shagreened, with short and sparse pubescences. Meso- and metaventrite shining, transversely rugose, without



Figures 1–8 *Chujochilus parisensis* sp. nov. (1) antenna; (2) mandible, right; (3) maxilla, right; (4) labium; (5) prosternum (PR), meso- (MS) and metaventrite (MT); (6) abdomen; (7) front leg; (8) hind leg. Scale bars: figs 1–4 = 0.3 mm, 5–8 = 0.5 mm.

punctures. Male genitalia: Penis moderately slender and strongly curved at basal half (Fig. 15); apex strongly and abruptly taper to pointed (Fig. 16); penis guide in lateral view slender and straight, somewhat thick at base, slightly longer than slender parameres, parameres sparsely setose at apices (Fig. 17); penis guide in ventral view slender and symmetrical, more than 4.0 times as long as wide, subparallel in basal $^3/_4$, and tapering to pointed apex (Fig. 18).

Female genitalia: Coxites elongate, each coxite about 4 times as long as wide, tapering to blunt apex, with several long terminal setae (Fig. 19); basal half of spermatheca about 2.5 times as thick as curved apical half (Fig. 20).

Types. holotype, 1♂, **Yunnan:** 2200 m, Jianchuan (26°31'N, 99°53'E), 2.IX.2005, Wang XM leg. Paratypes, 4♀♀, **Yunnan:** same data as holotype; 1♀, **Sichuan:** 2500m, Zhaojue (28°03'N, 102°51'E), 18.IX.2007, Wang XM leg.

Distribution. China (Sichuan, Yunnan).

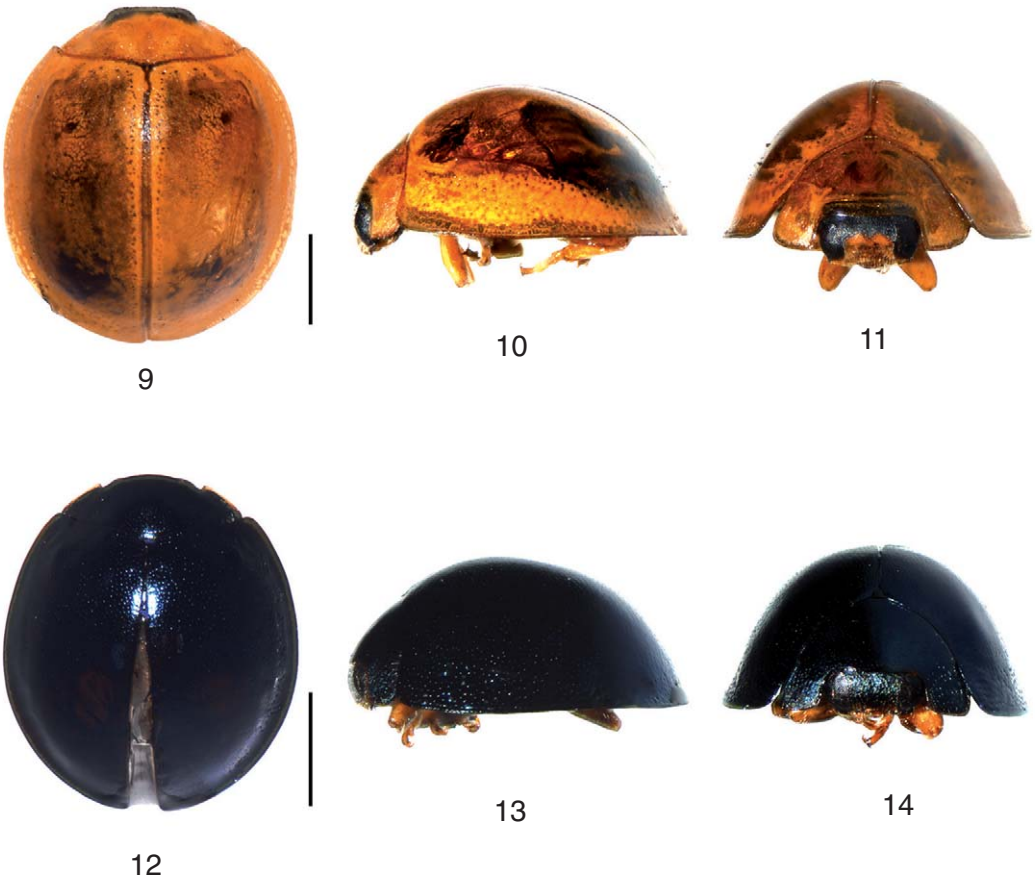
Etymology. The specific epithet refers to close similarity to *C. isensis*.

Chujochilus sagittatus sp. nov.
(Figs 12–14, 21–25)

Diagnosis. *C. sagittatus* is easily distinguishable from other species of *Chujochilus* by the black elytra with strong metallic blue sheen and the structure of the male genitalia.

This species is also similar to *Orcus punctulatus* (Blackburn, 1892) having black body and metallic blue or green sheen (Ślipiński and Giorgi 2006; Łączyński and Tomaszewska 2009), but it is easily distinguishable from the latter by having unreflexed and moderately expanded elytral margin, the mid and hind tibiae with apical spurs and incomplete abdominal postcoxal lines which reach the posterior margin of the first abdominal ventrite and then recurve anteriorly. In *O. punctulatus*, elytral margin is reflexed and broadly expanded, tibiae don't have apical spurs and abdominal postcoxal lines are incomplete and not recurving anteriorly.

Description. TL: 2.9–3.4 mm, TW: 2.6–3.1 mm, TH: 1.3–1.6 mm, TL/TW: 1.09–1.12; PL/PW: 0.45–0.46; EL/EW: 0.87–0.93.

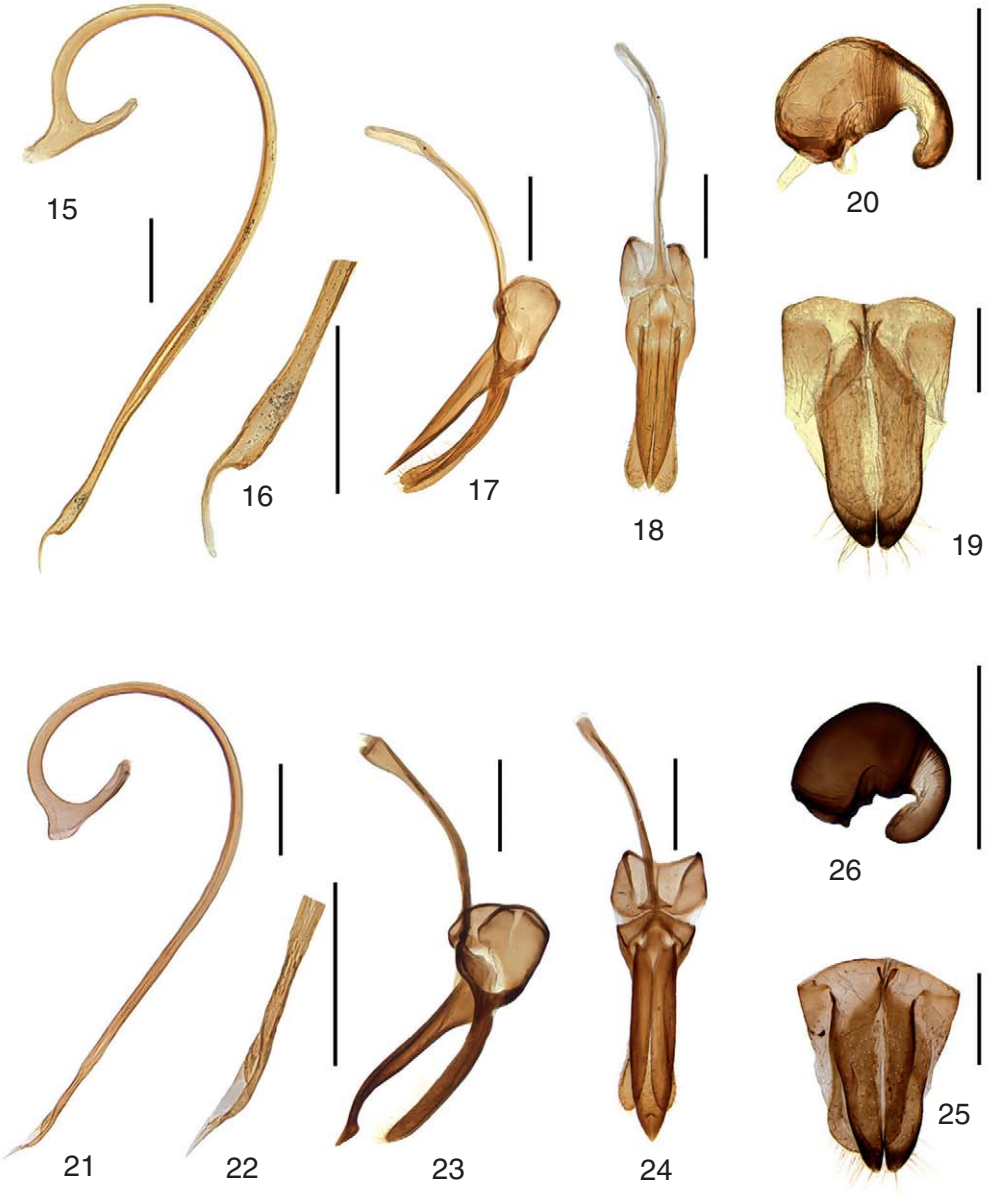


Figures 9–11 *Chujochilus parisensis* sp. nov. (9) dorsal view; (10) lateral view; (11) frontal view. Figs 12–14 *Chujochilus sagittatus* sp. nov. (12) dorsal view; (13) lateral view; (14) frontal view. Scale bars = 1 mm.

Body black with very strong metallic bluish sheen (Figs 12–14); head entirely black, with reddish–brown antennae, and anterior margin of clypeus, maxillary and labial palpi which are red brown.

Head small, about 0.32× of elytral width (HW/EW =1: 3.11). Surface of head coarsely and distinctly punctate, separated by about 1.0–1.5 times a diameter, with very short setae in punctures. Pronotum about 0.61× of elytral width (HW/EW=1: 1.65), punctures on pronotum fine and sparse, much smaller than those on head, separated by about 2.0–4.0 times a diameter. Surface of elytra shining, with coarse and dense punctures separated by about 0.3–0.5 times a diameter, slightly larger towards lateral margins. Surface of prosternum shagreened, with short and parse pubescences. Meso- and metaventrite shining, transversely rugose, without punctures.

Male genitalia: Penis moderately slender and strongly curved at basal half forming $^{2}/_{3}$ of circle, with a distinct inner arm and obscure outer one of penis



Figures 15–20 *Chujochilus parisensis* sp. nov. (15–18) male genitalia: (15) penis; (16) apex of penis; (17) tegmen, lateral view; (18) tegmen, ventral view; (19–20) female genitalia: (19) ovipositor; (20) spermatheca; Figs. 21–25 *Chujochilus sagittatus* sp. nov. (21–24) male genitalia: (21) penis; (22) apex of penis; (23) tegmen, lateral view; (24) tegmen, ventral view; (25–26) female genitalia: (25) ovipositor; (26) spermatheca. Scale bars: 0.3 mm.

capsule (Fig. 21), apex pointed (Fig. 22); penis guide in lateral view relatively thin, apex sagittate, distinctly longer than parameres (Fig. 23); parameres sparsely setose at apex; penis guide in ventral view long, slender and symmetrical, more than 4.5 times as long as wide, subparallel in basal 3/4, and tapering to pointed apex (Fig. 24).

Female genitalia: Coxites elongate–triangular, each coxite about 4.5 times as long as wide, generally tapering to the blunt apex, with several long terminal setae (Fig. 25); basal half of spermatheca about 3.0 times as thick as curved apical half (Fig. 26).

Types. Holotype, 1♂, **Yunnan:** Yuanmo (25°42'N, 101°51'E), 2270 m, 13.IX.2007, Wang XM leg.; Paratypes, 5♂♂, 5♀♀, same data as holotype.

Distribution. China (Yunnan).

Etymology. The specific epithet refers to the sagittate apex of penis guide in lateral view.

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