



## Review of the genus *Novius* Mulsant (Coleoptera: Coccinellidae) from China with description of four new species

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### Abstract

The genus *Novius* Mulsant, 1846 from China is revised to include fifteen species. Four new species are described, namely *N. trapezoidalis* Tao & Wang **sp. nov.**, *N. megalocystis* Tao & Wang **sp. nov.**, *N. penicillioides* Tao & Wang **sp. nov.** and *N. oncosiphonus* Tao & Wang **sp. nov.** *Novius ruficollis* (Mulsant, 1850) is recorded from China for the first time. Nomenclatural history, diagnosis, detailed description, illustrations, and distribution map for each species are presented. A key to the Chinese species of *Novius* is also given.

**Key words:** Coleoptera, Coccinellidea, Noviini, new species, new distribution

### Introduction

*Novius* Mulsant, 1846 (= *Rodolia* Mulsant, 1850) belongs to the tribe Noviini Mulsant, 1846 under the family Coccinellidae Latreille, 1807. The genus has a worldwide distribution but is primarily concentrated in tropical and subtropical regions (Pang *et al.* 2020a).

According to the hairy coccinellid taxa, Mulsant (1846) established a new genus *Nomius*, which was revised to *Novius* in the same year and belonged to the Scymniens branch, namely Nomiaires, eventually replaced by Noviini. Gordon (1972, 1985) included three genera in the tribe Noviini, i.e. *Novius* Mulsant, *Rodolia* Mulsant and *Anovia* Casey, based on differences of the segmentation of the larval antennae, although the study examined one species of *Anovia* only (Rees 1947). However, this classification system has sparked controversies, particularly over the validity of larval characters, which arises from both morphological and subsequent molecular studies. (Ślipiński 2007; Forrester *et al.* 2009; Giorgi *et al.* 2009; Magro *et al.* 2010; Aruggoda *et al.* 2009; Seago *et al.* 2011, Robertson *et al.* 2015). Forrester (2008) suggested that all three genera of Noviini should be synonymized under the oldest available name *Novius* based on the morphological phylogeny in her unpublished study and this proposal was adopted by Iqbal *et al.* (2018). Pang *et al.* (2020a, 2020b) used the prior name, *Novius*, in their comprehensive study of the Australian *Novius* fauna and 63 species are transferred from *Rodolia* to *Novius*. These treatments were accepted by Poorani (2023).

Species belonging to the genus *Novius* play an indispensable role in controlling population of Margarodid scales, specifically those of the genus *Icerya*, owing to their feeding habits, making them excellent natural enemies (Causton *et al.* 2004; Pang *et al.* 2020b).

So far, *Novius* includes 75 described species, which is a moderately large genus of ladybird beetles (Pang *et al.* 2020a, 2020b). The genus can be distinctly distinguished by the relatively weakly sclerotized elytra, the 8-

segmented antennae with large scape and rather indistinct antennal club, and the 2-segmented labial palp is even more distinctive (Pang *et al.* 2020b). Prior to the present study, 13 species of *Novius* were documented in China (Pang *et al.* 2020a).

In this study, a taxonomic revision of Chinese *Novius* is provided. Fifteen species of *Novius* are recorded, including four new species and a new country record. A diagnosis of the genus and a key to species are also given.

## Materials and methods

All studied materials were collected from China. Type specimens designated in this paper are deposited in the collection of the Department of Entomology, South China Agricultural University (SCAU), Guangzhou, China.

The morphological terminology follows Ślipiński (2007). External morphology was assessed using a micrometer attached to a SteREO Discovery V20 dissecting stereoscope and is defined as follows:

**TL** total length, from apical margin of clypeus to apex of elytra;

**TW** total width, across both elytra at widest part;

**TH** total height, through the highest point of elytra to metaventrite;

**HW** head width, including eyes;

**PL** pronotal length, from the middle of anterior margin to the base of pronotum;

**PW** pronotal width at widest part;

**EL** elytral length, along the suture, from the apex to the base including the scutellum;

**EW** elytral width, across both elytra at widest part;

**ID** interocular distance, nearest distance between compound eyes.

The abdomen was detached and cleared in warm 10% NaOH solution for several minutes. Genitalia of both sexes were dissected, rinsed with distilled water, transferred to glycerol, and examined on slides. Photographs were taken by using digital cameras (ZEISS Imager M2 and AxioCam 506 Color) attached to the dissecting microscope using the ZEN 2.3 software.

## Taxonomy

### Genus *Novius* Mulsant, 1846

(Figs 1, 2d)

*Nomius* Mulsant, 1846: 213. Type species: *Nomius cruentatus* Mulsant, 1846, by monotypy. Junior homonym of *Nomius* Laporte, 1835.

*Novius* Mulsant, 1846: addenda et errata [p. 4]. Replacement name for *Nomius* Mulsant. Treated as synonym of *Rodolia* by Iqbal *et al.*, 2018: 1104.

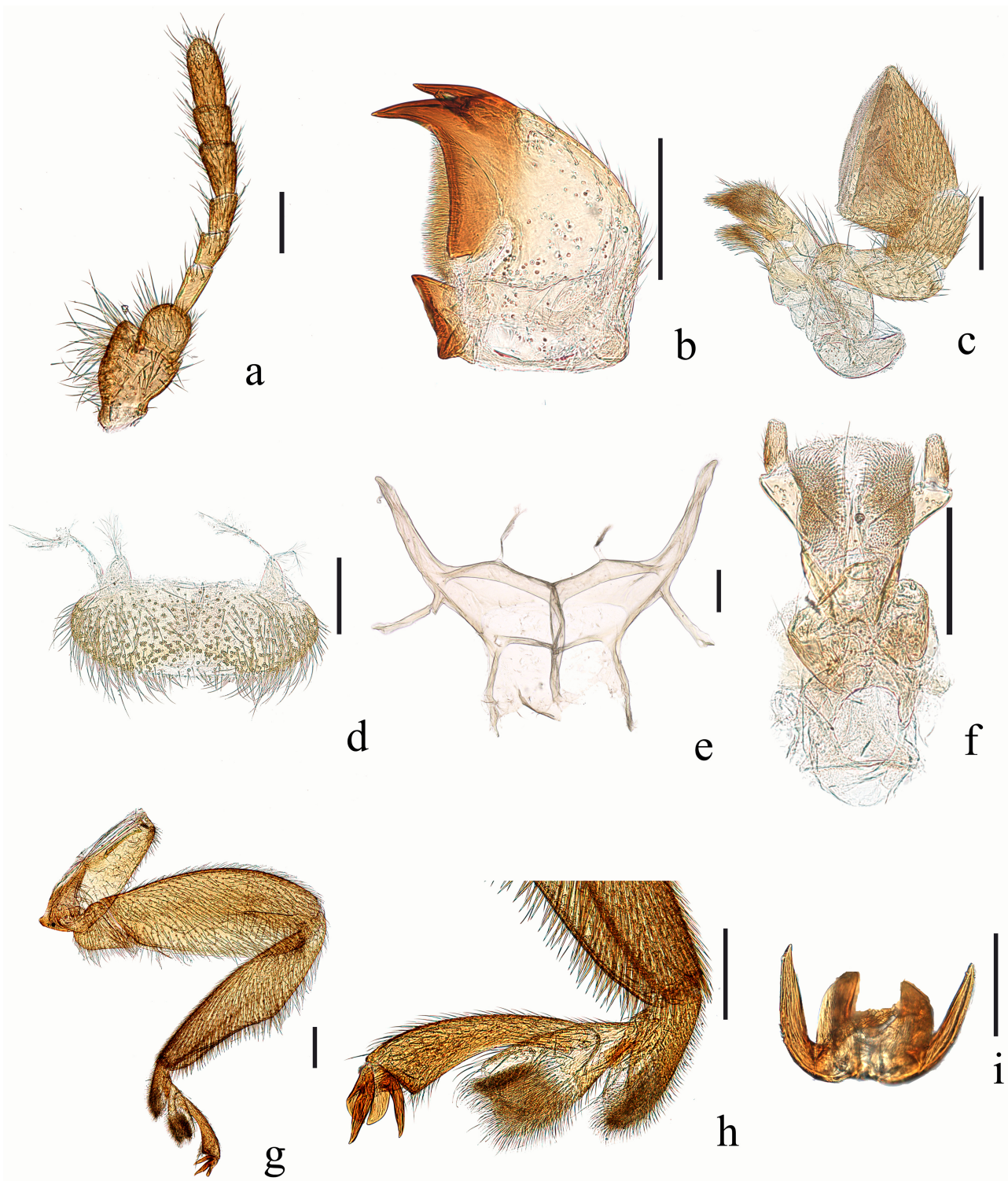
*Rodolia* Mulsant, 1850: 902. Type species: *Rodolia ruficollis* Mulsant, 1850, by subsequent designation of Crotch, 1874: 280. Korschefsky, 1931: 98; Sasaji, 1971: 233; Gordon, 1972: 25; 1985: 665; 1990: 291; Ślipiński, 2007: 141. Synonymized by Iqbal *et al.*, 2018: 1104.

*Macronovius* Weise, 1885: 63. Type species: *Novius limbatus* Motschulsky, 1866 (subgenus of *Rodolia*). Weise, 1895: 149 (synonym of *Rodolia*). Sicard, 1907: 68.

*Eurodolia* Weise, 1895: 149. Type species: *Eurodolia severini* Weise, 1895, by monotypy. Synonymized by Ślipiński, 2007: 141.

*Anovia* Casey, 1908: 408. Type species: *Scymnus virginalis* Wickham, 1905, by monotypy. Synonymized by Iqbal *et al.*, 2018: 1104.

**Description.** Body oval or elongate oval, medium size, moderately convex, dorsum densely pubescent without distinct rows of punctures (Fig. 2a–c). Head relatively broad with relatively large eyes, and without ocular canthus extending into eyes (Fig. 2c). Clypeus narrowed before eyes. Antenna short with 8 antennomeres, insertions within eye range, scape visible, antennal club with 3 antennomeres, divisions often indistinct (Fig. 1a). Mandible with two apical teeth, sharp and smooth, molar part with a single basal tooth (Fig. 1b). Terminal maxillary palpomeres distinctly securiform with strongly expanded (Fig. 1c). Labial palps composed of 2 palpomeres (Fig. 1f). Labrum long, approximately two times as long as wide, with distinct setae (Fig. 1d).



**FIGURE 1.** Main characters of *Novius rufopilosus* (Mulsant, 1850). **a.** Antenna. **b.** Mandible, right, dorsal view. **c.** Maxilla. **d.** Labrum. **e.** Metendosternite. **f.** Labium. **g.** Middle leg, left, dorsal view. **h.** Tarsi. **i.** Tarsal claws. Scale bars: 0.2 mm.

Pronotum trapezoidal, widest area before the base, with blunt anterior angles (Figs 2a–c). Prosternum in front of coxa strongly reduced; anterior margin of prosternum continuing as a line (Fig. 2a–c). Metendosternite stalk as long as broad, with tendons in the middle (Fig. 1e). Junction of meso-metaventrites narrow, narrower than coxal diameter, forming a straight line, with a visible suture. Tibia wide, with the outer edge angularly produced posteriorly and grooves (Fig. 1g). Tarsi with three tarsomeres (Fig. 1h), claws bifid with stout basal teeth (Fig. 1i). Abdomen with

six ventrites, abdominal postcoxal lines on ventrite 1 complete, separate medially and recurved, posteriorly distinctly separated from posterior margin of ventrite, ventrite 5 of the male with apical margin emarginated medially (Fig. 2d).

**Distribution.** Worldwide.

**Notes.** Pang *et al.* (2020) provided a world checklist of *Novius* including 13 species recorded from China. We examined a large number of *Novius* specimens from China, however specimens matching *N. brevisculus* (Weise, 1892), *N. hauseri* Mader, *N. rubeus* (Mulsant, 1850), *N. rufocinctus* (Lewis, 1896) and *N. sexnotatus* (Mulsant, 1850) were not found. Further investigation is necessary to determine whether these species are indeed distributed in China.

## Key to species of the genus *Novius* from China

1. Elytra without spots (Figs 2a, 3a) . . . . . 2
- Elytra with spots (Figs 9a, 10a) . . . . . 8
2. Elytra dark red (Fig. 2a) . . . . . *N. concolor* Lewis, 1879
- Elytra red, yellow or reddish orange (Figs 3a, 4a, 5a) . . . . . 3
3. Body yellow (Fig. 3a) . . . . . *N. oncosiphonus* Tao & Wang **sp. nov.**
- Body red or reddish orange (Figs 4a, 5a) . . . . . 4
4. Penis capsule distinctly enlarged (Fig. 4e) . . . . . *N. megalocystis* Tao & Wang **sp. nov.**
- Penis capsule not enlarged (Figs 5e, 6e) . . . . . 5
5. Penis guide longer than parameres in lateral view (Fig. 5f) . . . . . *N. penicillioides* Tao & Wang **sp. nov.**
- Penis guide as long as or slightly shorter than parameres in lateral view (Figs 6f, 7f) . . . . . 6
6. Penis guide strongly narrowed at the distal 1/4 in inner view (Fig. 6f) . . . . . *N. ruficollis* (Mulsant, 1850)
- Penis guide gradually narrowed in inner view (Figs 7f, 8f) . . . . . 7
7. Penis guide stout in lateral view (Fig. 7f) . . . . . *N. pumilus* (Weise, 1892)
- Penis guide slender in lateral view (Fig. 8f) . . . . . *N. rufopilosus* (Mulsant, 1850)
8. Pronotum red without black spots (Fig. 9a) . . . . . *N. octoguttatus* (Weise, 1910)
- Pronotum red or yellow with black spots (Figs 10a, 11a) . . . . . 9
9. Pronotum with a black narrow V-shaped spot (Fig. 10a) . . . . . *N. formosanus* (Korschefskey, 1935)
- Pronotum without V-shaped spots (Fig. 11a) . . . . . 10
10. Penis stout (Fig. 11e) . . . . . *N. cardinalis* (Mulsant, 1850)
- Penis slender (Figs 12e, 13e) . . . . . 11
11. Elytra with two black spots (Figs 12a, 13a) . . . . . 12
- Elytra with more than two spots (Figs 14a, 15a) . . . . . 13
12. Body short oval, extremely convex, widest at 1/3, outer arm of penis capsule obtuse (Fig. 12a, e) . . . . . *N. fumidus* (Mulsant, 1850)
- Body elongate oval, moderately convex, widest at middle, outer arm of penis capsule with a small, pointed protrusion (Fig. 13a, e) . . . . . *N. limbatus* Motschulsky, 1866
13. Elytra with connecting black spots (Fig. 14a) . . . . . *N. xianfengensis* (Xiao, 1992)
- Elytra without connecting black spots (Figs 15a, 16a) . . . . . 14
14. Head black (Fig. 15c) . . . . . *N. trapezoidalis* Tao & Wang **sp. nov.**
- Head reddish brown (Fig. 16c) . . . . . *N. quadrimaculatus* (Mader, 1939)

## Species descriptions and redescriptions

### *Novius concolor* Lewis, 1879

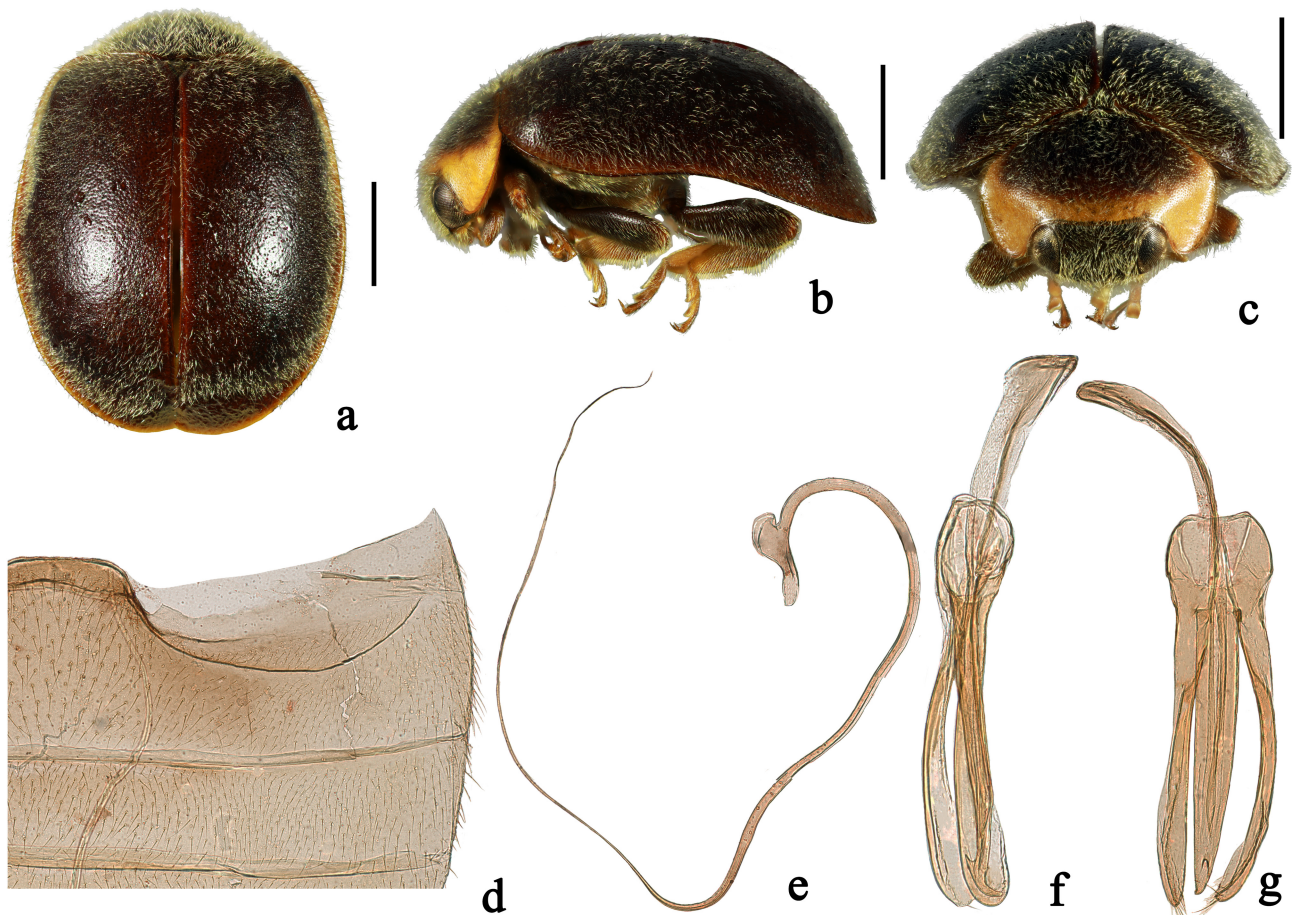
Chinese common name: 暗红瓢虫  
(Fig. 2)

*Novius concolor* Lewis, 1879: 466; Pang *et al.*, 2020a: 18; Wang *et al.*, 2022: 326.

*Rodolia concolor* Lewis, 1896: 40; Mader 1955: 969; Nakane 1963: 104; Korschefskey 1931: 101; Kamiya 1965: 98; Sasaji 1968: 112; 1970: 209; 1971: 237; Forrester 2008: 92; Ren *et al.* 2009: 160.

**Material examined. China: Henan:** 1♂, Baiyunshan National Nature Reserve, Luoyang City, 14. VI. 2009, Wang XM *et al.* leg.

**Diagnosis.** This species can be distinguished from other members of Chinese *Novius* by the dark red elytra (Fig. 2a) and the abdominal postcoxal lines reaching about 1/4 length of ventrite 1 (Fig. 2d).



**FIGURE 2.** *Novius concolor* Lewis, 1879. **a.** Dorsal view. **b.** Lateral view. **c.** Frontal view. **d.** abdomen. **e.** Penis. **f.** Tegmen, lateral view. **g.** Tegmen, inner view. Scale bars: **a–c:** 1.0 mm.

**Description.** TL: 4.15 mm, TW: 3.33 mm, TH: 1.33 mm, TL/TW: 1.25; PL/PW: 0.58; EL/EW: 1.01; HW/PW: 0.59; PW/TW: 0.61; HW/TW: 0.36; Eye W/HW: 0.54.

Body elongate oval, lightly convex; surface covered with short setae (Fig. 2a, b). Head dark red (Fig. 2c). Pronotum trapezoid, dark red, with anterior margin and anterior corner yellowish brown (Fig. 2a, c). Legs dark (Fig. 2b). Elytra completely dark red, unspotted (Fig. 2a, c). Head 0.36 times of elytral width ( $HW/TW=1:2.78$ ) (Fig. 2c); eyes densely faceted, interocular distance 0.54 times width of head (Fig. 2c). Pronotum 0.61 times of elytral width ( $PW/TW=1:1.64$ ), moderately transverse, punctures uniform (Fig. 2a, c). Abdomen with six ventrites; abdominal postcoxal lines complete, recurved roundly, reaching 1/4 length of ventrite 1 (Fig. 2d).

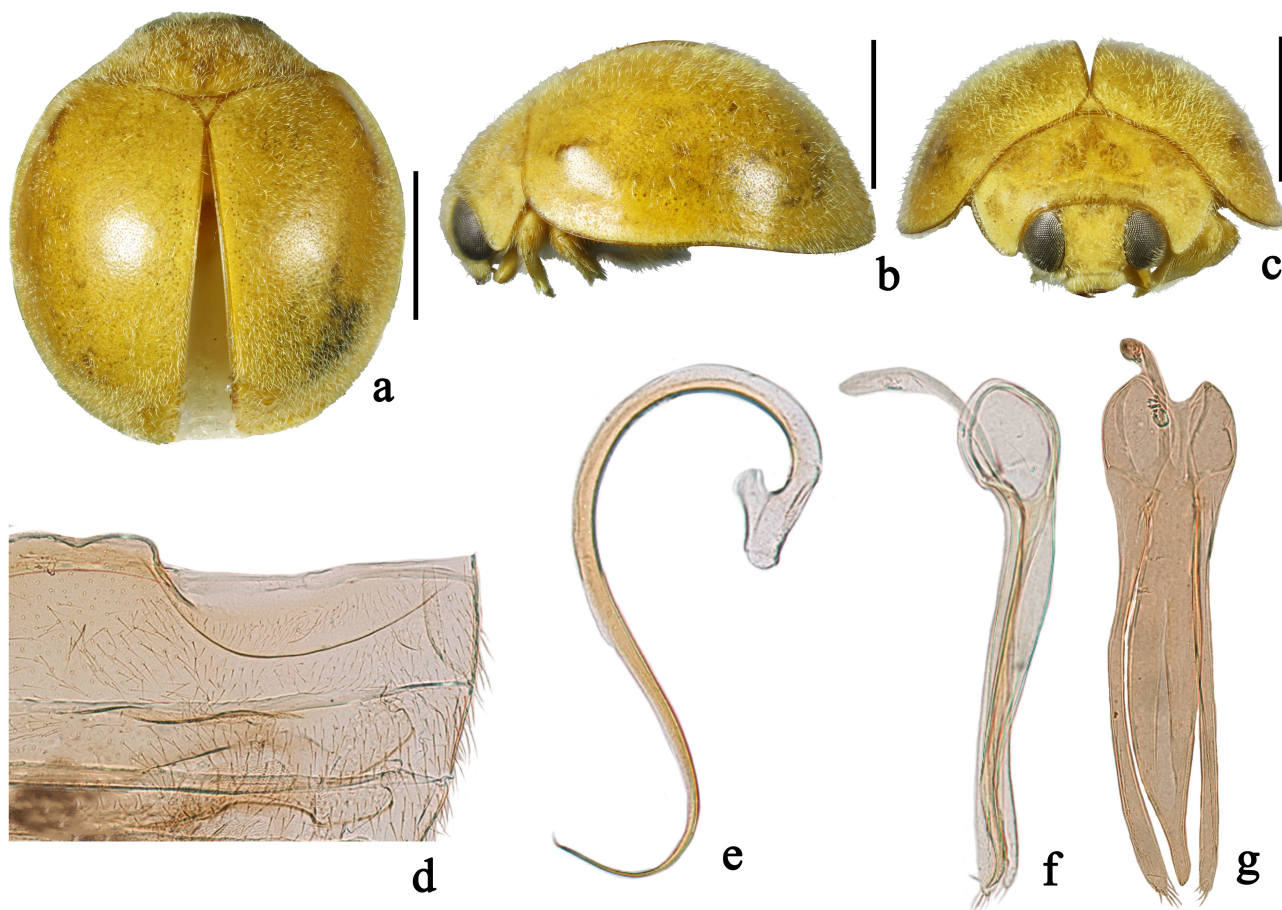
Male genitalia: penis slender, extremely long and strongly curved, abruptly narrowed at the proximal 1/2; penis capsule T-shaped, inner arm slightly longer the outer arm (Fig. 2e). Parameres long, slender, excavate, approximately narrowest at the proximal 1/2, then gradually widening to the pointed apex. Penis guide slightly shorter than parameres, with basal part dorsally expanded to form apical barb (Fig. 2f, g).

**Distribution.** China (Henan); Africa.

***Novius oncosiphonus* Tao & Wang sp. nov.**

Chinese common name: 钩管红瓢虫  
(Fig. 3)

**Type material. HOLOTYPE:** CHINA: Guangxi: ♂, Shiwandashan National Forest Park, 9–11. XI. 2004, Wang XM leg, No. SCAU(E)17252. **PARATYPES:** CHINA: Guangxi: 5♂3♀, Shiwandashan National Forest Park, 9–11. XI. 2004, Wang XM leg. Yunnan: 1♂1♀, Mengla Farm, 22. IV. 2002, Peng ZQ leg; 1♂, East Farm, Jinghong City, 1. IV. 2002, Peng ZQ leg; 1♂, Longmen Village, Mengla County, 9.V. 2009, Ren SX leg.



**FIGURE 3.** *Novius oncosiphonus* Tao & Wang **sp. nov.** **a.** Dorsal view. **b.** Lateral view. **c.** Frontal view. **d.** Abdomen. **e.** Penis. **f.** Tegmen, lateral view. **g.** Tegmen, inner view. Scale bars: **a–c:** 1.0 mm.

**Diagnosis.** This species can be distinguished from other members of Chinese *Novius* by the small yellow body (Fig. 3a), the penis strongly curved as S-shape and the penis capsule with inner arm nearly equal length to outer arm (Fig. 3e).

**Description.** TL: 2.67–2.86 mm, TW: 2.44–2.56 mm, TH: 1.49–1.49 mm, TL/TW: 1.09–1.32; PL/PW: 0.58–0.63; EL/EW: 0.89–0.90; HW/PW: 0.61–0.62; PW/TW: 0.64–0.64; HW/TW: 0.39–0.39; Eye W/HW: 0.41–0.41.

Body nearly rounded, moderately convex, hemispherical, widest near middle part, with short setae (Fig. 3a, b). Head yellow (Fig. 3c). Pronotum yellow (Fig. 3a, b). Legs yellow (Fig. 3b). Elytra yellow (Fig. 3a). Head 0.39 times of elytral width ( $HW/TW=1:2.56$ ); eyes densely faceted, interocular distance 0.41 times width of head (Fig. 3c). Pronotum 0.64 times of elytral width ( $PW/TW=1:1.56$ ), moderately transverse, punctures uniform (Fig. 3a, c). Abdomen with six ventrites, postcoxal lines recurved roundly and complete, reaching to 1/2 length of ventrite 1 (Fig. 3d).

Male genitalia: penis slender, long and strongly curved as S-shape; penis capsule with inner arm nearly as long as outer arm (Fig. 3e). Parameres long, slender, narrow in basal region, slightly expanded at apex in front view (Fig. 3h); penis guide slightly shorter than parameres, narrowing at distal half, with upturned apex (Fig. 3g, f).

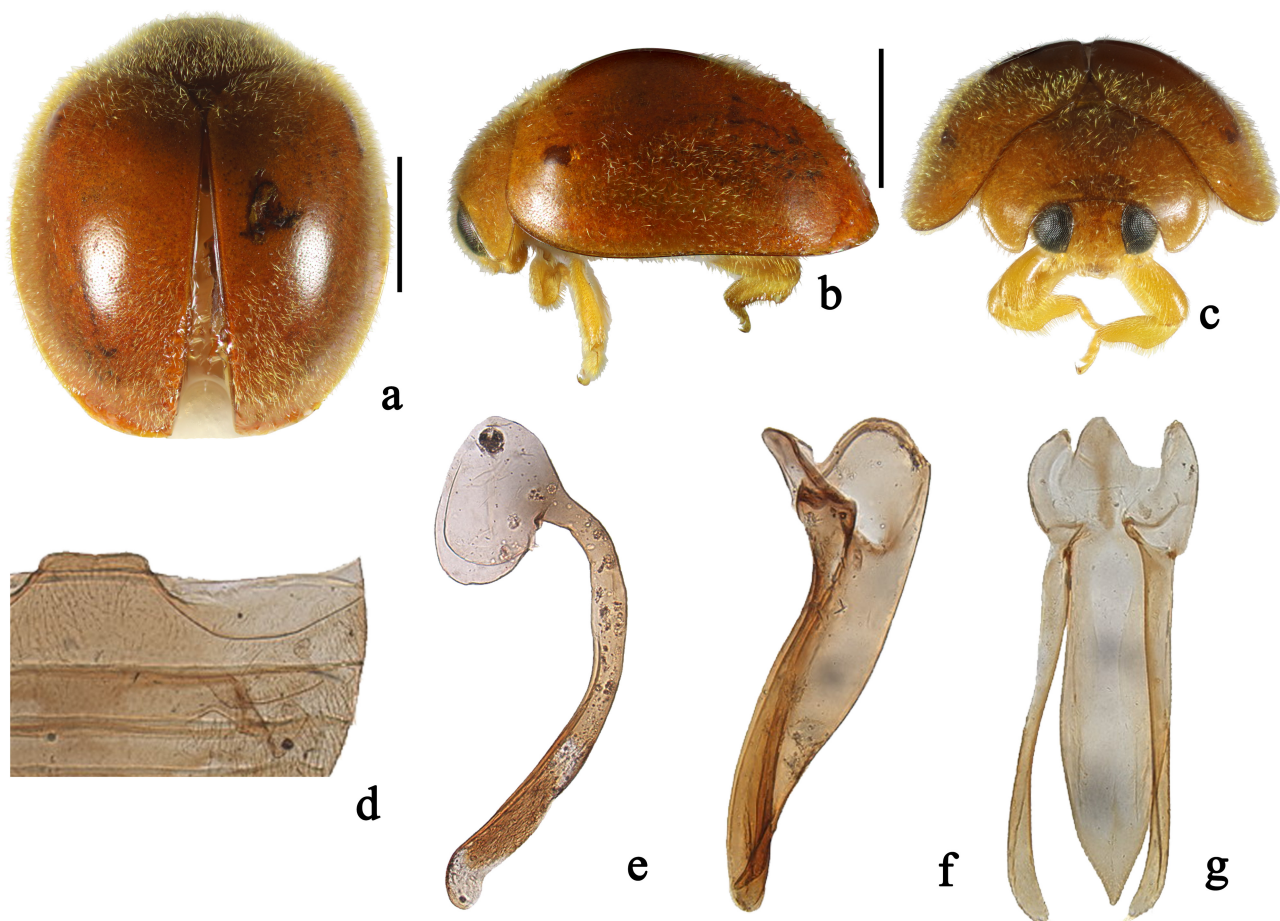
**Distribution.** China (Guangxi; Yunan).

**Etymology.** The specific epithet is derived from the Latin adjective "oncosiphonus", referring to its penis strongly curved as S-shape.

***Novius megalocystis* Tao & Wang **sp. nov.****

Chinese common name: 大囊红瓢虫

(Fig. 4)



**FIGURE 4.** *Novius megalocystis* Tao & Wang sp. nov. **a.** Dorsal view. **b.** Lateral view. **c.** Frontal view. **d.** Abdomen. **e.** Penis. **f.** Tegmen, lateral view. **g.** Tegmen, inner view. Scale bars: **a–c:** 1.0 mm.

**Type material. HOLOTYPE:** CHINA: Yunnan: ♂, Jinghong City, 24. VIII. 2005, Wang XM leg, No. SCAU(E)17261. **PARATYPES:** CHINA: Yunnan: 4♂1♀, Jinghong City, 24. VIII. 2005, Wang XM leg.

**Diagnosis.** This species can be distinguished from other members of Chinese *Novius* by its penis broad and relatively short, broad and relatively short, penis apex rounded, the penis capsule distinctly enlarge, the abdominal postcoxal lines reaching lateral margin of the ventrite (Fig. 4e), and the tegminal strut very short (Fig. 4f). This species is similar to *N. pumilus* in having the red body (Figs 4a, 8a), while it can be distinguished from the latter by the distinctly enlarged penis capsule (Fig. 4e). In *N. pumilus*, the penis capsule is not distinctly enlarged (Fig. 8e).

**Description.** TL: 3.25–3.79 mm, TW: 3.00–3.55 mm, TH: 1.61–1.92 mm, TL/TW: 1.07–1.08; PL/PW: 0.63–0.66; EL/EW: 0.90–0.91; HW/PW: 0.50–0.56; PW/TW: 0.58–0.60; HW/TW: 0.29–0.34; Eye W/HW: 0.37–0.47.

Body short oval, length slightly longer than its width, convex in dorsal part, with short setae (Fig. 4a, b). Head, pronotum and elytra red (Fig. 4a–c). Legs pale yellow (Fig. 4b–c). Head 0.32 times of elytral width (HW/TW=1:3.16); eyes densely faceted, interocular distance 0.42 times width of head (Fig. 4c). Pronotum 0.59 times of elytral width (PW/TW=1:1.69), moderately transverse, punctures uniform (Fig. 4a, c). Abdomen with six ventrites; postcoxal lines recurved roundly and complete, reaching about 1/2 length of ventrite 1 (Fig. 4d).

Male genitalia: penis relatively short and stout, strongly curved at the basal 1/3, with a very large and circle-shaped penis capsule (Fig. 4e). Parameres slender and straight, weakly expanded at apex; apical setae short. Penis guide stout, shorter than parameres, with short uptured apex; medially with a relatively broad lobe, which is almost parallel in both sides and strongly tapering apically (Fig. 4f, g).

**Distribution.** China (Yunnan).

**Etymology.** The specific epithet is formed from the Latin noun "megalocystis", referring to its penis capsule distinctly enlarged.

*Novius penicillioides* Tao & Wang sp. nov.

Chinese common name: 笔头红瓢虫

(Fig. 5)

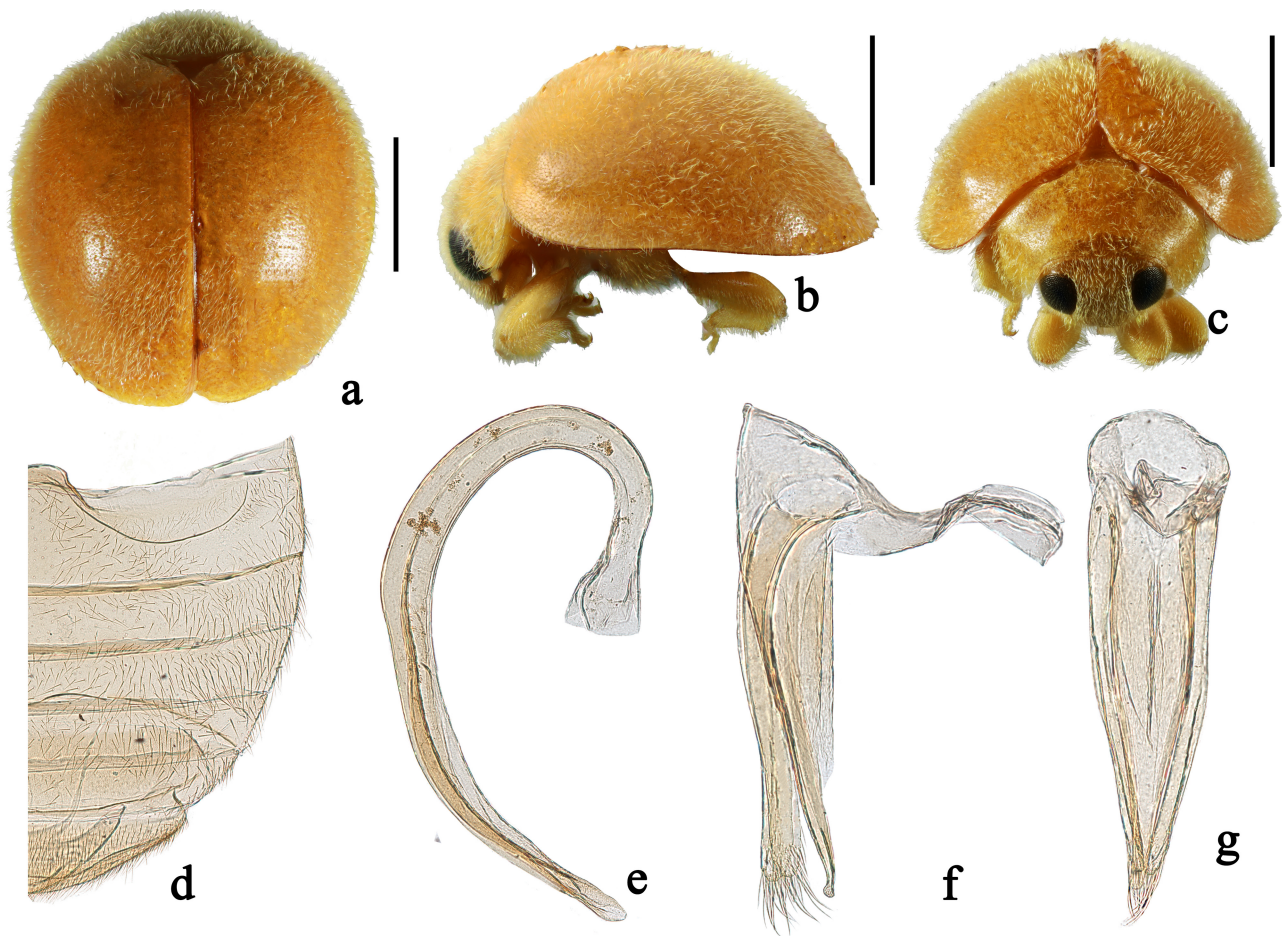


FIGURE 5. *Novius penicillioides* Tao & Wang sp. nov. a. Dorsal view. b. Lateral view. c. Frontal view. d. Abdomen. e. Penis. f. Tegmen, lateral view. g. Tegmen, inner view. Scale bars: a–c: 1.0 mm.

**Type material.** HOLOTYPE: CHINA: Yunnan: ♂, Mengla County, 12–13. X. 2006, Wang XM leg, No. SCAU(E)17259. PARATYPES: CHINA: Guangxi: 1♂, Mao'ershan National Nature Reserve, 19. X. 2004, Wang XM leg. Guizhou: 1♂1♀, Dongtang Village, Libo County, 15. V. 2006, Wang XM *et al.* leg. Yunnan: 4♂4♀, Mengla County, 8. X. 2006, Wang XM leg; 1♂1♀, Menglun Town, Jinghong City, 11. X. 2009, Wang XM *et al.* leg.

**Diagnosis.** This species can be distinguished from other members of Chinese *Novius* by its penis capsule is reduced, arms are reduced (Fig. 5e), the penis guide longer than parameres, and it is a droplet-like apical projection close to apex in lateral view (Fig. 5f).

**Description.** TL: 3.03–3.78 mm, TW: 2.79–3.53 mm, TH: 1.72–1.94 mm, TL/TW: 1.07–1.09; PL/PW: 0.64–0.65; EL/EW: 0.88–0.89; HW/PW: 0.59–0.61; PW/TW: 0.56–0.58; HW/TW: 0.33–0.35; Eye W/HW: 0.40–0.44.

Body nearly round, moderately convex, hemispherical, widest near middle part, with short setae (Fig. 5a, b). Head, pronotum and legs reddish orange (Fig. 5b–c). Elytra orange, unspotted (Fig. 5a). Head 0.34 times of elytral width (HW/TW=1:2.94); eyes densely faceted, interocular distance 0.42 times width of head (Fig. 5c). Pronotum 0.57 times of elytral width (PW/TW=1:1.75), moderately transverse, punctures uniform (Fig. 5a, c). Abdomen with six ventrites; postcoxal lines recurved roundly and complete, reaching to 1/2 length of ventrite 1 (Fig. 5d).

Male genitalia: penis stout, strongly curved; penis capsule reduced, arms are reduced and the penis tip apically rounded (Fig. 5e). Parameres slender, weakly expanded at apex; apical setae long. Penis guide longer than parameres, with a droplet-like apical projection close to apex (Fig. 5f, g).



**Distribution.** China (Guangxi, Guizhou, Yunnan).

**Etymology.** The specific epithet is formed from the Latin adjective "*penicillioides*", referring to its apex of penis guide, which resembles the tip of pen in lateral view.

***Novius ruficollis* (Mulsant, 1850)**

Chinese common name: 舟叶红瓢虫

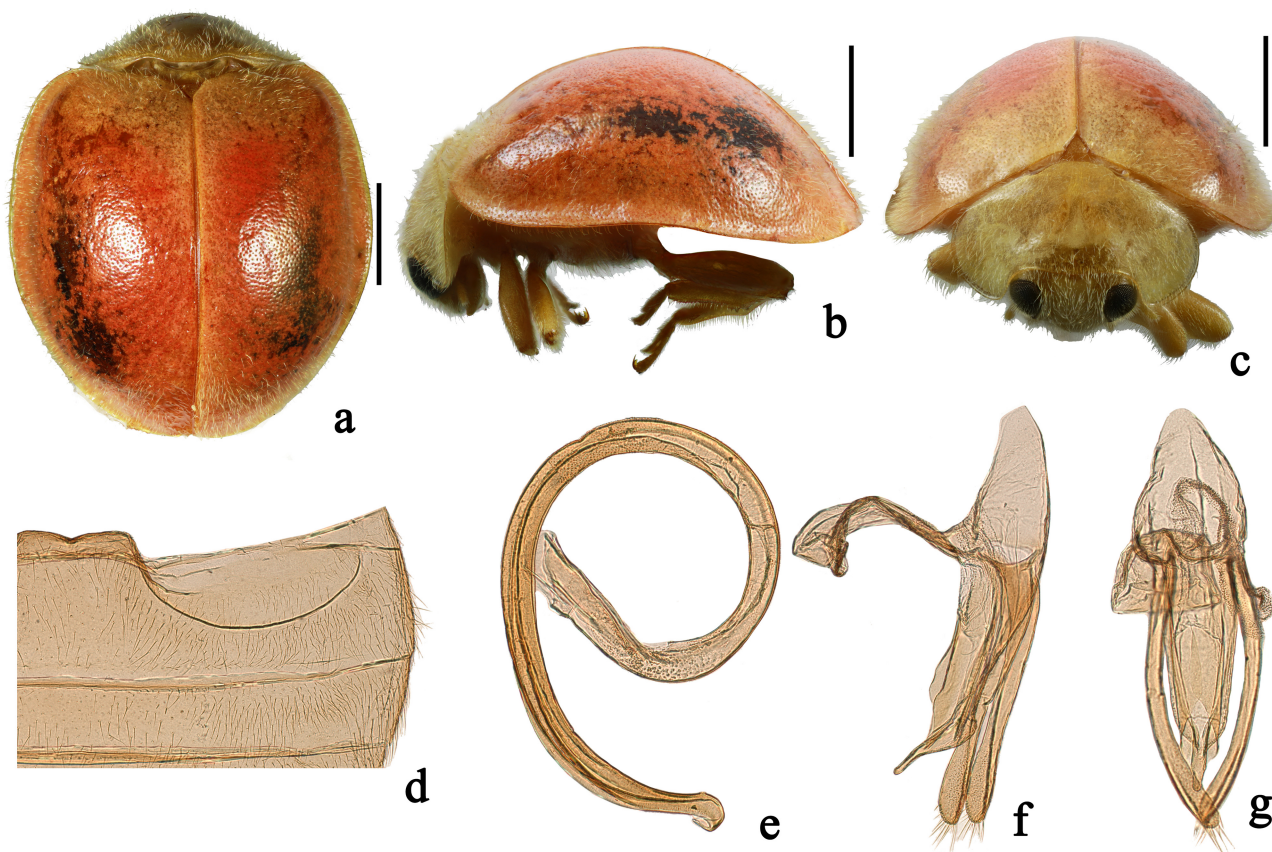
(Fig. 6)

*Rodolia ruficollis* Mulsant, 1850: 903; Korschefsky 1931: 102; Kapur 1949: 535; Poorani 2002: 318.

*Vedalia ruficollis*: Crotch 1874: 281.

*Novius ruficollis*: Pang *et al.* 2020a: 20; Poorani 2023: 30.

**Material examined. China: Yunnan:** 2♂2♀, Tongbiguan Town, 23–24. IX. 2006, Wang XM leg; 3♂5♀, Nanjingli Village, Ruili City, 25. IX. 2006, Wang XM leg; 2♂5♀, Mengla County, 8. X. 2006, Wang XM *et al.* leg; 3♂, Anban Town, Zhenyuan County, 4. X. 2006, Wang XM leg; 1♂1♀, Ainiguzhai, Menglun Town, Jinghong City, 11. V. 2009, Wang XM leg; 1♂, Nuozhadu Town, 12. V. 2008, Wang XM *et al.* leg; 1♂, Wuliangshan National Nature Reserve, 29. IX. 2006, Wang XM leg; 2♀, Dadugang Town, Xishuangbanla City, 5.V. 2009, Wang XM *et al.* leg; 2♀, Lafu village, Menglian county, 7. V. 2008, Wang XM *et al.* Leg; 2♂, Dadugang Town, 15. X. 2006, Wang XM leg.



**FIGURE 6.** *Novius ruficollis* (Mulsant, 1850): a. Dorsal view. b. Lateral view. c. Frontal view. d. Abdomen. e. Penis. f. Tegmen, lateral view. g. Tegmen, inner view. Scale bars: a–c: 1.0 mm.

**Diagnosis.** This species can be distinguished from other members of *Novius* by the penis capsule not obvious (Fig. 6e), and the penis guide strongly narrowed at the distal 1/4 in lateral view (Fig. 6f).

**Description.** TL: 3.86–4.63 mm, TW: 3.52–4.36 mm, TH: 1.85–2.49 mm, TL/TW: 1.06–1.10; PL/PW: 0.58–0.60; EL/EW: 0.92–0.98; HW/PW: 0.53–0.53; PW/TW: 0.57–0.60; HW/TW: 0.30–0.32; Eye W/HW: 0.49–0.55.

Body broadly oval, with short setae (Fig. 6a). Head and pronotum yellow (Fig. 6a, c). Legs reddish brown (Fig.

6b–c). Elytra red with yellow base (Fig. 6a). Head 0.31 times of elytral width ( $HW/TW=1:3.23$ ), with fine frontal punctures; eyes densely faceted, interocular distance 0.52 times width of head (Fig. 6c). Pronotum 0.58 times of elytral width ( $PW/TW=1:1.72$ ), moderately transverse, punctures uniform (Fig. 6a, c). Abdomen with six ventrites; postcoxal lines recurved roundly and complete, reaching about 1/3 length of ventrite 1 (Fig. 6d).

Male genitalia: penis stout, strongly curved; penis capsule reduced, arms are reduced (Fig. 6e). Parameres slender, narrow at base, slightly expanded apically (Fig. 6g). Penis guide slightly shorter than parameres, strongly narrowed at the distal 1/4 in lateral view (Fig. 6f).

**Distribution.** China (Yunan) **New distribution;** India; Pakistan; Thailand; Vietnam.

***Novius pumilus* (Weise, 1892)**

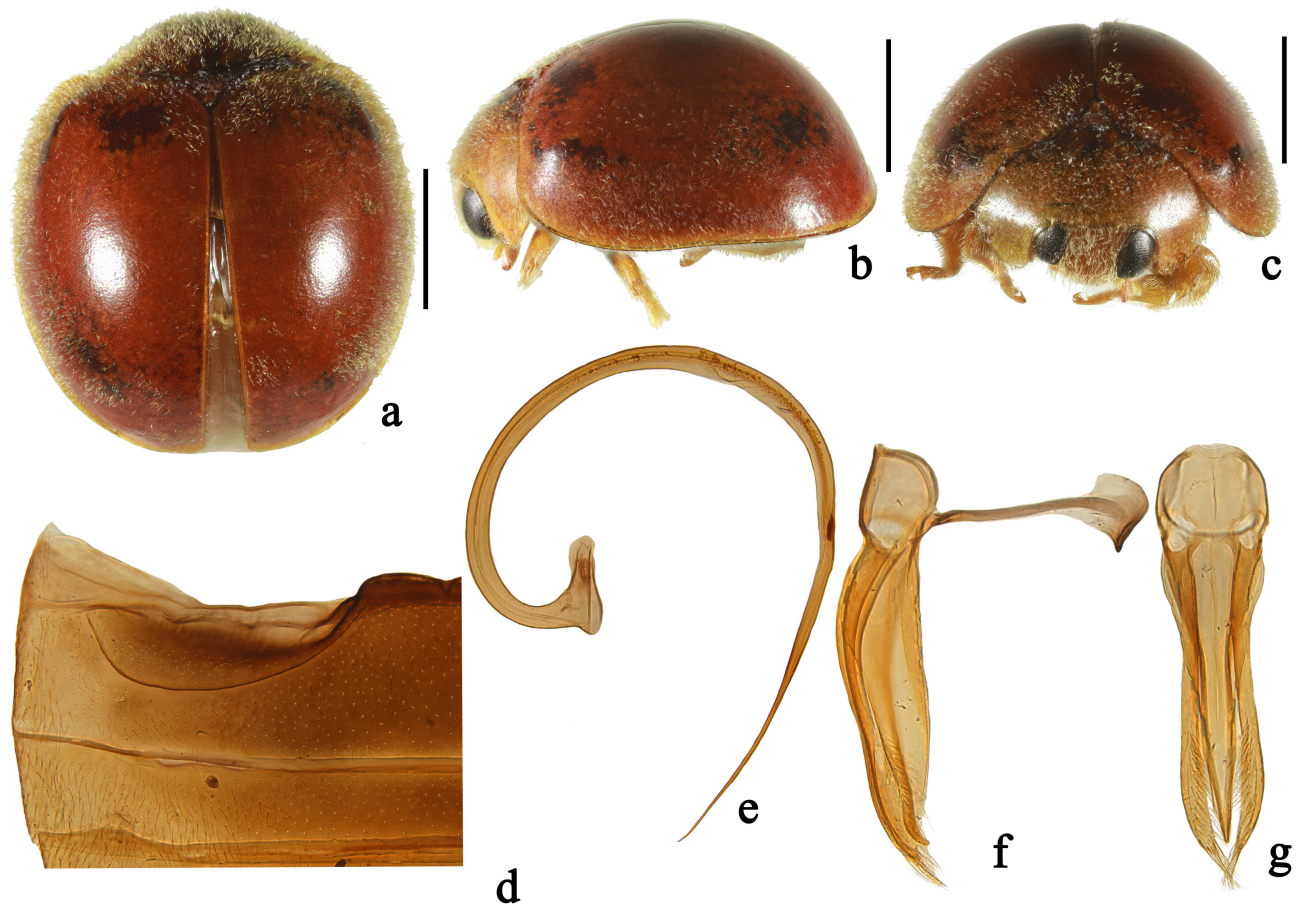
Chinese common name: 小红瓢虫  
(Fig. 7)

*Rodolia pumila* Weise, 1892: 26; Korschefsky 1931:102; Mader 1955: 969; Beardsley 1955: 396; Miyatake 1959: 127; Nakane 1963: 104; Chapin 1965: 239; Kamiya 1965: 99; Sasaji 1971: 239; Fürsch 1974: 23; Hoang 1983: 30; Yu & Lau 2001: 148; Forrester 2008: 131; Ren *et al.* 2009: 162.

*Rodolia okinawensis* Miyatake, 1959: 127. Synonymized by Sasaji 1971: 239.

*Novius pumilus*: Pang *et al.* 2020a: 20; Wang *et al.* 2022: 328; Poorani 2023: 28.

**Material examined.** **China: Guangdong:** 1♂2♀, campus of Sun Yat-Sen University, 1. XII. 2004, Wang XM leg. **Guangxi:** 1♂2♀, Shiwandashan National Nature Reserve, 11. XI. 2004, Wang XM leg. **Hainan:** 35♂42♀, Haikou City, 18. VI. 1996, Peng ZQ leg. **Yunnan:** 1♂, Jinghong City, 24. VIII. 2005, Wang XM *et al.* leg.



**FIGURE 7.** *Novius pumilus* (Weise, 1892). a. Dorsal view. b. Lateral view. c. Frontal view. d. Abdomen. e. Penis. f. Tegmen, lateral view. g. Tegmen, inner view. Scale bars: a–c: 1.0 mm.

**Diagnosis.** This species can be distinguished from other members of Chinese *Novius* by the penis capsule not obvious (Fig. 7e), the outer arm small and shorter than inner arm of penis capsule and the penis guide stout in lateral view (Fig. 7f). This species is similar to *N. megalocystis* in having the red body (Figs 4a, 8a), while it can be distinguished from the latter by the not enlarged penis capsule (Fig. 4e). In *N. megalocystis*, the penis capsule is distinctly enlarged (Fig. 8e).

**Description.** TL: 2.69–3.70 mm, TW: 2.59–3.50 mm, TH: 1.40–1.87 mm, TL/TW: 1.04–1.06; PL/PW: 0.58–0.62; EL/EW: 0.86–0.91; HW/PW: 0.55–0.55; PW/TW: 0.59–0.61; HW/TW: 0.33–0.33; Eye W/HW: 0.42–0.43.

Body nearly round, extremely convex, hemispherical, covered yellow short setae (Fig. 7a). Head red (Fig. 7c). Pronotum red, with convex posterior margin and concaved anterior margin, unspotted (Fig. 7a, c). Legs red (Fig. 7b–c). Elytra red, unspotted. Head 0.33 times of elytral width ( $HW/TW=1:3.0$ ), with fine frontal punctures; eyes densely faceted, interocular distance 0.42 times width of head (Fig. 7c). Pronotum 0.60 times of elytral width ( $PW/TW=1:1.67$ ), moderately transverse, punctures uniform (Fig. 7a, c). Abdomen with six ventrites, abdominal postcoxal lines complete and recurved roundly, reaching about 1/3 length of ventrite 1 (Fig. 7d).

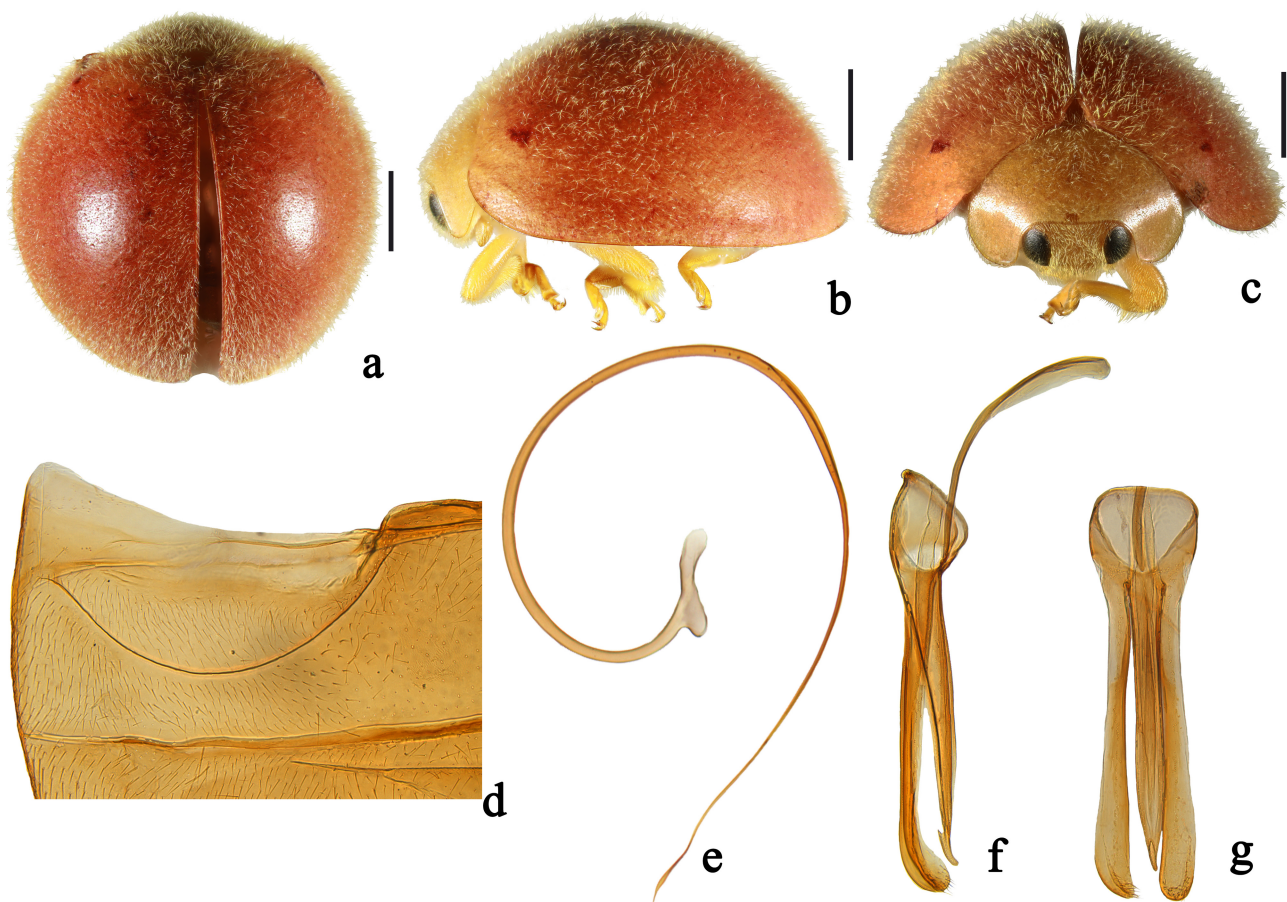
Male genitalia: penis slender, long and strongly curved, narrowed near the apical 1/5; penis capsule with short outer arm and long inner arm (Fig. 7e). Parameres long, slender, narrow in basal region, expanded at apex in inner view (Fig. 7g). Penis guide slightly shorter than parameres, stout, with short setae apically (Fig. 7f).

**Distribution.** China (Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hong Kong, Taiwan, Yunnan); India; Japan; Micronesia; Vietnam.

### *Novius rufopilosus* (Mulsant, 1850)

Chinese common name: 大红瓢虫

(Fig. 8)



**FIGURE 8.** *Novius rufopilosus* (Mulsant, 1850). a. dorsal view. b. Lateral view. c. Frontal view. d. Abdomen. e. Penis. f. Tegmen, lateral view. g. Tegmen, inner view. Scale bars: a–c: 1.0 mm.

*Rodolia rufopilosa* Mulsant 1850: 903; Crotch 1874: 281; Korschefsky 1931: 102; Mader 1955: 969; Hoang 1983: 31; Weise 1892: 26; Yu & Lau 2001: 149; Ren *et al.* 2009: 164.  
*Novius rufopilosus*: Pang *et al.* 2020a: 20; Wang *et al.* 2022: 328; Poorani 2023: 33.

**Material examined. China: Hainan:** 1♀, Wushi Village, 14. VII. 1999, Peng ZQ leg; 1♂, Bawangling National Nature Reserve, 20. VII. 2006, Tang LD leg. **Hunan:** 1♂, Mangshan National Nature Reserve, 3. X. 2004, Zhou HP leg. **Guangdong:** 1♂1♀, Shipai Village, Guangzhou City, 5. VIII. 1965, Wang BC leg. **Jiangxi:** 1♂1♀, Jinggangshan National Nature Reserve, 18. IX. 2004, Wang XM leg. **Zhejiang:** 1♂1♀, Yandangshan National Forest Park, 15. VIII. 1989, Yu GY leg.

**Diagnosis.** This species can be distinguished from other Chinese members of *Novius* by the inner arm of penis capsule is longer than the outer arm and the penis guide slender in lateral view (Fig. 8f).

**Description.** TL: 3.79–5.50 mm, TW: 3.65–5.30 mm, TH: 1.74–2.86 mm, TL/TW: 1.04–1.04; PL/PW: 0.62–0.64; EL/EW: 0.90–0.91; HW/PW: 0.51–0.53; PW/TW: 0.55–0.57; HW/TW: 0.28–0.30; Eye W/HW: 0.45–0.46.

Body nearly round, moderately convex, hemispherical, widest near middle part, with yellow short setae (Fig. 8a, b). Tibiae with transverse cavities (Fig. 8c). Pronotum red (Fig. 8a, c). Elytra red, unspotted. Head 0.29 times of elytral width (HW/TW=1:3.4), with fine frontal punctures; eyes densely faceted, interocular distance 0.46 times width of head (Fig. 8c). Pronotum 0.56 times of elytral width (PW/TW=1:1.8), moderately transverse, punctures uniform (Fig. 8a, c). Abdomen with six ventrites; postcoxal lines recurved roundly and complete; ventrite 6 convex in middle of posterior margin, reaching about 3/5 length of ventrite 1 (Fig. 8d).

Male genitalia: penis slender, very long and strongly curved, narrow in middle part and penis tip lightly thickened; penis capsule with short outer arm and long inner one, (Fig. 8e). Parameres long and slender, narrow at base, expanded apically (Fig. 8g). Penis guide slightly shorter than parameres, with apical barb in lateral view (Fig. 8f).

**Distribution.** China (Fujian, Hainan, Hong Kong, Hubei, Hunan, Gansu, Guangdong, Guangxi, Guizhou, Jiangsu, Jiangxi, Shanxi, Shanghai, Sichuan, Xizang, Yunnan, Zhejiang); Myanmar; Philippine; Sumatra; Vietnam.

### *Novius octoguttatus* (Weise, 1910)

Chinese common name: 八斑红瓢虫  
(Fig. 9)

*Rodolia octoguttata* Weise 1910: 51.

*Rodolia octoguttata* (Sic!): Ren *et al.*, 2009: 162.

*Novius octoguttatus*: Pang *et al.* 2020: 20; Wang *et al.* 2022: 328; Poorani 2023: 26.

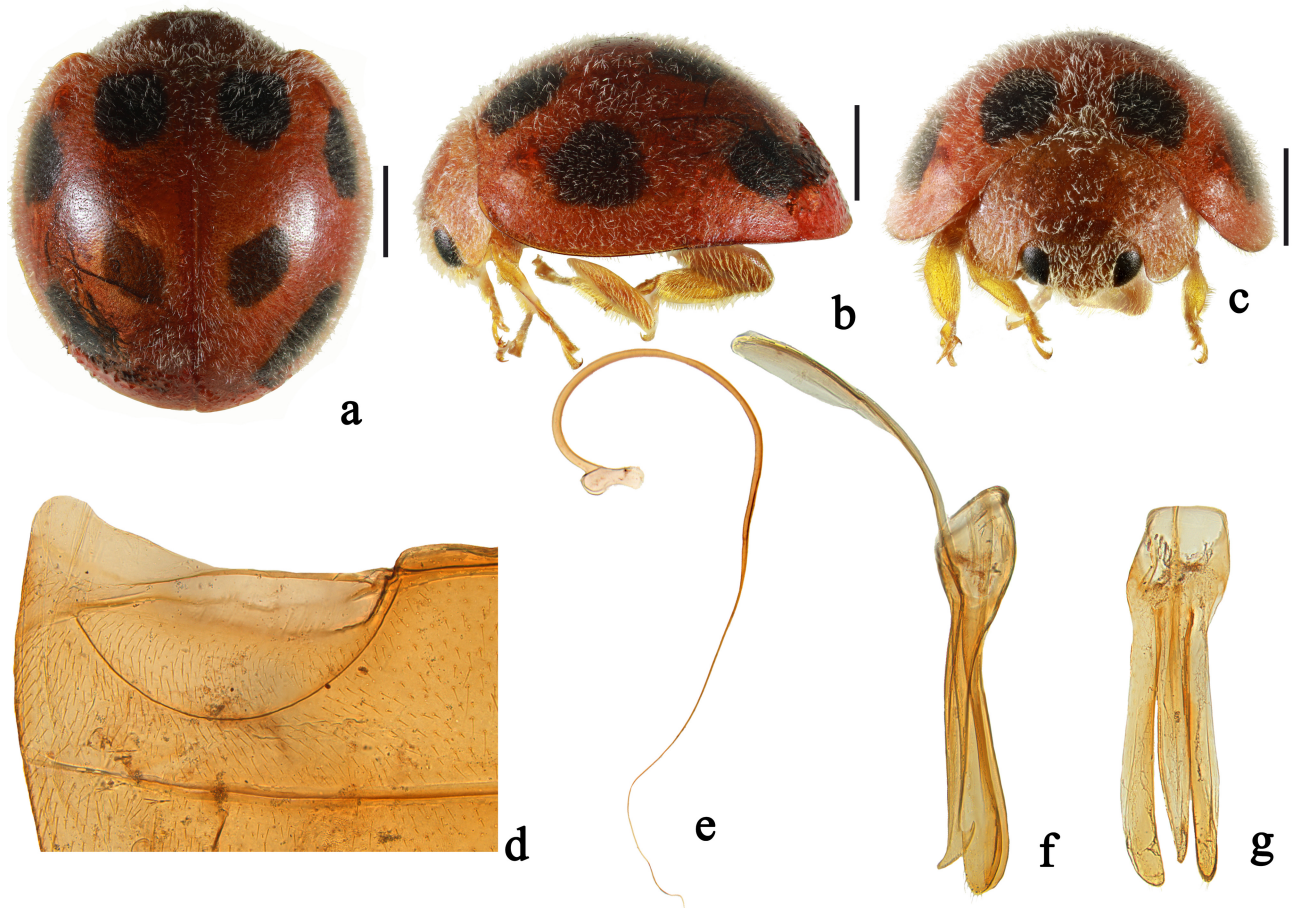
**Material examined. China: Guangdong:** 3♂5♀, Shipai Village, IV. 1980, Yu JQ leg; 2♀, Heishiding Nature Reserve, Fengkai County, 5. VII. 1987, Zhang QL leg. **Hainan:** 2♀, Wuzhishan National Nature Reserve, 24. VII. 2006, Wang XM leg; 1♀, Limushan National Forest Park, 23. VII. 2006, Peng ZQ. **Yunnan:** 1♂, Gonglang Town, Nanjian County, Dali City, 28. IX. 2006, Wang XM leg.

**Diagnosis.** This species can be distinguished from other members of Chinese *Novius* by the red elytra with eight black spots (Fig. 9a), the pronotum red without black spots, and postcoxal lines reaching to 3/5 length of ventrite 1 (Fig. 9c).

**Description.** TL: 3.94–4.67 mm, TW: 3.49–4.22 mm, TH: 1.99–2.08 mm, TL/TW: 1.11–1.13; PL/PW: 0.63–0.63; EL/EW: 0.91–0.94; HW/PW: 0.53–0.56; PW/TW: 0.59–0.59; HW/TW: 0.32–0.33; Eye W/HW: 0.48–0.51.

Body nearly round, extremely convex, hemispherical, covered with short setae (Fig. 9a). Head red (Fig. 9c). Pronotum reddish. Legs yellowish red (Fig. 9b–c). Elytra red; each elytron with four large black spots, two closed to the inner edge and two approaching the outer edge (Fig. 9a). Head 0.32 times of elytral width (HW/TW=1:3.1), with fine frontal punctures; eyes densely faceted, interocular distance 0.50 times width of head (Fig. 9c). Pronotum 0.59 times of elytral width (PW/TW=1:1.7), moderately transverse, punctures uniform (Fig. 9a, c). Abdomen with six ventrites; abdominal postcoxal lines recurved roundly and complete, reaching to 3/5 length of ventrite 1 (Fig. 9d).

Male genitalia: penis extremely long and slender, strongly curved; penis capsule T-shaped, with long inner arm and short outer arm (Fig. 9e). Parameres long, narrow at base, not significantly expanded apically (Fig. 9g). Penis guide slender, nearly shorter than parameres with basal part dorsally expanded to form apical barb in lateral view (Fig. 9f–g).



**FIGURE 9.** *Novius octoguttatus* (Weise, 1910). **a.** Dorsal view. **b.** Lateral view. **c.** Frontal view. **d.** Abdomen. **e.** Penis. **f.** Tegmen, lateral view. **g.** Tegmen, inner view. Scale bars: **a–c:** 1.0 mm.

**Distribution.** China (Guangdong, Hainan Sichuan, Yunnan); India; Myanmar; Nepal; Sri Lanka; Thailand; Vietnam.

***Novius formosanus* (Korschefsky, 1935)**

Chinese common name: 台湾红瓢虫  
(Fig. 10)

*Rodolia formosana* Korschefsky, 1935c: 255.

*Novius formosanus*: Pang *et al.* 2020a: 19; Wang *et al.* 2022: 326.

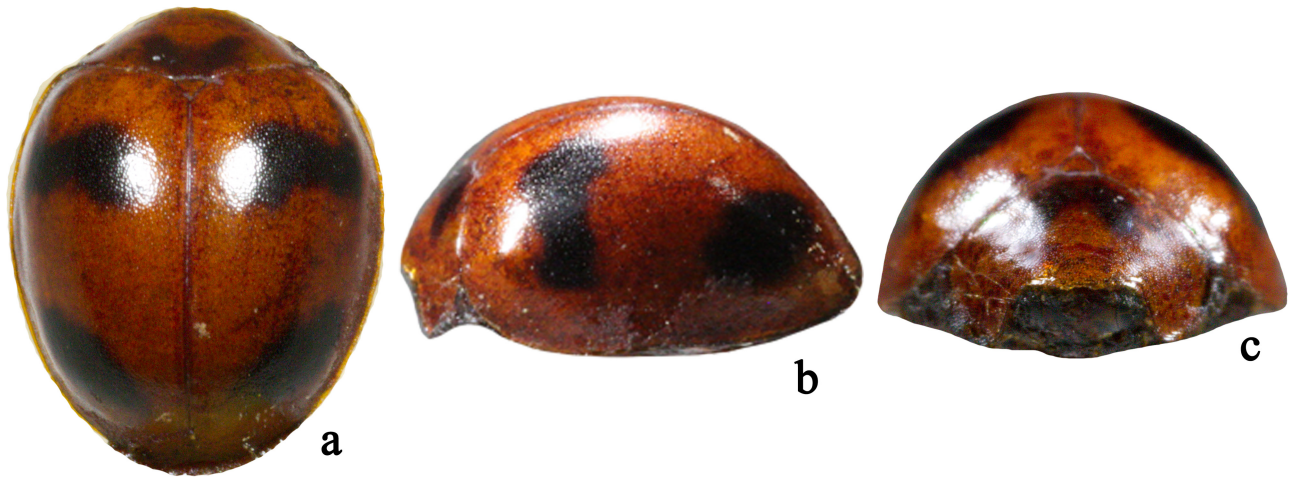
**Material examined.** Not examined.

**Diagnosis.** This species can be distinguished from other members of Chinese *Novius* by its body shorter oval, extremely convex, widest at 1/3 and each elytron with a black spot located in the front and back respectively.

**Description.** Body oval, widest near 1/3 position, covered with white setae (Fig. 10a). Head reddish (Fig. 10c). Pronotum trapezoid, red with a black V-shaped spot on posterior margin (Fig. 10a, c). Elytra red, a black spot respectively located in the front and back of each elytron: the former transverse with slightly cavities; the latter nearly triangular, oblique to the inside (Fig. 10a).

**Distribution.** China (Taiwan).

**Notes.** The photographs were obtained by Professor Xingmin Wang in 2015 at National Taiwan University, description of *N. formosanus* is based on the photographs. This specimens is a little broken and most of the setae on the elytra are disappeared.



**FIGURE 10.** *Novius formosanus* (Korschefskey, 1935). **a.** Dorsal view. **b.** Lateral view. **c.** Frontal view. Scale bars: **a–c:** 1.0 mm.

***Novius cardinalis* (Mulsant, 1850)**

Chinese common name: 澳洲瓢虫  
(Fig. 11)

*Vedalia cardinalis* Mulsant, 1850: 906.

*Novius cardinalis*: Crotch 1874: 283; Pang *et al.* 2020: 18; Wang *et al.* 2022: 326; Poorani 2023: 13.

*Eurodolia cardinalis*: Weise 1895: 150.

*Rodolia cardinalis*: Weise 1905: 220; Weise 1916: 50 (*Macronovius* group); Korschefskey 1931: 99; Sasaji 1971: 238; Gordon 1972: 25; 1985: 666; 1990: 291; Ślipiński 2007: 143; Ren *et al.* 2009: 160.

*Rodolia aegyptiaca* Sicard, 1907: 67. Synonymized by Korschefskey 1931: 99.

*Macronovius cardinalis*: Weise 1922: 104.

*Macronovius cardinalis* ab. *obnubilatus* Weise, 1922: 104; Korschefskey 1931: 98.

**Material examined. China: Guangdong:** 1♂2♀, Wengcheng Town, 30. VI. 1974, collector unknown; 1♂1♀, campus of Sun Yat-Sen University, V. 2005, Wang XM leg. **Yunnan:** 2♂3♀, Xishan Forest Park, Kunming City, 22. VIII. 2013, Chen XS *et al.* leg.

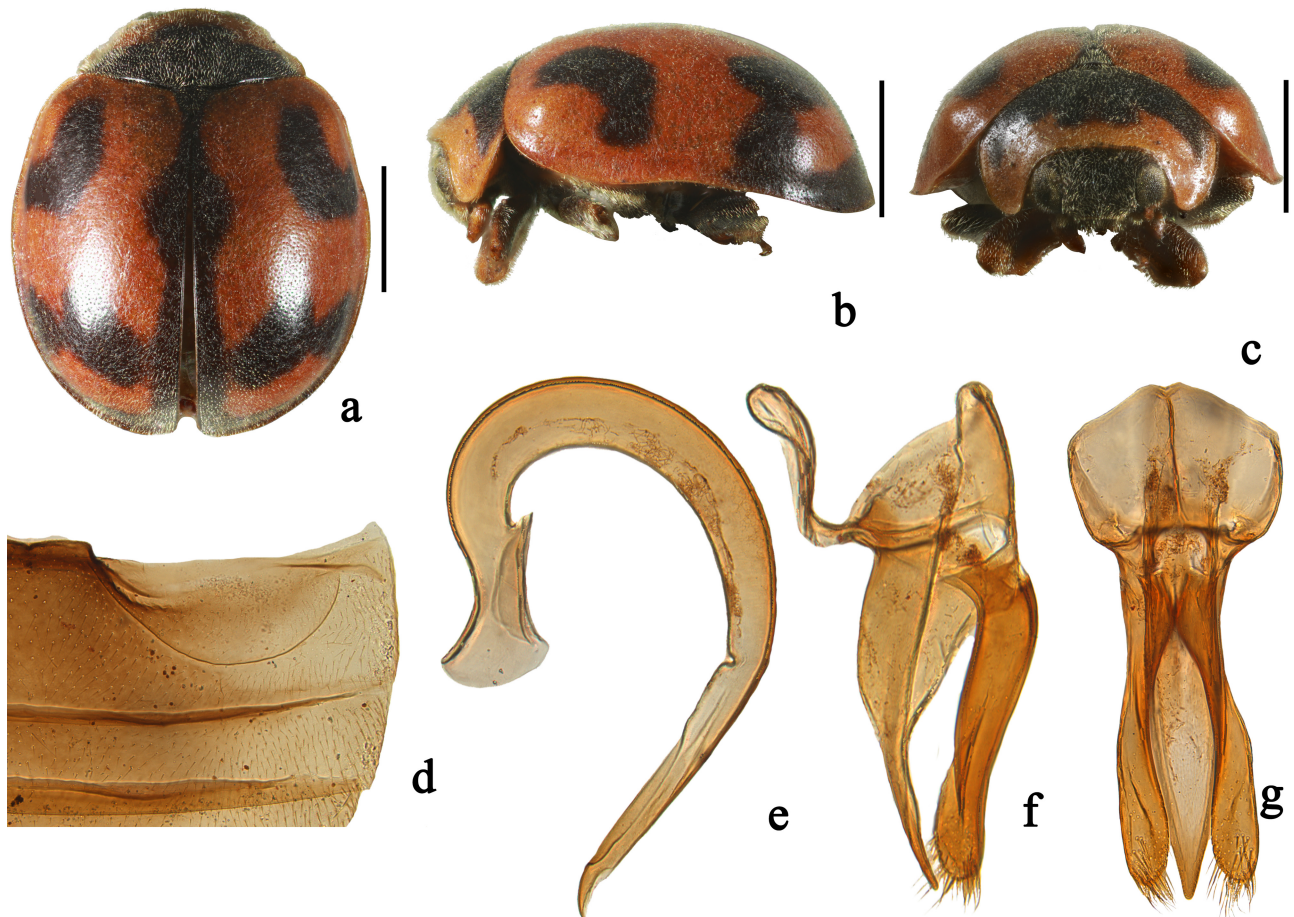
**Diagnosis.** This species can be distinguished from other members of Chinese *Novius* by the typical color forms, the red elytra with two transverse to oblique blotches, the black sutural stripe (Fig. 11a), and the stout penis with weakly pointed apex (Fig. 11e).

**Description.** TL: 3.37–3.90 mm, TW: 2.95–3.21 mm, TH: 1.70–1.75 mm, TL/TW: 1.14–1.21; PL/PW: 0.62–0.68; EL/EW: 0.85–0.94; HW/PW: 0.58–0.60; PW/TW: 0.60–0.61; HW/TW: 0.35–0.37; Eye W/HW: 0.54–0.55.

Body oval, with short setae. Pronotum trapezoid, dark with red in anterior margin (Fig. 11a–c). Legs dark with red tibiae and tarsi (Fig. 11b, c). Elytra of pattern variable, typical form red with two lunar spots towards ventral part, and two sutural stripes connected to outer edge (Fig. 11a). Head 0.36 times of elytral width (HW/TW=1:2.8), with fine frontal punctures; eyes densely faceted, interocular distance 0.45 times width of head (Fig. 11c). Pronotum 0.55 times of elytral width (PW/TW=1:1.8), moderately transverse, punctures uniform (Fig. 11a, c). Abdomen with six ventrites; abdominal postcoxal lines recurved roundly and complete, reaching about 3/5 length of ventrite 1 (Fig. 11d).

Male genitalia: penis stout and weakly pointed apically (Fig. 11e). Parameres slender, narrow at base, expanded apically with a bunch of short setae at apex; penis guide stout, broad at base, strongly narrowed apically (Fig. 11f), slightly longer than parameres in lateral view, apically pointed (Fig. 11f, g).

**Distribution.** China (Fujian, Guangdong, Guangxi, Hong Kong, Jiangsu, Jiangxi, Shanghai, Sichuan, Taiwan, Yunnan, Zhejiang); Native to Australia, then introduced worldwide for biocontrol.



**FIGURE 11.** *Novius cardinalis* (Mulsant, 1850). **a.** Dorsal view. **b.** Lateral view. **c.** Frontal view. **d.** Abdomen. **e.** Penis. **f.** Tegmen, lateral view. **g.** Tegmen, inner view. Scale bars: **a–c:** 1.0 mm.

***Novius fumidus* (Mulsant, 1850)**

Chinese common name: 烟红瓢虫  
(Fig. 12)

*Rodolia fumida* Mulsant, 1850: 904; Korschevsky 1931: 101; Kapur 1949: 534.  
*Rodolia roseipennis*, Mulsant, 1850: 904. Synonymized by Crotch 1874: 281.  
*Rodolia chermesina* Mulsant, 1850: 905. Synonymized by Crotch 1874: 282.  
*Epilachna arethusa* Mulsant, 1853: 254. Synonymized by Crotch 1874: 281.  
*Epilachna testicolor* Mulsant, 1853: 255. Synonymized by Crotch 1874: 281.  
*Novius fumidus*: Pang *et al.* 2020: 20; Poorani 2023: 19.

**Material examined. China: Yunnan:** 1♂, Tongbiguan Nature Reserve, Yingjiang County, Time unknown, Collector unknown.

**Diagnosis.** This species is similar to *N. limbatus* Mostchulsky in elytral spots (Figs 12a, 13a), while can be distinguished from the latter by the widest in the distal 1/3 of body (Fig. 12a) and the outer arm of penis capsule obtuse (Fig. 12e). In *N. limbatus*, the widest area of the body is in the middle, (Fig. 13a) and the outer arm of penis capsule features a small, pointed protrusion (Fig. 13e).

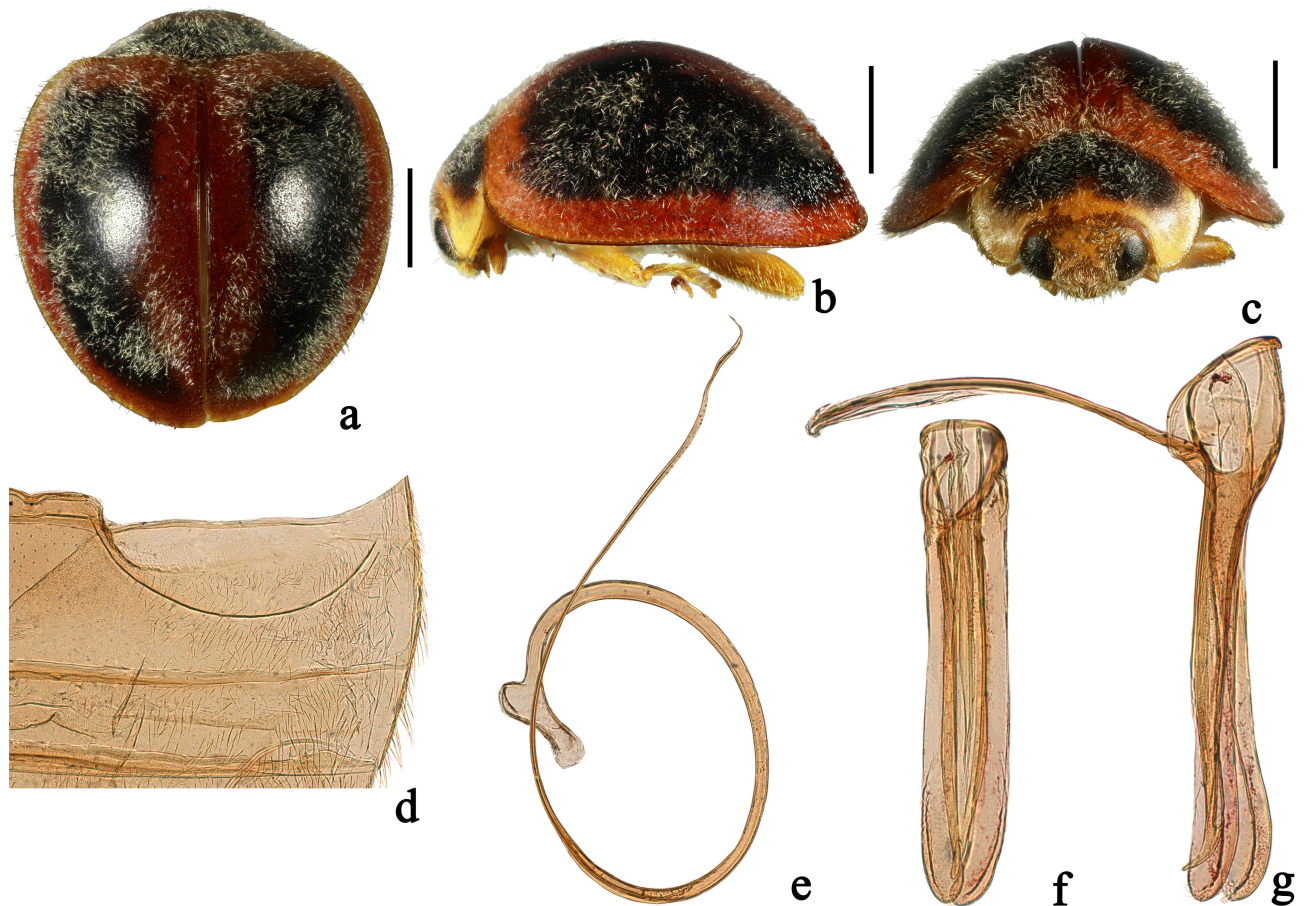
**Description.** TL: 4.28mm, TW: 3.97mm, TH: 1.95mm, TL/TW: 1.08; PL/PW: 0.57; EL/EW: 0.92; HW/PW: 0.56; PW/TW: 0.56; HW/TW: 0.31; Eye W/HW: 0.48.

Body short oval, extremely convex, hemisphere in dorsal part, with short setae, narrowing in the distal 1/3 (Fig. 12a, b). Head yellow. Pronotum yellow, with a large black spot on posterior margin (Fig. 12a, c). Legs yellow (Fig. 12b). Elytra almost red, each elytron with a longitudinal black strip (Fig. 12a). Head 0.31 times of elytral width

(HW/TW=1:3.18), with fine frontal punctures; eyes densely faceted, interocular distance 0.48 times width of head (Fig. 12c). Pronotum 0.56 times of elytral width (PW/TW=1:79), moderately transverse, punctures uniform (Fig. 12a, c). Abdomen with six ventrites; postcoxal lines recurved roundly and complete, reaching about 1/2 length of ventrite 1 (Fig. 12d).

Male genitalia: penis slender, extremely long and strongly curved, narrow in middle part; penis capsule with a short outer arm and a long inner one (Fig. 12e). Parameres long, slender, narrow at base, slightly expanded apically in inner view (Fig. 12f). Penis guide slightly shorter than parameres, featuring an apical barb, with long lower spur and a short upper spur in lateral view (Fig. 12g).

**Distribution.** China (Fujian, Guangdong, Yunan); India; Mauritius; Myanmar; Nepal; Pakistan; Rodrigues Islands; Seychelles; Sri Lanka; Vietnam.



**FIGURE 12.** *Novius fumidus* (Mulsant, 1850). **a.** Dorsal view. **b.** Lateral view. **c.** Frontal view. **d.** Abdomen. **e.** Penis. **f.** Tegmen, inner view. **g.** Tegmen, lateral view. Scale bars: **a–c:** 1.0 mm.

### *Novius limbatus* Motschulsky, 1866

Chinese common name: 红环瓢虫  
(Fig. 13)

*Novius limbatus* Motschulsky, 1866: 178; Crotch 1874: 283; Weise 1885: 63, 1892: 26; Blackburn 1895, 254; Pang *et al.* 2020a: 19; Wang *et al.* 2022: 326.

*Rodolia limbatus*: Lewis 1896: 40; Korschefsky 1931: 98; Mader 1939: 48; 1955, 970; Nakane 1963: 104(207); Bielawski 1960: 439; Sasaji 1968: 111; 1971: 235; Ślipiński 2007: 143; Forrester 2008: 111; Ren *et al.* 2009: 162.

**Material examined. China: Fujian:** 1♀, Wuyishan National Nature Reserve, ca 1291 m, 15. IX. 2012, Huo LZ *et al.* leg. **Gansu:** 1♀, Dangchuan, Maijishan National Forest Park, Tianshui City, ca 1800 m, 4. VIII. 2009, Wang XM *et al.* leg. **Guizhou:** 4♂1♀, Xifeng County, 9. VIII. 1997, Peng ZQ leg. **Hubei:** 3♂1♀, Yinyu River, Shennongjia National Nature Reserve, ca 1600–1800 m, 31, VII, 2007, Wang XM *et al.* leg. **Liaoning:** 2♀, Yiwulvshan National



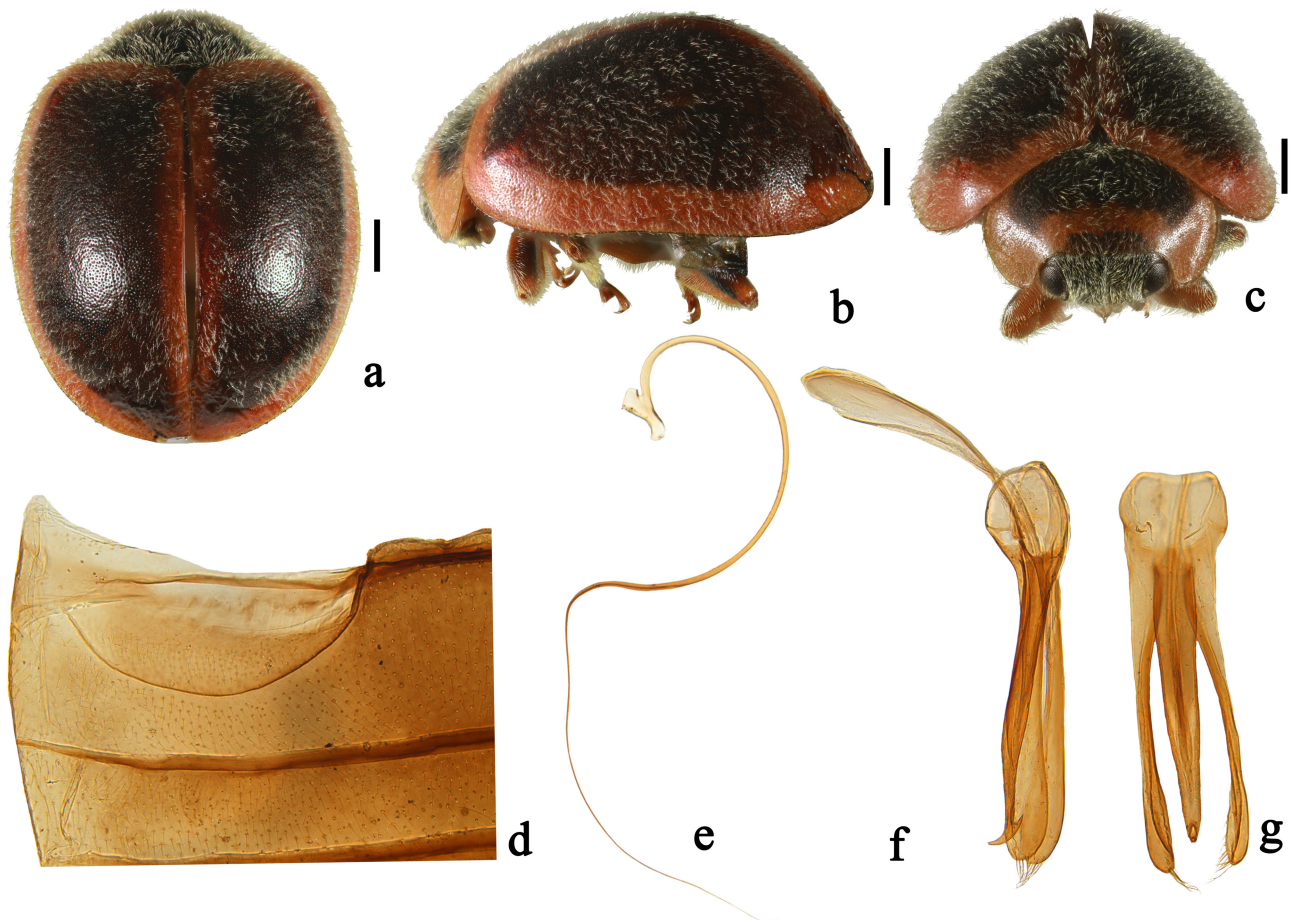
Forest Park, 200–400 m, 22. VII. 2011, Chen XS *et al.* leg. **Shandong**: 3♂3♀, Mengshan National Forest Park, ca 800–1000 m, 5–6. VIII. 2011, Chen XS *et al.* leg. **Shanxi**: 1♂1♀, Luyashan National Nature Reserve, Ningwu County, ca 1460 m, 28. VII. 2011, Chen XS *et al.* leg; 2♀, Lishan National Nature Reserve, ca 800–1400 m, 3. VIII. 2011, Chen XS *et al.* leg. **Shaanxi**: 3♂1♀, Fengyu Forest Farm, Changan City, ca 1500 m, 28. VII. 2009, Wang XM *et al.* leg; 1♀, Zhouzhi County, Xi'an City, ca 1550 m, 19. VII. 2009, Wang XM *et al.* leg. **Tianjin**: 1♀, campus of Nankai University, 29. VI. 1961, Li JY leg. **Yunnan**: 1♀, Wuliangshan National Nature Reserve, Jingdong County, ca 2400 m, 18. III. 2013, Chen XS *et al.* leg. **Zhejiang**: 1 specimen, undissected, Qingliang Feng National Nature Reserve, 28. VI. 2012, Song HT leg.

**Diagnosis.** This species is similar to *N. fumidus* in elytral spots (Figs 12a, 13a), while can be distinguished from the latter by the widest area of the body is in the middle, (Fig. 13a) and the outer arm of penis capsule features a small, pointed protrusion (Fig. 13e). In *N. fumidus* the widest in the distal 1/3 of body (Fig. 12a) and the outer arm of penis capsule obtuse (Fig. 12e).

**Description.** TL: 4.08–5.38 mm, TW: 3.16–4.41 mm, TH: 1.72–2.41 mm, TL/TW: 1.22–1.29; PL/PW: 0.58–0.59; EL/EW: 1.06–1.10; HW/PW: 0.53–0.56 PW/TW: 0.58–0.62; HW/TW: 0.31–0.34; Eye W/HW: 0.50–0.62.

Body elongate oval, moderately convex, parallel in two sides; surface covered with distinctly uniformly hairy (Fig. 13a–c). Head dark (Fig. 13c). Pronotum dark in middle part with outer edge reddish. Legs red with dark in basal part (Fig. 13b, c). Elytra dark, with outer edge reddish (Fig. 13a). Head 0.33 times of elytral width (HW/TW=1:3.0), with fine frontal punctures; eyes densely faceted, interocular distance 0.56 times width of head (Fig. 13c). Pronotum 0.60 times of elytral width (PW/TW=1:1.7), moderately transverse, punctures uniform (Fig. 13b–c). Abdomen with six ventrites; postcoxal lines recurved roundly and complete, reaching about 1/2 length of ventrite 1 (Fig. 13d).

Male genitalia: penis slender, extremely long and strongly curved; penis capsule with outer and inner branches recurved (Fig. 13e). Parameres slender, excavate, with narrow middle and slightly expanded apex, apical setae short. Penis guide slender and slightly shorter than parameres, with large apical barb in lateral view (Fig. 13f–g).



**FIGURE 13.** *Novius limbatus* Mostchulsky, 1866. **a.** Dorsal view. **b.** Lateral view. **c.** Frontal view. **d.** Abdomen. **e.** Penis. **f.** Tegmen, lateral view. **g.** Tegmen, inner view. Scale bars: **a–c:** 1.0 mm.

**Distribution.** China (Beijing, Fujian, Gansu, Guizhou, Guangdong, Guangxi, Hebei, Heilongjiang, Henan, Jiangsu, Liaoning, Shaanxi, Shandong, Shanghai, Sichuan, Tianjin, Yunnan, Zhejiang); Mongolia; Japan; North Korea; Russia (East Siberia, Far East); South Korea.

**Notes.** In the study conducted by Pang *et al.* (2020a), the species' distribution encompasses India. Nevertheless, as per Poorani (2023), there is uncertainty surrounding the misidentification of *N. limbatus* specimens in the Indian region as *N. fumidus*, a finding that contradicts the previous record documented by Pang *et al.* (2020a).

***Novius xianfengensis* (Xiao, 1992)**

Chinese common name: 咸丰红瓢虫

(Fig. 14)

*Rodolia xianfengensis* Xiao, 1992: 377; Ren *et al.* 2009: 164.

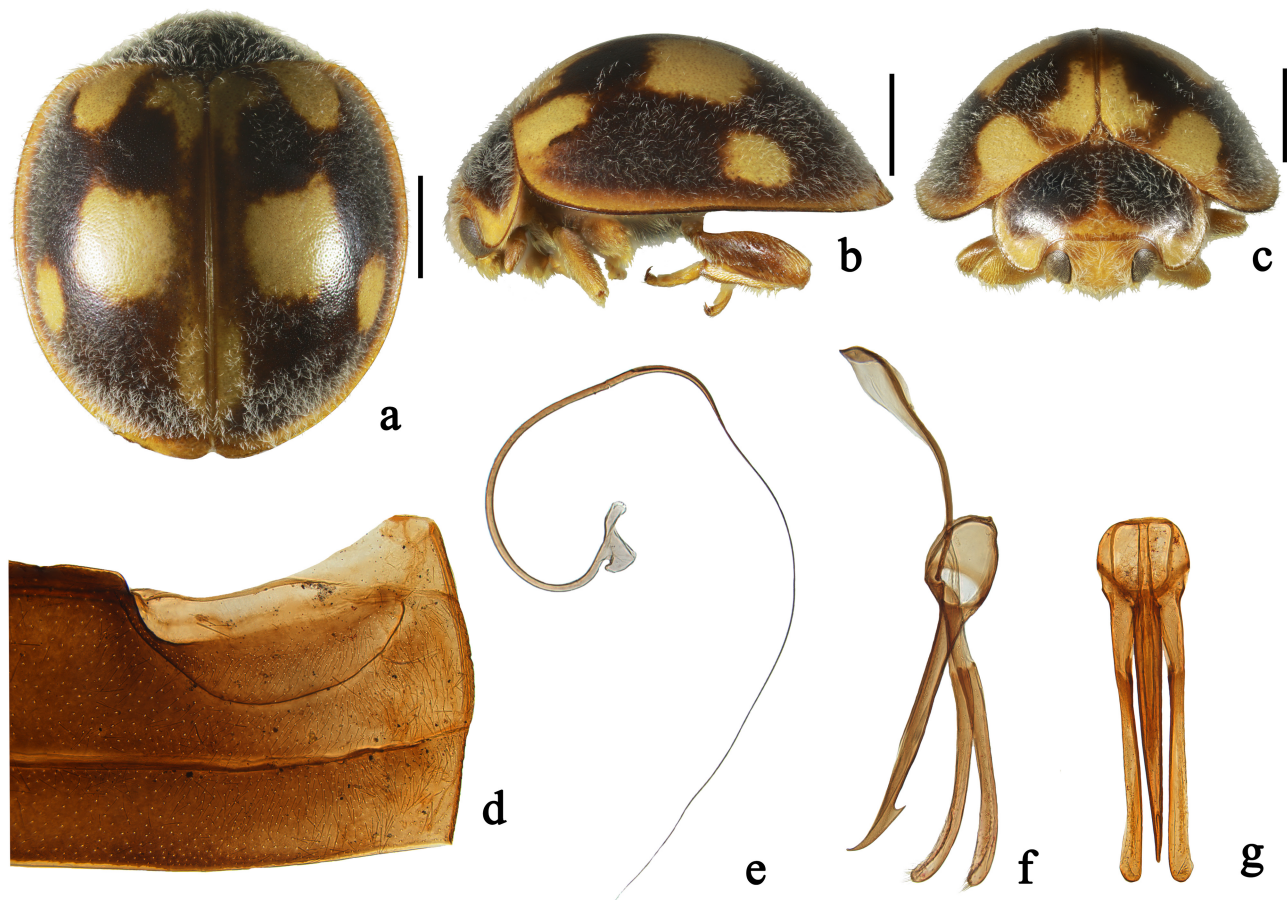
*Novius xianfengensis*: Pang *et al.* 2020a: 21; Wang *et al.* 2022: 328.

**Material examined. China: Guizhou:** 1♂2♀, Xifeng County, 9. VIII. 1997, Peng ZQ leg; 1♀, Xiaodanjiang, Emeishan City, 12–14. X. 2008, Liang JB *et al.* leg; 1♂1♀, Xiangshuiyan, Leigongshan National Nature Reserve, 14. VIII. 2006, Wang XM *et al.* leg. **Hubei:** 1♂, Laojunshan Mountains, Shennongjia Nature Reserve, ca 1230 m, 5. VIII. 2007, Wang XM *et al.* leg.

**Distribution.** China (Guizhou, Hubei, Sichuan, Yunan).

**Diagnosis.** This species can be distinguished from other members of Chinese *Novius* by its black elytra with ten red or yellow spots (Fig. 14a), and its penis strongly narrowed approximately at the proximal 1/3 (Fig. 14e).

**Description.** TL: 4.07–4.70 mm, TW: 3.64–4.23 mm, TH: 1.78–2.26 mm, TL/TW: 1.11–1.12; PL/PW: 0.60–0.61; EL/EW: 0.92–0.97; HW/PW: 0.52–0.55; PW/TW: 0.56–0.60; HW/TW: 0.29–0.33; Eye W/HW: 0.51–0.55.



**FIGURE 14.** *Novius xianfengensis* (Xiao, 1992). **a.** Dorsal view. **b.** Lateral view. **c.** Frontal view. **d.** Abdomen. **e.** Penis. **f.** Tegmen, lateral view. **g.** Tegmen, inner view. Scale bars: **a–c:** 1.0 mm.

Body broadly oval, with short setae (Fig. 14a). Head reddish brown or yellowish brown (Fig. 14c). Pronotum red or yellow, with a large black spot on posterior margin (Fig. 14a, c). Legs reddish brown or yellowish brown (Fig. 14b–c). Elytra dark with epipleuron and ten red or yellow spots (Fig. 14a). Head 0.31 times of elytral width (HW/TW=1:3.2), with fine frontal punctures; eyes densely faceted, interocular distance 0.53 times width of head (Fig. 14c). Pronotum 0.58 times of elytral width (PW/TW=1:1.7), moderately transverse, punctures uniform (Fig. 14a, c). Abdomen with six ventrites; abdominal postcoxal lines recurved roundly and complete, reaching about 1/2 length of ventrite 1 (Fig. 14d).

Male genitalia: penis slender, extremely long and strongly curved, strongly narrowed approximately at the proximal 1/3; penis capsule T-shaped, outer arm curved, inner arm nearly as long as outer arm (Fig. 14e). Parameres slender, excavate, approximately narrowest at the proximal 1/3 (Fig. 14g). Penis guide nearly as long as parameres, with apical barb in lateral view (Fig. 14f).

**Notes.** In comparison to prior research, we discern that *N. xianfengensis* exhibits a striking similarity in external morphology to *Noivus chapaensis* (Hoàng, 1980) from Vietnam. Nevertheless, the inaccessibility of the type specimen of *N. chapaensis* necessitates further investigation into the taxonomic status of these two species..

### *Novius trapezoidalis* Tao & Wang sp. nov.

Chinese common name: 梯斑红瓢虫

(Fig. 15)

**Type material. HOLOTYPE:** CHINA: Yunnan: ♂, Xianggelila City, 3. IX. 2005, Wang XM leg, No. SCAU(E)17254. **PARATYPES:** CHINA: Chongqing: 4♂2♀, Hongguang Village, Houping Township, Chengkou County, ca1261 m, 21. VII. 2017, Cheng B *et al* leg. Yunnan: 1♀, Pianma Township, Lushui City, ca2100–2300 m, 10. VIII. 2010, Wang XM *et al* leg; 1♀, Jianchuan County, 2.IX. 2005, Wang XM leg; 1♀, Jinping Fenshuiling Nature Reserve, Jinping County, ca1800–2200m 9.V. 2009, Ren XS *et al* leg; 1♂, Danjian Mountain, Pingbian County, ca2100m, 20–21.IV. 2008, Wang XM *et al* leg. Guizhou: 1♂, Xianheping Nature Reserve, Anlong County, 14–15.IX. 2006, Wang XM leg. Sichuan: 1♂, Erlang Mountain, Tianquan County, ca1600m, 7.X. 2007, Wang XM *et al* leg

**Diagnosis.** This species can be distinguished from other members of Chinese *Novius* by the anterior of the elytra with trapezoidal black spot (Fig. 15a), the body more flattened in lateral view (Fig. 15c). This species is similar to *N. limbatus* in the elytra shape from dorsal view (Figs 13a, 15a), while can be distinguished from the latter by the tegminal strut broader and the shape of apical barb on penis guide larger (Fig. 15f). In *N. limbatus*, the tegminal strut narrower and the shape of apical barb on penis guide smaller (Fig. 13f). This species is also similar to *N. fumidus* in the shape of apical barb on penis guide (Figs 12g, 15f), while can be distinguished from the latter by the body elongate oval (Fig. 15a). In *N. fumidus*, the body short oval (Fig. 12a).

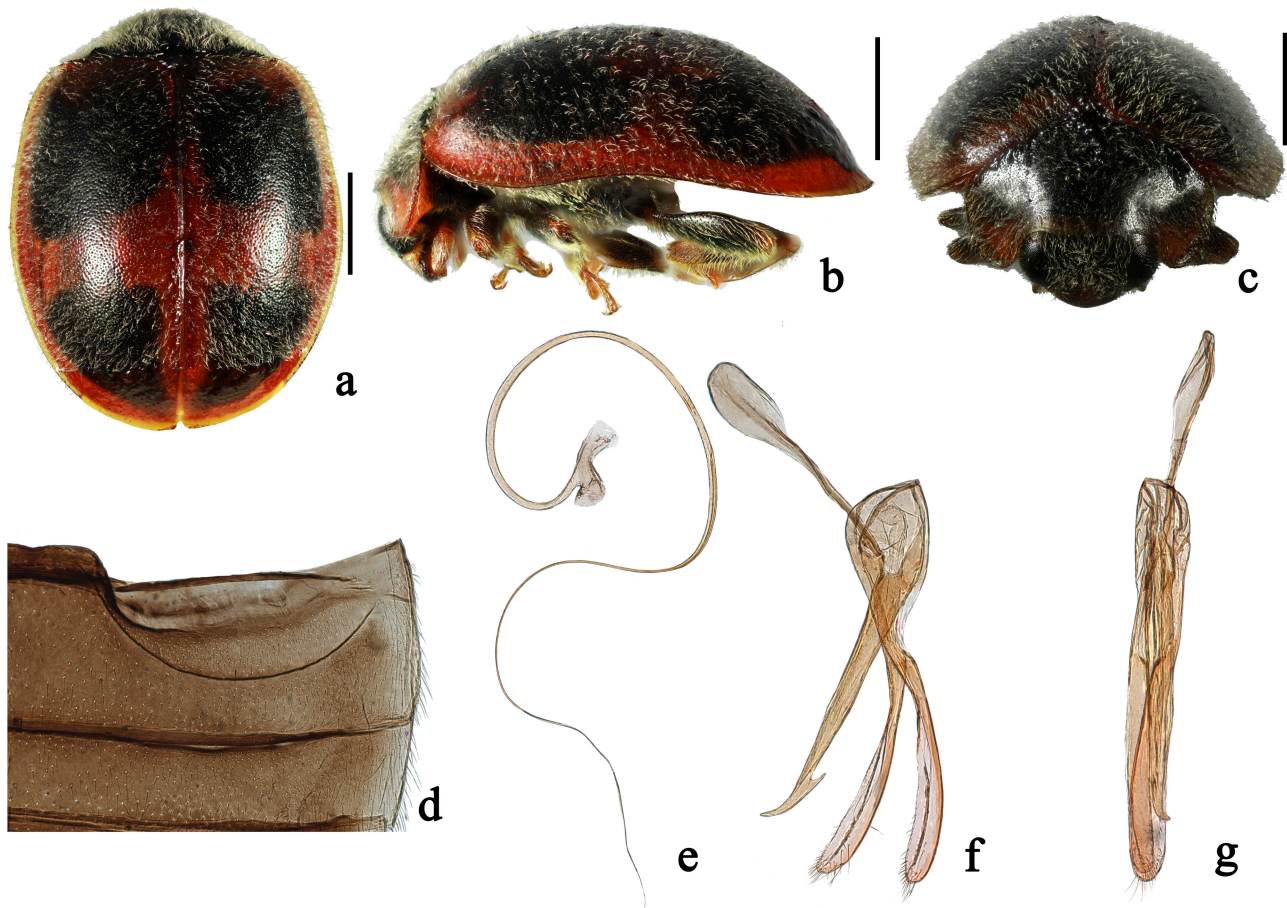
**Description.** TL: 4.27 mm, TW: 3.39 mm, TH: 1.7 mm, TL/TW: 1.26; PL/PW: 0.60; EL/EW: 1.06; HW/PW: 0.56; PW/TW: 0.64; HW/TW: 0.36; Eye W/HW: 0.54.

Body elongate oval, convex in dorsal part, with short setae (Fig. 15a). Head black (Fig. 15b). Pronotum blackish brown with reddish brown margins; the anterior margin inverted U-shaped (Fig. 15a–c). Elytra red, each elytron with a trapezoidal black spot in anterior part and two subtriangular black spots in posterior part, all the spots disconnected to the edge (Fig. 15a–c). Head 0.36 times of elytral width (HW/TW=1:2.78), with fine frontal punctures; eyes densely faceted, interocular distance 0.54 times width of head (Fig. 15c). Pronotum 0.64 times of elytral width (PW/TW=1:1.56), moderately transverse, punctures uniform (Fig. 15a, c). Abdomen with six ventrites; postcoxal lines recurved roundly and complete, reaching about 2/5 length of ventrite 1 (Fig. 15d).

Male genitalia: penis slender, extremely long and strongly curved, suddenly narrowed at the proximal 1/2; penis capsule excavate as right angle, outer arm curved, inner arm nearly as long as outer arm (Fig. 15e). Parameres slender, weakly expanded and rounded in the apical part; apical setae short. Penis guide nearly as long as parameres, with apical barb in lateral view (Fig. 15f–g).

**Distribution.** China (Yunnan).

**Etymology.** The specific epithet is derived from the Latin adjective "trapezoidalis", referring to its elytra with trapezoidal black spot.



**FIGURE 15.** *Novius trapezoidalis* Tao & Wang sp. nov. **a.** Dorsal view. **b.** Lateral view. **c.** Frontal view. **d.** Abdomen. **e.** Penis. **f, g.** Tegmen, lateral view. Scale bars: **a–c:** 1.0 mm.

***Novius quadrimaculatus* (Mader, 1939)**

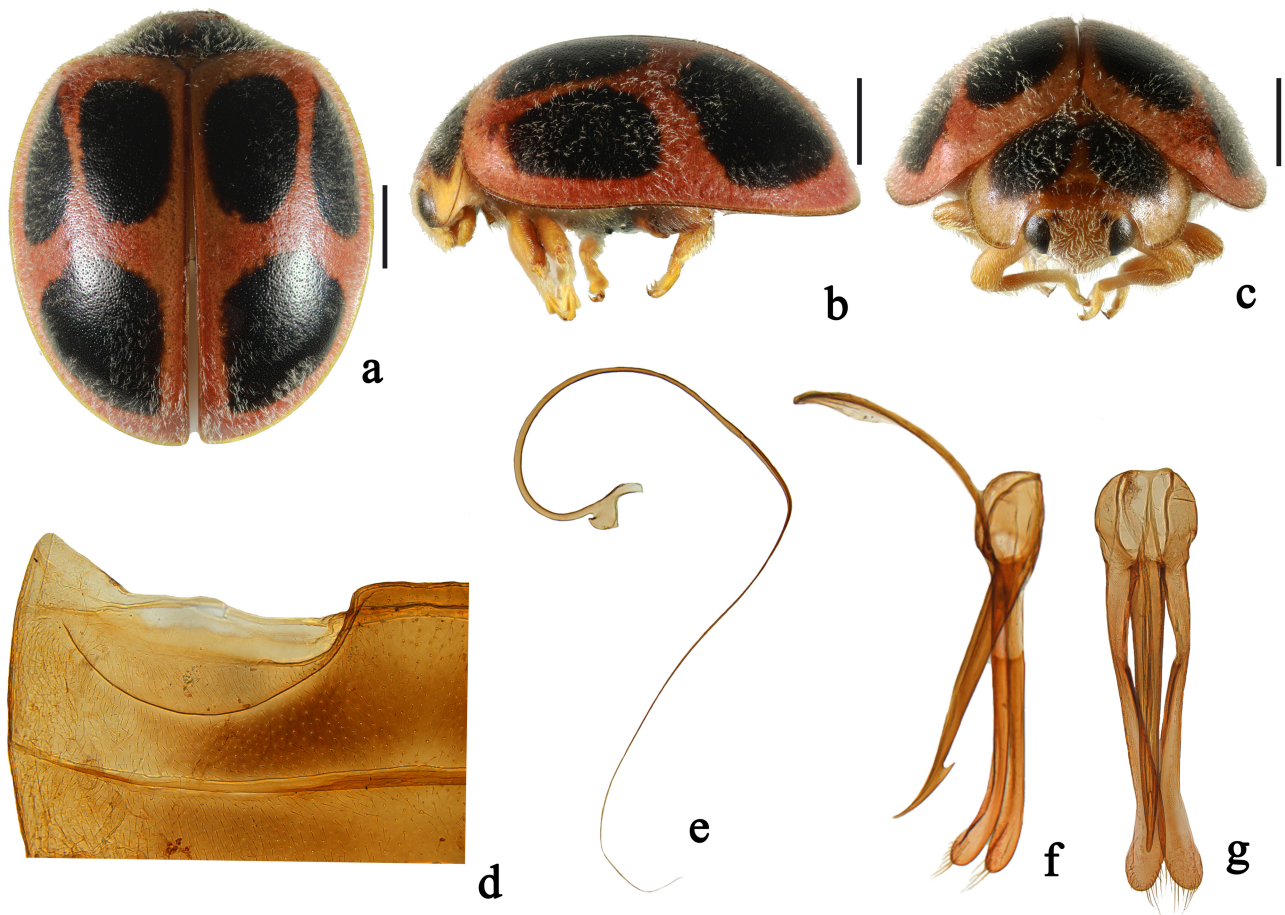
Chinese common name: 四斑红瓢虫

(Fig. 16)

*Rodolia quadrimaculata* Mader, 1939: 48; Ren *et al.* 2009: 164.

*Novius quadrimaculatus*: Pang *et al.* 2020a: 20; Wang *et al.* 2022: 328.

**Material examined. China: Anhui:** 1♂, Yaoluoping National Nature Reserve, Yuexi County, ca 1000 m, 28–29. IX. 2010, Wang XM leg; 1♂, Jinzhai Tianma National Nature Reserve, ca 600 m, 3–5. X. 2010, Wang XM leg; 1♂, Shitai County, Hengdu Town, ca 230 m, 20. IX. 2010, Wang XM leg; 1♂, Huangshan Mountains Scenic Spot, 30. VII. 2005, Wang XM leg. **Guangxi:** 1♂, Shili Grand Canyon, Mao'ershan National Nature Reserve, 19. X. 2004, Wang XM leg. **Guizhou:** 1♂1♀, Lipo, Maolan National Nature Reserve, ca 750 m, 20–23. X. 2008, Chen XS *et al.* leg; 1♂, Libo Dongtang, Maolan National Nature Reserve, ca 730 m, 15–18. X. 2008, Chen XS leg; 1♀, Lianhuaping, Leigongshan National Nature Reserve, 8. X. 2008, Chen XS leg; 1♂1♀, Xianheping Nature Reserve, Anlong County, 14–15. IX. 2006, Wang XM leg; 1♀, Xiaodanjiang River, Leigongshan National Nature Reserve, 12–13. X. 2008, Chen XS leg; 4 specimens, Fanjingshan National Nature Reserve, 19–21. VII. 1990, Tian MY *et al.* leg. **Hubei:** 1♂7♀, Wudangshan National Forest Park, Shiyan City, ca 700–930 m, Wang XM *et al.* leg; 2♂, Banqiao, Shennongjia National Nature Reserve, ca 1170 m, 21–24. VII. 2007, Wang XM *et al.* leg; 2♀, Guanmenshan Mountains, Shennongjia National Nature Reserve, ca 1260 m, 16–19. VII. 2007, Wang XM *et al.* leg; 2♀, Laojunshan Mountains, Shennongjia National Nature Reserve, ca 1230 m, 5. VIII. 2007, Wang XM *et al.* leg. **Hunan:** 1♂3♀, Zhubotang Village, Yiyang, 18. VIII. 2001, Peng ZQ leg. **Jiangxi:** 1♂, Jingzhushan Mountains, Jinggangshan National Nature Reserve, 22. IX. 2004, Wang XM leg. **Shaanxi:** 1♂, Datuping Village, Foping National Nature Reserve, ca 1100 m, 22. VII. 2009, Wang XM leg.



**FIGURE 16.** *Novius quadrimaculatus* (Mader, 1939). **a.** Dorsal view. **b.** Lateral view. **c.** Frontal view. **d.** Abdomen. **e.** Penis. **f.** Tegmen, lateral view. **g.** Tegmen, inner view. Scale bars: **a–c:** 1.0 mm.

**Diagnosis.** This species can be distinguished from other members of Chinese *Novius* by the elytra pattern with six or four black spots (Fig. 16a), and the outer arm of penis capsule with a small, pointed protrusion (Fig. 16e).

**Description.** TL: 4.25–5.53 mm, TW: 3.65–4.97 mm, TH: 1.89–2.28 mm, TL/TW: 1.11–1.16; PL/PW: 0.58–0.58; EL/EW: 0.92–1.01; HW/PW: 0.52–0.55; PW/TW: 0.57–0.60; HW/TW: 0.30–0.33; Eye W/HW: 0.49–0.55.

Body nearly round, moderately convex, covered with white setae (Fig. 16a). Head reddish brown (Fig. 16c). Pronotum reddish brown with two large square black spots on posterior margin (Fig. 16a). Legs reddish brown (Fig. 16b–c). Elytra red, three large square black spots present on each elytron, with two abreast on the anterior half and one located on the posterior half (Fig. 16a). Head 0.31 times of elytral width ( $HW/TW=1:3.23$ ), with fine frontal punctures; eyes densely faceted, interocular distance 0.52 times width of head (Fig. 16c). Pronotum 0.59 times of elytral width ( $PW/TW=1:1.69$ , moderately transverse, punctures uniform. Abdomen with six ventrites; abdominal postcoxal lines recurved roundly and complete, reaching about 1/2 length of ventrite 1 (Fig. 16d).

Male genitalia: penis extremely long and slender, strongly curved, strongly narrowed at the proximal 1/2; penis capsule T-shaped, inner arm slightly longer than the outer arm (Fig. 16e). Parameres long and slender, approximately narrowest at the proximal 1/3 (Fig. 16f–g). Penis guide is about the same length as parameres, with apical barb in lateral view (Fig. 16f–g).

**Distribution.** China (Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Heilongjiang, Henan, Hubei, Hunan, Inner Mongolia, Jiangxi, Liaoning, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang); Japan.

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## 中国短角瓢虫属 *Novius* 研究及四新种描述 (鞘翅目: 瓢虫科)

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**摘要:** 对中国短角瓢虫属 *Novius* 进行了分类修订, 共记录15种, 包括4新种, 即梯斑红瓢虫 *N. trapezoidalis* sp. nov.、大囊红瓢虫 *N. megalocystis* sp. nov.、笔头红瓢虫 *N. penicillioides* sp. nov. 和钩管红瓢虫 *N. oncosiphonus* sp. nov. 及1中国新记录种 *N. ruficollis*。提供了每个种物种的分类学历史、鉴别特征、详细描述、特征图版和采集地, 并给出了中国短角瓢虫属检索表。

**关键词:** 鞘翅目; 瓢虫科; 瓢甲总科; 短角瓢虫族; 新种; 新纪录