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# A review of the species of the reduviid genus *Tiarodes* (Heteroptera: Reduviidae: Reduviinae) from China

WANZHI CAI[1], LU SUN[1] and MASAAKI TOMOKUNI [2]

[1] Department of Entomology, China Agricultural University, Yuanmingyuan West Road, Beijing 100094, China
[2] Department of Zoology, National Science Museum, Tokyo 3-23-1 Hyakunin-cho, Shinjuku-ku, Tokyo, 169 Japan

**Key words.** Taxonomy, China, new species, key, Reduviidae, *Tiarodes*.

**Abstract.** The species of the genus *Tiarodes* Burmeister from China are reviewed. Three species are recognized, described or redescribed, illustrated and keyed. *T. venenatus* Cai et Sun and *T. pictus* Cai et Tomokuni are described as new species. The *T. versicolor* (Laporte) previously reported from China by Hua is in fact *T. salvazai* Miller.

## INTRODUCTION

Species of the genus *Tiarodes* Burmeister are easily recognized by their bright shiny coloration and strange head structure. Some are found in decaying vegetable debris and under the loose bark of dead trees. Miller (1959) reviewed the genus. He described 45 species, which he divided into 4 species groups, i. e., *nigrirostris*, *waterstradti*, *cruentus* and *versicolor* groups. Eighty-two species are now known.

*T. salvazai* Miller and *T. versicolor* (Laporte) have previously been recorded from China (Hsiao, 1976; Hua, 1983). Unfortunately, Hua's *T. versicolor* is *T. salvazai*. The examination of material in Chinese and Japanese institutions, revealed another two species of this genus from Zhejiang, Fujian and Taiwan Provinces were found.

The following abbreviations are used for the institutions where the type specimens are deposited: BMNH, The Natural History Museum, London; CAU, China Agricultural University, Beijing; KU, Kyushu University, Fukuoka; NIAES, National Institute of Agro-Environmental Sciences, Tsukuba; NSMT, National Science Museum, Tokyo; NWAFU, Northwestern Agricultural & Forestry University, Yangling; RNH, Rijksmuseum van Natuurlijke Historie, Leiden; and TAU, Tokyo Agricultural University, Tokyo. All the measurements are in millimeters.

### *Tiarodes* Burmeister

*Cimbus* (non Hahn, 1831): Laporte, 1833: 78, 80. Misidentification.
*Tiarodes* Burmeister, 1835: 237; Amyot & Serville, 1843: 341; Stål, 1874: 67; Distant, 1904: 284; Miller, 1940: 580; Miller, 1948: 436; Miller, 1959: 59; Putshkov & Putshkov, 1985: 93; Maldonado-Capriles, 1990: 450: Putshkov & Putshkov, 1996: 204.
*Cymbidus* Spinola, 1837: 98.

**Type species.** *Cimbus versicolor* Laporte, 1833.

**Diagnosis.** Medium to large sized, length 10–35 mm, mostly 15–20 mm. Body moderately depressed; most are brightly coloured, usually bluish black, shiny, with red and yellow markings, some of the brilliance is lost during the mounting of specimens. Head long and subcylindrical; anteocular portion much longer than postocular portion; insertion of antennae far removed from eyes; ocelli moderately separated; first rostral segment longer than second, second antennal segment more than twice as long as first antennal segment. Pronotum strongly medially impressed, posterior lobe wider than anterior lobe, collar process tuberculously prominent, posterior angles broadly rounded. Distances between middle and hind coxae subequal, sponge furrow usually as long as 1/4 and in some species can cover to 1/2 length of tibia. Hemelytra usually project beyond the tip of the abdomen. Clasper clavate (Figs 11, 12, 21, 22, 34, 35); median pygophore process usually unexposed (Fig. 20); basal plate bridge of phallus slender (Figs 13, 23, 37).

**Distribution.** Oriental Region (including New Guinea).

### Key to Chinese species of the genus *Tiarodes* Burmeister

1. Pronotum totally reddish or just with part of posterior lobe dark ..... 2
- Pronotum totally bluish black .... *Tiarodes venenatus* sp. n.
2. Pronotum totally reddish; middle portion of hemelytron lacks pale maculation; connexivum with pale areas ..... ..... *Tiarodes salvazai* Miller
- Pronotum with disc on posterior lobe dark or black; middle portion of costal margin of hemelytron with two reddish maculation; connexivum unicolorous ..... ..... *Tiarodes pictus* sp. n.

### *Tiarodes venenatus* Cai et Sun, sp. n. (Figs 1–15)

**Diagnosis.** The colour pattern on the hemelytron is similar to that in *T. bukit* Miller and *T. elongatus* Miller, but in this species has a bluish black pronotum and hemelytron that is not maculate at base.

**Description.** Colour. Bluish-black with metallic shiny. Eyes greyish brown; antennae, apices of tibiae and tarsi blackish brown to black; most of femora, third and fourth segments of connexivum (except base), third and fourth abdominal tergites and sternites, sometimes distal portion of the second sternite and middle portion of the fifth ster-

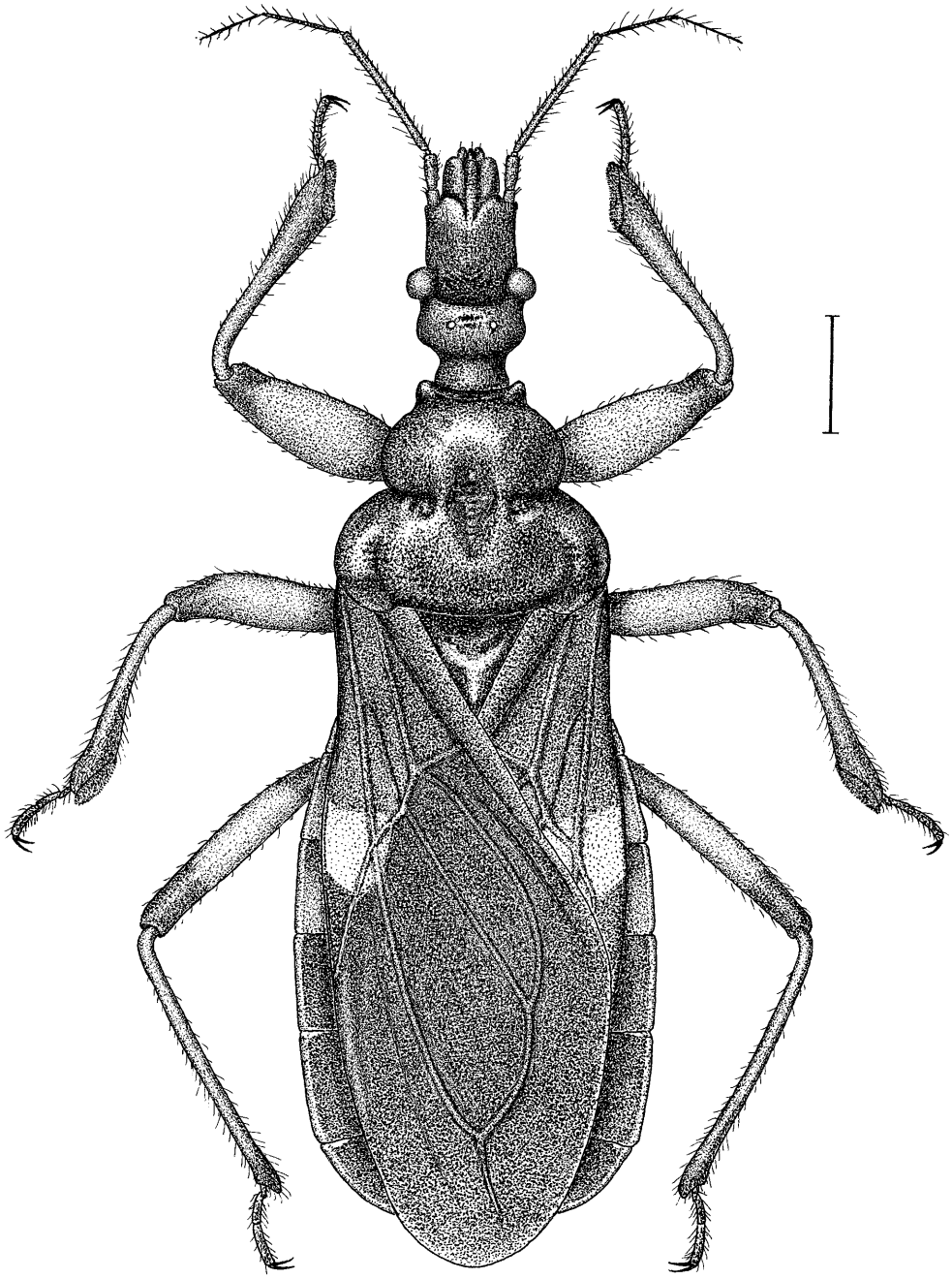
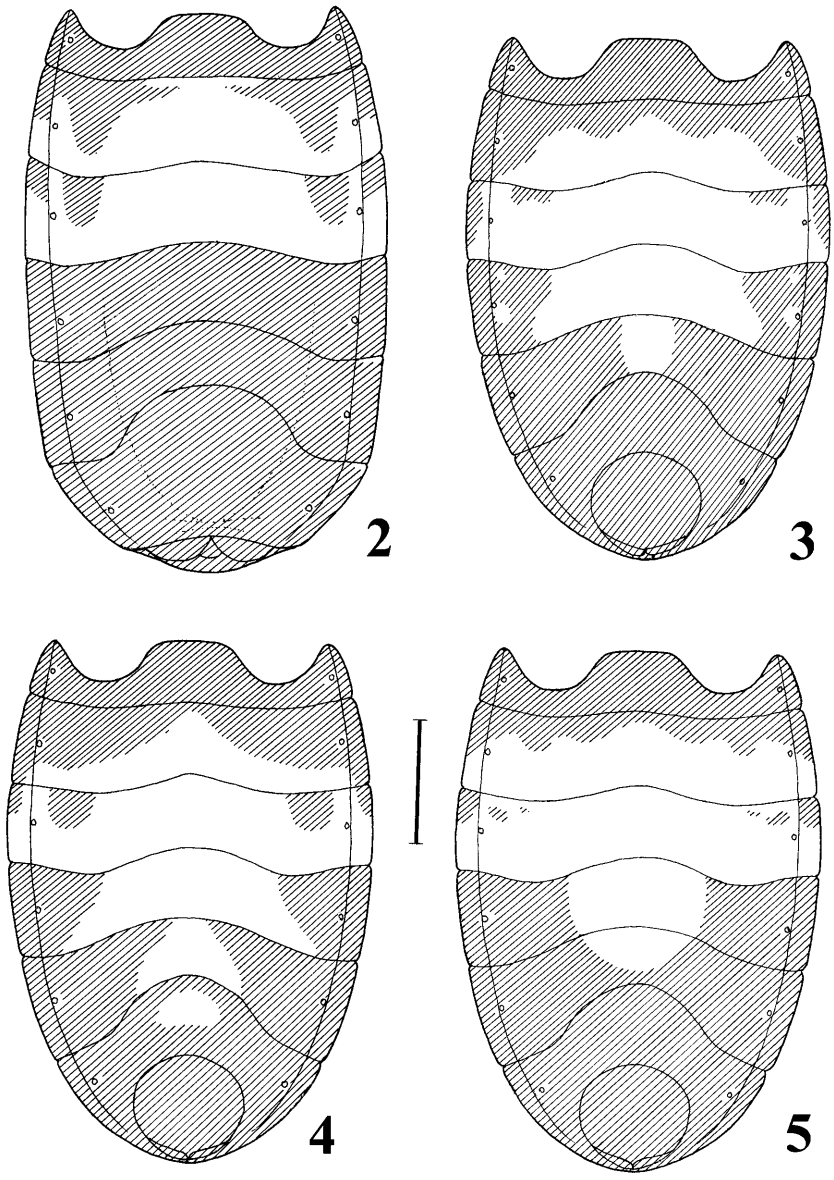


Fig. 1. *Tiarodes venenatus* Cai et Sun, sp. n., habitus. Scale: 2 mm.

nite orange to yellowish red (Figs 2~5); hemelytron black, marking on subapical portion of corium yellow to dark yellow.

**Structure.** Eyes somewhat large, protruding laterally; transverse constriction distinct; anteocular portion twice as long as postocular portion (Fig 6), above with many weak wrinkles; first rostral segment longest, subequal to the remaining segments in males and slightly shorter than remaining segments in females; first antennal segment shortest, not reaching tip of head; second antennal segment in male distinctly longer than in female, 2.8 times as long as third segment in male and just twice as long as third segment in female; mandibular plate well developed, slightly surpassing tip of anteclypeus. Collar processes rounded; anterior pronotal lobe relatively small, transverse constriction deep, middle longitudinal depression nearly reaching posterior pronotal margin; lateral pronotal angle rounded, middle portion of posterior margin of pronotum convex. Basal portion of scutellum depressed. Hemelytron surpassing abdominal tip. Clasper clavate, bent, inner side of apex with angular process (Figs 11, 12). Median pygophore process small, not extending beyond outer posterior margin of pygophore in dorsal view (Fig. 10). Basal plate of phallus thick and short; basal plate bridge slender and long, pedicel wide and short (Fig. 13). Phallosoma wide; dorsal phallotheca




Figs 2–5. Colour patterns on the ventral surface of the abdomen of *Tiarodes venenatus* Cai et Sun, sp. n. 2,♀; 3–5,♂. Scale: 2 mm.

weakly sclerotized except distal portion; struts well developed, expanded distally (Fig. 14); vesica tips rounded (Fig. 15).

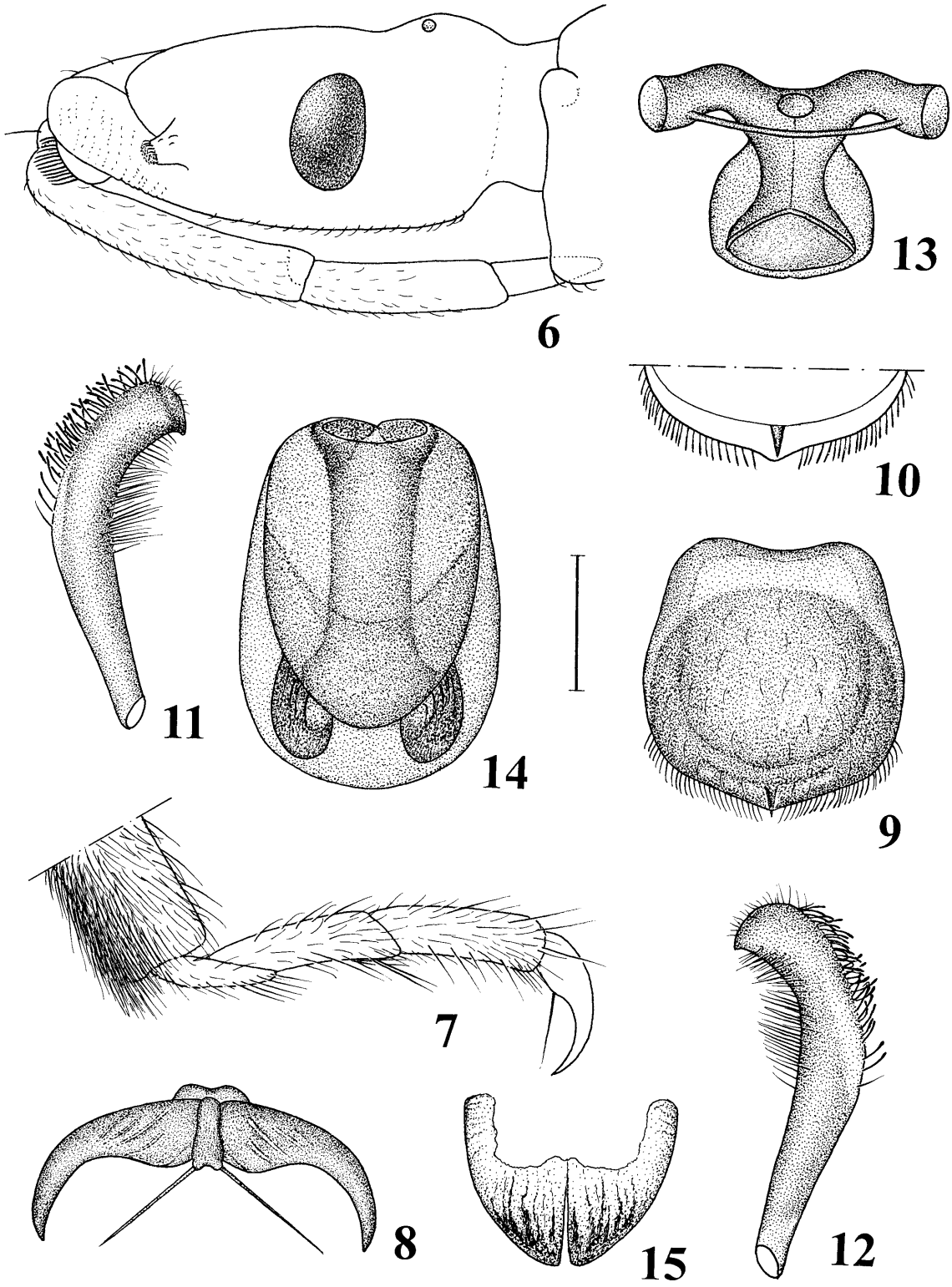
**Measurements (mm).** Body length 18.46–20.1(♂), 20.0(♀); maximum width of abdomen 5.2–5.87(♂), 6.1(♀). Head length 3.2-3.7(♂), 3.68(♀); length of anteocular part 1.87–2.1(♂), 2.3(♀); length of postocular part 0.84–0.93(♂), 1.0(♀); length of synthlipsis 1.07–1.3(♂), 1.35(♀); distance between ocelli 0.53–0.6(♂), 0.6 (♀); length of antennal segments I:II:III:IV = 0.6–0.7(♂), 0.6(♀): 3.4–3.95(♂), 2.4(♀): 1.4–1.66(♂), 1.3(♀): 1.03–1.1(♂), 1.0(♀); length of rostral segments I:II:III = 2.1–2.5(♂), 2.2(♀): 1.34–1.75(♂), 1.6(♀): 0.7–0.75(♂), 0.64(♀). Length of anterior lobe of pronotum 1.67–2.1(♂), 1.9(♀); length of posterior lobe of pronotum 2.1–2.3(♂), 2.1(♀); maximum width of thorax 4.53–5.1(♂), 4.9(♀); length of scutellum 1.13–1.55(♂), 1.6(♀); length of hemelytron 11.6–12.8(♂), 11.57(♀).

**Type material.** Holotype:♂, China, Fujian, Mt. Wuyi, Sanxiang, 650 m; 20-VIII-1988; Yang Zhongqi leg.; in NWAFU. Paratypes: 1♀, China, Zhejiang, Suichang, Mt. Jiulong; 20-VIII-1991; Chou Wenbao leg.; in CAU. 1 ♂, China: Taiwan (Formosa), Rara-san; 8-VIII-1941; H. Hasegawa leg.; in NIAES. 1 ♂, China: Taiwan (Formosa), Kayo~Nishimura; 24-VI-1941; A. Kira leg.; in NIAES. 1 ♂, China: Taiwan (Formosa), Urai; 14-V-1933; M. Chujo leg.; in KU.

**Etymology.** From the Latin, venenatus (venomous). According to the collector of the holotype, the specimen bit his finger, which was very painful, caused the finger to swell, and turn a dark green colour for more than four hours.

**Notes.** This species belongs to Miller's *versicolor* group as its meso- and metasternum lack a median longitudinal carina and the mesosternum also lacks a median sulcus.

**Distribution.** China (Zhejiang, Fujian, Taiwan).




Figs 6–15. *Tiarodes venenatus* Cai et Sun, sp. n. 6 – head, antennae removed; 7 – apical portion of left hind leg; 8 – pretarsus; 9 – distal portion of pygophore; 10 – pygophore; 11–12 – clasper; 13 – phallobase; 14 – phallosoma; 15 – apex of vesica. 6 – lateral view; 8 – distal view; 9,15 – ventral view; 10,14 – dorsal view. S cale: for 6, 9, 10: 1 mm; for 7, 11–15: 0.5 mm; for 8: 0.25 mm.

***Tiarodes salvazai* Miller (Figs 16–25)**

*Tiarodes salvazai* Miller, 1959: 88; Hsiao, 1976:88; Hsiao & Ren, 1981: 450; Maldonado-Capriles, 1990: 452: Putshkov & Putshkov, 1996: 204.
*Tiarodes versicolor*: Hua, 1983: 148 (misidentification).

**Redescription.** Colour. Red, shiny. Two basal antennal segments, basal portion of fore and mid tibiae and most of hind tibiae blackish brown; distal antennal segments and tarsi brown to dark brown; top of head, apices of femora, scutellum, most of second to fifth segments of connex-

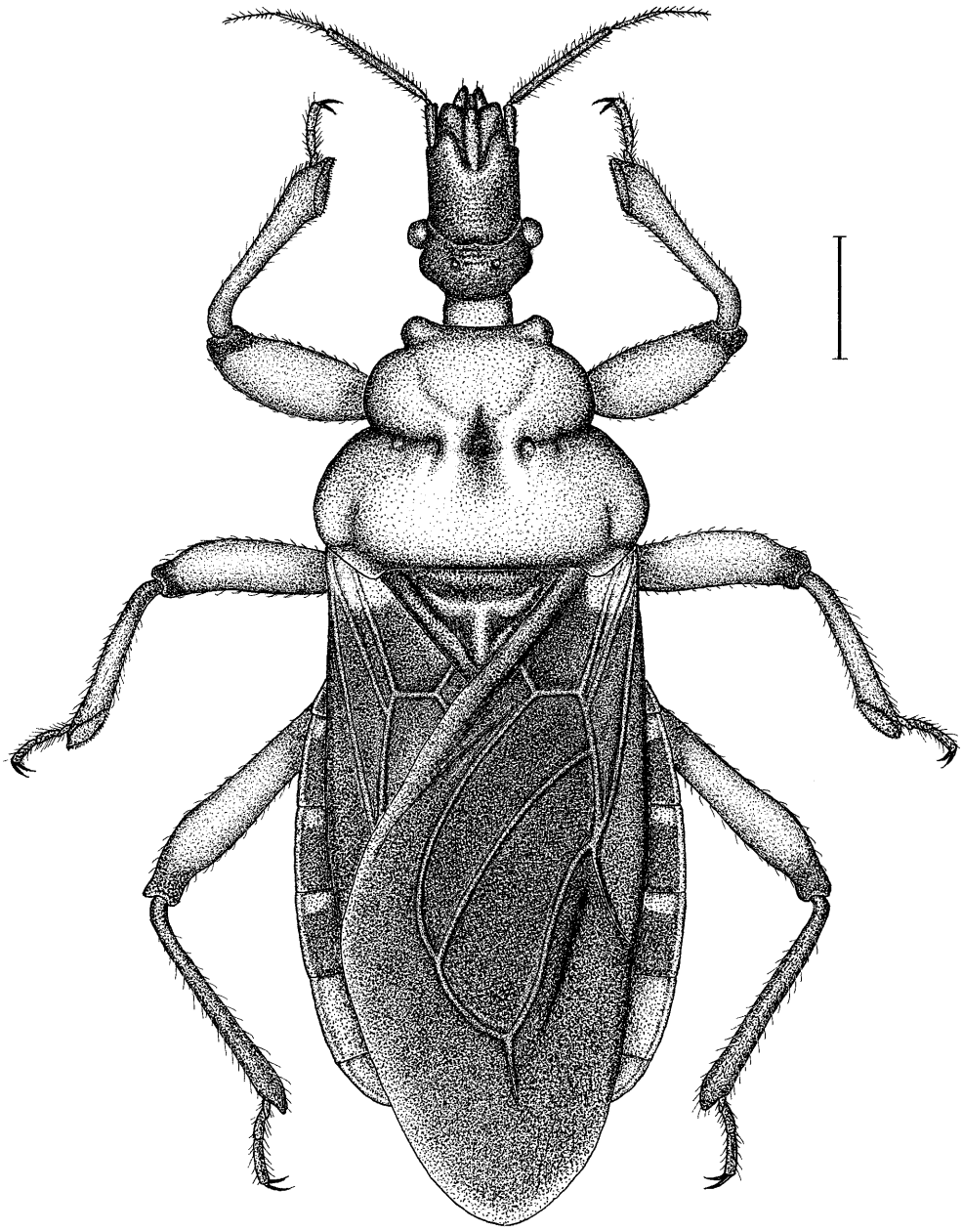
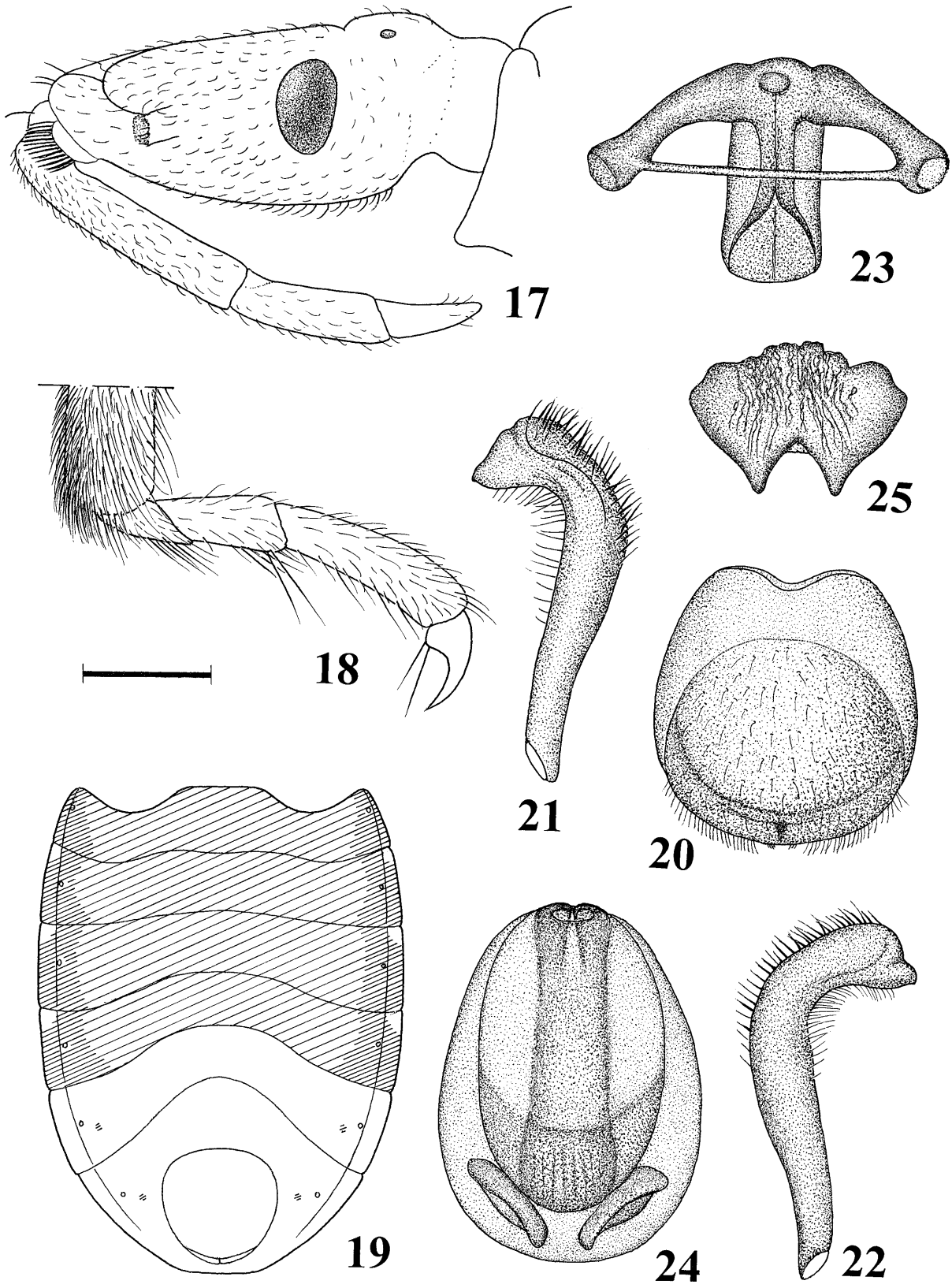


Fig. 16. *Tiarodes salvazai* Miller, habitus. Scale: 2 mm.

ivum dark reddish brown to brownish black, tinged a shiny metallic blue; hemelytron black except for basal reddish portion; spots on second to fifth segments of connexivum, sixth and seventh abdominal segments yellow to reddish yellow.

**Structure.** Head nearly cylindrical in dorsal view, narrower anteriorly in lateral view; eyes relatively small; mandibular plate well developed, projecting beyond tip of anteclypeus; first antennal segment slightly projecting beyond anterior end of mandibular plate; anteocular portion nearly twice as long as postocular portion, with fine wrinkles dorsally; first segment of the rostrum longest, second segment reaches posterior part of head (Fig. 17). Collar process well developed, roundly produced; middle of pronotum with a deep longitudinal depression and a transverse constriction, lateral angles rounded, middle portion of posterior margin nearly straight; anterior portion of prothoracic sternum with two processes. Scutellum short, basal portion depressed, apex rounded. Hemelytron reaches tip of abdomen in female and projecting beyond it in male. Abdomen dilated in female. Clasper clavate, apical portion distinctly bent and slightly dilated, inner side with a rounded process (Figs 21, 22). Median pygophore process small, apex sharp, not extending beyond outer posterior margin of pygophore in ventral and dorsal view (Fig. 20). Basal plate of phallus strong, basal plate bridge long and slender, pedicel relatively long and narrow (Fig. 23). Phallosoma ovate; struts well developed, apical portion slightly dilated; dorsal phallotheca sclerite strongly sclerotized (Fig. 24); vesica processes highly sclerotized, apices angularly produced (Fig. 25).




Figs 17–25. *Tiarodes salvazai* Miller. 17 – head, antennae removed; 18 – apical portion of left hind leg; 19 – ventral surface of abdomen, showing colour pattern; 20 – pygophore; 21 – 22 – clasper; 23 – phallobase; 24 – phallosoma; 25 – apex of vesica. 17 – lateral view; 19, 20 – ventral view; 24 – dorsal view. Scale: for 17, 18, 20: 1 mm; for 19: 2 mm; for 21–25: 0.5 mm.

**Measurements (mm).** Body length 16.0–18.5(♂), 19.0–20.5(♀); maximum width of abdomen 4.0–5.1(♂), 6.8–7.9(♀). Head length 3.0–3.4(♂), 4.0–4.1(♀); length of anteocular part 1.8–2.0(♂), 2.7–2.8(♀); length of pos-

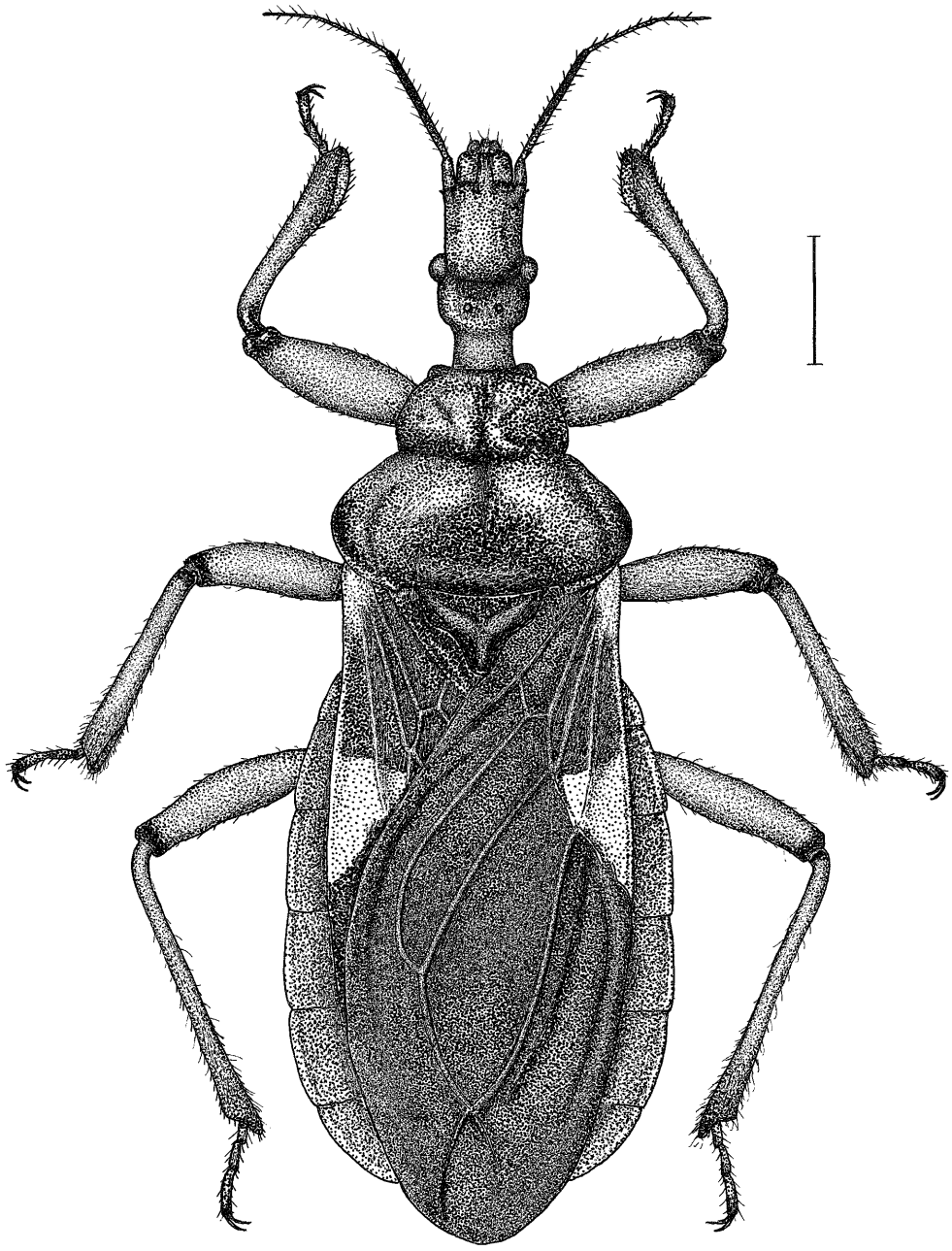


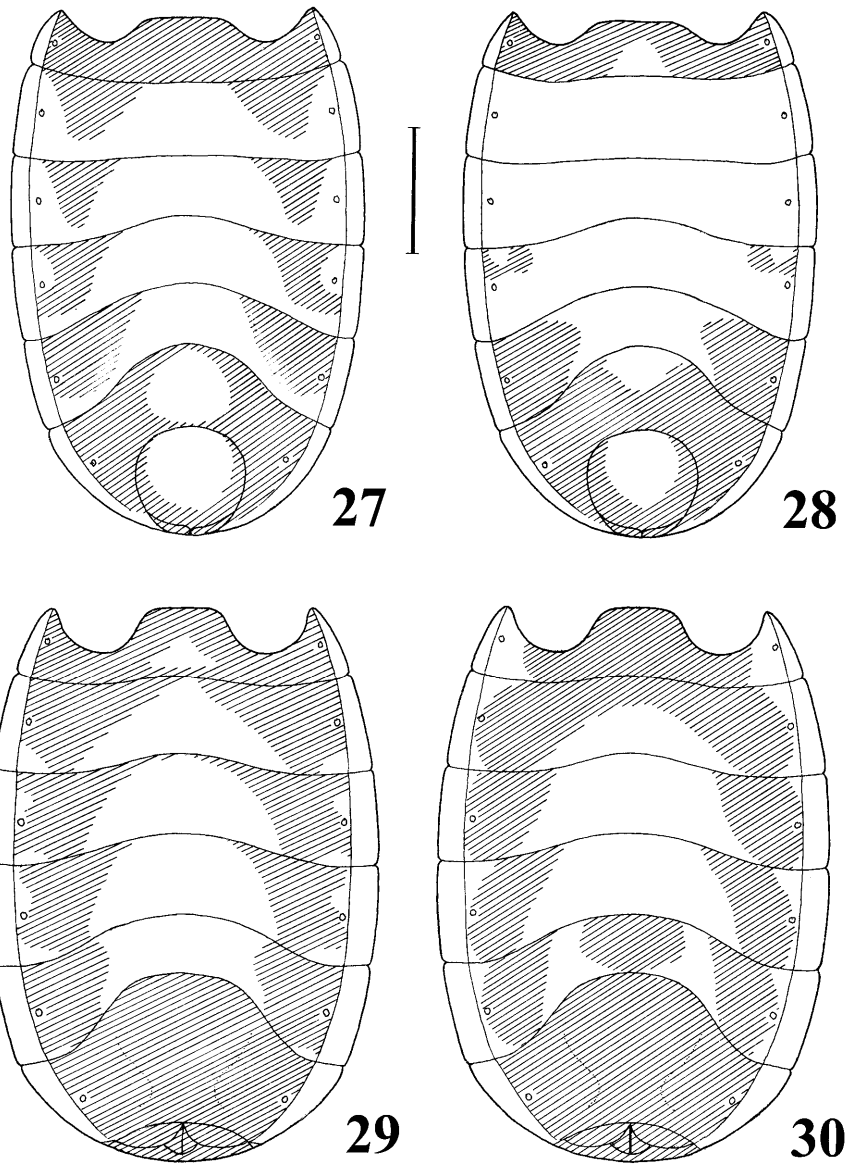
Fig. 26. *Tiarodes pictus* Cai et Tomokuni, sp. n., habitus. Scale: 2 mm.

tocular part 0.6–0.85(♂), 0.93–1.0(♀); length of synthlipsis 1.02–1.2(♂), 1.8–1.9(♀); distance between ocelli 0.61–0.65(♂), 0.65–0.72(♀); length of antennal segments I:II:III:IV = 0.6–0.7(♂), 0.71–0.8(♀): 2.0–2.2(♂), 2.1–2.2(♀): 0.75–0.9(♂), 0.9–1.1(♀): 0.81–0.87(♂), 0.86–0.9(♀); length of rostral segments I:II:III = 2.2–2.3(♂), 2.2-2.4(♀): 1.43–1.51(♂), 1.4–1.53(♀): 0.65–0.71(♂), 0.73–0.8(♀). Length of anterior lobe of pronotum 1.5–1.7(♂), 2.2–2.3(♀); length of posterior lobe of pronotum 1.9–2.1(♂), 2.1–2.2(♀); maximum width of thorax 5.5–5.6(♂), 5.8–6.3(♀); length of scutellum 1.3–1.6(♂), 1.6–1.65(♀); length of hemelytron 10.3–11.5(♂), 11.4–12.1(♀).

**Type material.** Holotype: ♂, Tonkin, Hoabinh;VI-1917; in RNH. Paratypes: 1 ♂, Laos, Vientiane; 20-X-1919; in BM. 1♀, Laos, Na Hoi; 12-III-1920; R. V. de Salvaza leg.; in BM. Not examined by the authors.

**Notes.** We have examined 11 specimens from China and Vietnam. Hua (1983) reported *T. versicolor* from Hainan Province. However the first author could not find any *Tiarodes* specimens in the Insect Collection at Zhongshan University. Professor Hua told the first author that the material may have been lost or destroyed during the relocation of the collection. From the diagnostic notes and photo in Hua's reports, it is clear that his *T. versicolor* is in fact *T. salvazai*. In addition, Hua (2000) did not include the *T. versicolor* in his list of Chinese insects.

**Distribution.** China (Hainan), Vietnam, Laos.



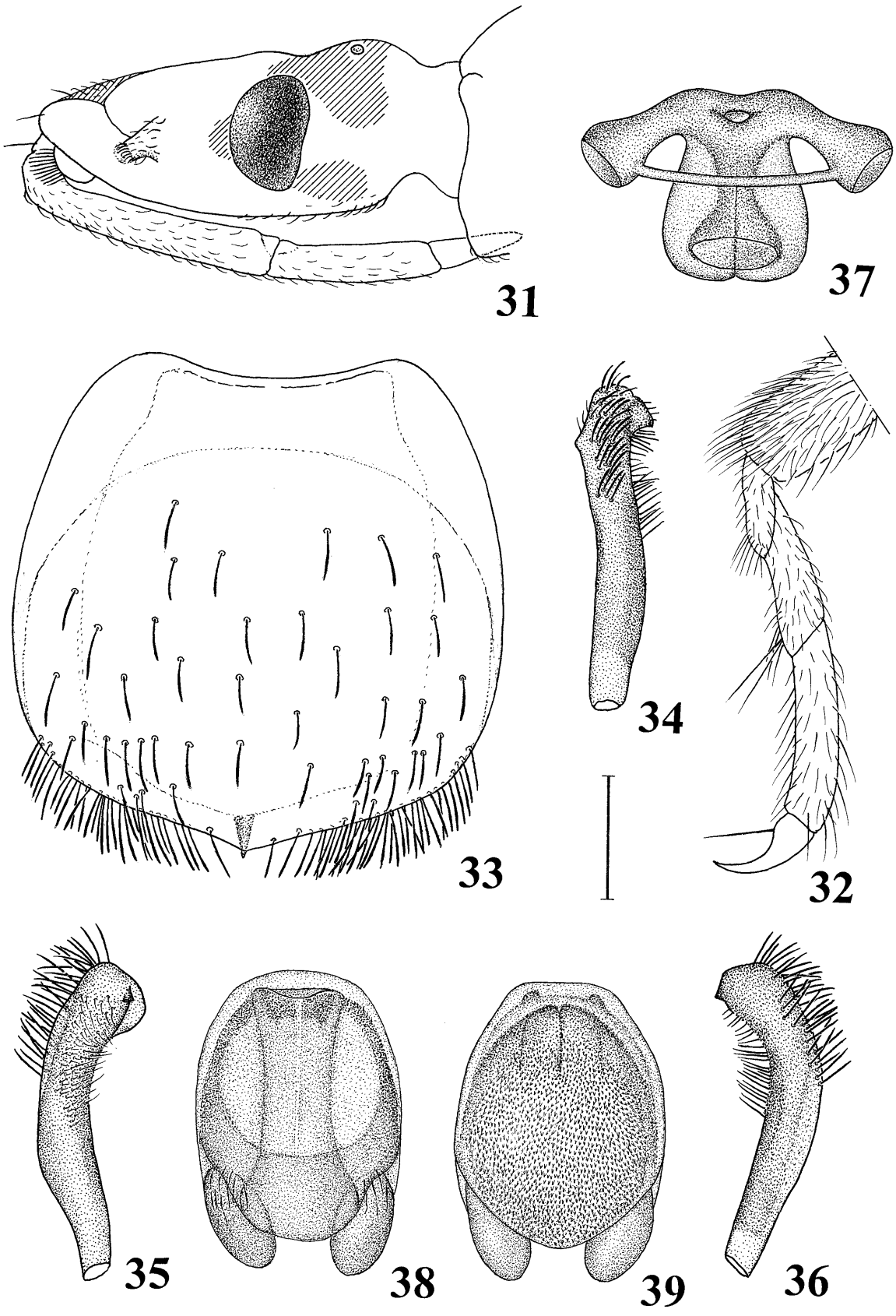

Figs 27–30. Colour patterns on the ventral surface of abdomen of *Tiarodes pictus* Cai et Tomokuni, sp. n. 27, 28,♂; 29, 30,♀. Scale: 2 mm.

***Tiarodes pictus* Cai et Tomokuni, sp. n. (Figs 26–39)**

**Diagnosis.** The general body shape and colour pattern on the hemelytron is somewhat similar to that in *T. assamensis* Miller, but this species lacks blue shiny head, the apical portion of hemelytron has a large reddish brown mark and the connexivum is unicoloured.

**Description.** Colour. Red to brownish red, shiny. Antennae, eyes, markings on postocular portion, collar, disk of posterior pronotal lobe, markings near lateral pronotal angles, apices of femora and bases of tibiae dark brown to brownish black; most of pronotum yellowish brown, tinged with red; scutellum and most of hemelytron black; base of corium and sometimes middle of costal margin dark yellow to brown; triangular (usually in female) or trapezoid (usually in male) marking on apex of corium orange to reddish brown; meso- and metathoracic pleura and sterna bluish black; tarsi pale yellow to dark yellow; dark markings (Figs 27–30) on venter purplish black; sometimes posterior pronotal lobe wholly bluish black in male.

**Structure.** Dorsal constriction on head shallow; first antennal segment nearly reaches tip of mandibular plate, second antennal segment nearly three times as long as first and about twice as long as the fourth antennal segment; first rostral segment subequal in length to remaining two segments (Fig. 31). Collar processes not well developed and indistinct; anterior pronotal lobe with indistinct shallow sculptures; median longitudinal depression on pronotum relatively shallow and narrow; middle portion of posterior pronotal margin slightly convex; basal and middle portions of scutellum depressed, lateral and apex ridged; hemelytron projects slightly beyond tip of abdomen in female and distinctly so in male. Connexivum moderately dilated laterally. Clasper clavate, apical half bent, inner side of apex with an angular process (Figs 34–36). Median pygophore process relatively long, spine-




Figs 31–39. *Tiarodes pictus* Cai et Tomokuni, sp. n. 31 – head, antennae removed; 32 – apical portion of left hind leg; 33 – pygophore; 34–36 – clasper; 37 – phallobase; 38–39 – phallosoma. 31– lateral view; 32, 37 – inner view; 33, 39 – ventral view; 38 – dorsal view; 34–36 – different views. Scale: for 31: 1 mm; for 32–39: 0.5 mm.

like, partly exposed (Fig. 33). Phallobase strongly developed, basal plate short and thick, pedicel dilated laterally, strong (Fig. 37). Phallosoma ovate; struts dilated at base and apex, endosoma processes medium-sized, vesica processes short (Figs 38, 39).

**Measurements (mm).** Body length 17.6–18.4(♂), 20.1–20.7(♀); maximum width of abdomen 5.5–5.7(♂), 6.4–7.07(♀). Head length 3.1–3.2(♂), 3.46–3.67(♀); length of anteocular part 1.75–1.87(♂), 2.07–2.14(♀); length of postocular part 0.85–0.87(♂), 0.93–1.02(♀); length of synthlipsis 1.03–1.1(♂), 1.15–1.26(♀); distance between ocelli 0.5–0.56(♂), 0.0.53–0.57 (♀); length of antennal segments I:II:III:IV = 0.6–0.66(♂), 0.6–0.7(♀): 2.94–3.1(♂), 2.3–2.37(♀): 1.1–1.2(♂), 1.26–1.3(♀): 1.05–1.1(♂), 1.01–1.1(♀); length of rostral segments I:II:III = 2.12–2.2(♂), 2.2–2.33(♀): 1.4–1.43(♂), 1.4–1.46(♀): 0.65–0.7(♂), 0.45–0.53(♀). Length of anterior lobe of pronotum 1.72–1.74(♂), 1.87–1.94(♀); length of posterior lobe of pronotum 2.17–2.33(♂), 2.2–2.26(♀); maximum width of thorax 4.57–4.78(♂), 5.03–5.2(♀); length of scutellum 1.3–1.4(♂), 1.4–1.6(♀); length of hemelytron 11.5–11.6(♂), 12.67–13.2(♀).

**Type Material.** Holotype:♂, China, Taiwan, Nantow, Mt. Lu-shan; 7.VI.1976; J. Okuma leg.; in NSMT. Paratypes: 1 ♂, China, Taiwan, Musha; VII, without detailed data and collector; in NSMT. 1 ♂, China, Taiwan (Formosa), Kayo~Urai; 4.VII.1941; A. Kira leg.; in NIAES. 1♀, China, Taiwan (Formosa), Urai~Meiji; 5.VII.1941; A. Kira leg.; in NIAES. 1♀, China, Taiwan (Formosa), Kayou; 3, 4.VII.1941; T. Sato leg.; in NIAES. 1♀, China, Taiwan (Formosa), Urai; 4, 5.VII.1941; T. Sato leg.; in NIAES. 1 ♂, China, Taiwan, Nantou, Mt. Kwantao; 21.V.1997; Nobuo Gokan leg.; in TUA.

**Etymology.** The species name refers to its beautiful colour pattern.

**Notes.** Based on its meso- and metasternum structure, this species should be a member of Miller's *versicolor* group.

**Distribution.** China (Taiwan).

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