



New and poorly known *Meligethes* Stephens from China, with bionomical data on some species (Coleoptera: Nitidulidae: Meligethinae)

MEIKE LIU^{1,3}, MIN HUANG^{1,4}, ANDREW RICHARD CLINE² & PAOLO AUDISIO³

¹Key Laboratory of Plant Protection Resources and Pest Management of Ministry of Education, Entomological Museum, Northwest A&F University, Yangling, Shaanxi, 712100, China

²Plant Pest Diagnostics Center, California Department of Food & Agriculture, Sacramento, CA, USA

³Dipartimento di Biologia e Biotechnologie “Charles Darwin”, Sapienza Università di Roma, Via Borelli 50, I-00161 Rome, Italy

⁴Corresponding author. E-mail: huangmin@nwsuaf.edu.cn

Abstract

Meligethes (*Odonthogethes*) *trapezithorax* sp. n., *M. (O.) tricuspидatus* sp. n., and *M. (O.) luteomaculatus* sp. n. are described from Hubei Province, China, based on a series of recently collected specimens. The new species appear morphologically closely related to *M. (O.) brassicogethoides* Audisio, Sabatelli & Jelínek, 2015 from Yunnan [*M. (O.) trapezithorax* sp. n.], *M. (O.) occultus* Audisio, Sabatelli & Jelínek, 2015 from Yunnan [*M. (O.) tricuspидatus* sp. n.], as well as *M. (O.) pallidoelytrorum* Chen & Kirejtshuk, 2013 from Sichuan and *M. (O.) simulator* Audisio, Sabatelli & Jelínek, 2015 from Shaanxi and Gansu [*M. (O.) luteomaculatus* sp. n.]. The new species clearly differ from their closely related taxa by details of body shape and color, and the distinct shape of the male and/or female genitalia. The previously unknown male of the rare and localized *M. (M.) elytralis* Audisio, Sabatelli & Jelínek, 2015 from Sichuan is described for the first time, and new distributional data of other Chinese species of the genus are presented, including *M. (M.) semenovi* Kirejtshuk, 1979 from Hubei, *M. (M.) macrofemoratus* Liu, Yang, Huang, Jelínek & Audisio, 2016 from Hubei, *M. (M.) auropilosus* Liu, Yang, Huang, Jelínek & Audisio, 2016 from Hubei, *M. (O.) flavicollis* Reitter, 1873 from Chongqing, *M. (O.) wagneri* Rebmann, 1956 from Shaanxi, *M. (O.) pectoralis* Rebmann, 1956 from Guizhou, and *M. (O.) pseudopectoralis* Audisio, Sabatelli & Jelínek, 2015 from Sichuan. *Meligethes (M.) cinereoargenteus* is moved from the *Meligethes nepalensis* species group to the *Meligethes auripilis* species group. Additional data on geographic distribution and larval ecology of other species in the genus are also reported. An updated species checklist of the genus *Meligethes* is presented.

Key words: taxonomy, distribution, larval host-plants, pollen beetles

Introduction

The genus *Meligethes* (Coleoptera: Nitidulidae: Meligethinae), established by Stephens in 1830, as re-defined and delimited by Audisio *et al.* (2009, 2014) and Trizzino *et al.* (2009), was recently revised by Audisio *et al.* (2015). Subsequently, six additional new species from China were described by Chen *et al.* (2015) and by Liu *et al.* (2016, 2017). This genus now includes more than sixty species, mostly distributed in the Eastern portion of the Palearctic Region. Larvae of all members of the genus are associated with flowers of Rosaceae. An updated species checklist of the genus *Meligethes* is proposed in the present paper. An electronic interactive key for the identification of all known species is currently ready to be submitted (Liu *et al.* unpublished data).

Herein, we describe three new species from Hubei Province, China, based on a series of specimens recently collected during three field trips to Chongqing, Guizhou, Zhejiang, Shaanxi, Hubei and Sichuan (1–30 June 2016; 8 April–24 May 2017; 12–24 June 2017), organized by the second author (M.H.). The new species are all members of a clade [the *Meligethes (Odonthogethes) chinensis* Kirejtshuk, 1979 species group], including more than 15 related species, whose rather intricate taxonomy has been recently discussed by Audisio *et al.* (2015) and by Liu *et al.* (2017). The above cited field trips allowed us to collect new data on other rare and poorly-known species of Meligethinae, which are partially summarized in the present paper. These include the description of the previously

unknown male of *Meligethes (M.) elytralis* Audisio, Sabatelli & Jelínek, 2015 from Sichuan. Additional data on the distribution and larval ecology or insect host-plant relationships of some other Chinese species of the genus are also reported.

Abbreviations. *Acronyms used in morphological measurements:* refer to Fig. 3 and Table 1 in Audisio *et al.* (2015).

Acronyms of museum institutions:

ARCC	A.R. Cline's collection, currently housed in the Plant Pest Diagnostics Center in Sacramento, California, USA
BMNH	The Natural History Museum, London, UK
CAR-MZUR	P. Audisio's collection, currently housed in the Zoological Museum, Sapienza Rome University, Rome, Italy
CAS	California Academy of Sciences, Sacramento, USA
NMPC	National Museum, Prague, Czech Republic
NWAU	Entomological Museum of the Northwest A&F University, Yangling, China

***Meligethes (Meligethes) violaceus* Reitter, 1873**

Examined material. **China**, Zhejiang, Suichang County, Huangshayao town, Jiulongshan Nature Reserve, 24.v.2017, X. Chen lgt, on *Rosa multiflora* Thunb. var. *cathayensis* Rehder & E. H. Wilson, 24 ♂, 33 ♀ (NWAU, CAR-MZUR, NMPC, ARCC); Zhejiang, Kaihua County, Gutianshan Natural Reserve, 19.v.2017, X. Chen lgt, on *Rosa cymosa* Trattinnick, 10 ♂, 11 ♀ (NWAU, CAR-MZUR, NMPC, ARCC).

Distribution. China (Anhui, Shaanxi, Hubei, Zhejiang, Fujian, Guizhou, Jiangxi, Yunnan, Sichuan), Japan, SE Russia (Ussuri) (Audisio *et al.* 2015).

Host-plants. The host-plants of this common and widespread species were reported from Japan (Hayashi 1978) and Eastern Siberia (Kirejtshuk 1992), respectively, i.e., *Rosa multiflora* Thunberg and *Rosa rugosa* Thunberg in Murray (Rosaceae). Most of the above specimens collected from China were on flowering shrubs of *R. multiflora* var. *cathayensis* (Fig. 3a) and *R. cymosa* (Fig. 3d), in open spaces at the edge of semi-forested habitats and along roadsides. Both records likely represent true host-plants for larvae of *M. violaceus*.

***Meligethes (Meligethes) elytralis* Audisio, Sabatelli & Jelínek, 2015**

Examined material. **China**, Sichuan, Xiangcheng County, 3800–3900 m a.s.l., 29.003889° 99.931944°, 19.vi.2017, Liu & Audisio lgt, on *Rosa sericea* Lindley (Rosaceae), 3 ♂, 4 ♀, and two third-instar larvae (NWAU, CAR-MZUR, NMPC, ARCC); 3100–3400 m a.s.l., 28.994444° 99.918056°, 19.vi.2017, Liu & Audisio lgt, on *R. sericea*, 2 ♂, 2 ♀ (NWAU, CAR-MZUR, NMPC, ARCC); 2800–2900 m a.s.l., 28.946389° 99.806667°, 19.vi.2017, Liu & Audisio lgt, on *R. sericea*, 1 ♂, 1 ♀ (NWAU, CAR-MZUR).

Distribution. SW China (Sichuan); previously only known from the female holotype collected in Sichuan (Audisio *et al.* 2015) (Fig. 5a).

Host-plants. All specimens have been collected, with associated larvae, on flowering shrubs of *Rosa sericea*, which is characterized by white flowers typically with four petals (unusual for a member of the rose family), and long, flat and typically reddish to brown large and wide thorns (Fig. 3b). *R. sericea* is a common middle and high altitude species, widespread from SW China to NE India and N Myanmar. The species is present in a wide variety of different montane habitats (2000–4400 m; Lu *et al.* 2003). Wei *et al.* (2008) recently treated the taxonomic problems involving *R. sericea* and allied taxa. The observations above appear to confirm that within Chinese Meligethinae some strictly endemic and only locally distributed species are frequently associated as larvae with widespread floral host species; and these taxa are only rarely associated with strictly endemic and local host taxa (see also discussion about speciation and host-shift in Audisio & Antonini 2015). *Meligethes (M.) elytralis* seems to be confined, as well as its sister species *Meligethes (M.) tryznai* Audisio, Sabatelli & Jelínek, 2015, to NW Yunnan (Fig. 5a), in high altitude habitats (3000–3900 m) where the larval host-plants grow at the edge of semi-forested habitats.

Taxonomic remarks. Despite an external similarity to *M. tryznai* from Yunnan, this species is well-characterized by its peculiarly shaped female elytral apex, which is markedly prolonged into a blunt but distinct lobe (Fig. 1b; elytral apex is arcuately truncate in both sexes in *M. tryznai* and all other related species of the *M. binotatus* species complex). The previously unknown male of this species is also characterized by distinctive genitalia, exhibiting a strongly elongate and peculiarly bottle-neck shaped aedeagal apex, combined with a peculiarly long and deeply incised tegmen (Figs. 2a, b). The ovipositor of this species is characteristic due to its peculiarly wide truncated apex (Fig. 15n in Audisio *et al.* 2015).

***Meligethes (Meligethes) binotatus* Grouvelle, 1894**

Examined material. China, Sichuan, Xiangcheng County, 2800–2900 m a.s.l., 28.946389° 99.806667°, 19.vi.2017, Liu & Audisio lgt, on *Rosa soulieana* Crépin, 14 ♂, 18 ♀, and several third-instar larvae (NWAU, CAR-MZUR, NMPC, ARCC).

Distribution. SW China (Yunnan, Sichuan), NE India, Nepal, N Myanmar, Bhutan (Audisio *et al.* 2015).

Host-plants. The host-plants of this common and widespread species were previously unknown. All the above listed specimens have been collected, with several larvae, on flowering shrubs of *Rosa soulieana* Crépin (Rosaceae) (Fig. 3c), in open spaces at the edge of semi-forested habitats and along roadsides. This species was known from localities at intermediate and high altitudes (1100–3600 m; Lu *et al.* 2003). In the Xiangcheng area, where the related *M. elytralis* is sympatric and even syntopic (see above), *M. binotatus* was much more common at relatively lower altitudes (2800–3000 m), on *R. soulieana*, while *M. elytralis* was present mostly at higher altitudes (3400–3900 m), on *R. sericea*.

***Meligethes (Meligethes) transmissus* Kirejtshuk, 1988**

Examined material. China, Sichuan, Luding County, Moxi town, Mt. Gongga, Hailuogou, 1950 m a.s.l., 29.683333° 102.083333°, 23.vi.2017, Liu & Audisio lgt, on *Rosa cymosa*, 8 ♂, 10 ♀ (NWAU, CAR-MZUR, NMPC, ARCC).

Distribution. SW China (Sichuan, Yunnan) (Audisio *et al.* 2015).

Host-plants. The host-plants of this uncommon species were previously unknown. All the above listed specimens have been collected, along with two larvae, on flowering shrubs of *R. cymosa* (Fig. 3d), in open spaces at the edge of large rocks bordering cultivated fields and roadsides. This beetle species was reported from localities at intermediate and high altitudes (1500–2800 m; Audisio *et al.* 2015).

***Meligethes (Meligethes) semenovi* Kirejtshuk, 1979**

Examined material. China, Sichuan, Kangding County, 2770 m a.s.l., 30.006389° 101.958611°, 21.vi.2017, Liu & Audisio lgt, on *Rosa moyesii* Hemsley & Wilson (or closely related species; Fig. 3e), 2 ♂, 4 ♀ (NWAU, CAR-MZUR); ca. 2700 m a.s.l., 8.v.2017, X. Chen lgt, on *Rosa* sp., 10 specimens (NWAU, CAR-MZUR, NMPC, ARCC); Hubei, Shennongjia National Forest Park, Shennong peak Scenic Area, 2400–2600 m a.s.l., 31.454444° 110.285278°, 16.vi.2017, M. Liu, M. Huang & P. Audisio lgt, sparsely forested and bushy area, on flowering shrubs of *Rosa sericea*, 4 ♂, 2 ♀ (NWAU, CAR-MZUR, NMPC, ARCC).

Distribution. Central, SW and NW China (Sichuan, Hubei, Shaanxi), SE Russia (Ussuri) (Audisio *et al.* 2015; new data above).

Host-plants. Most of the above specimens from Sichuan (Kangding) were collected on a red flowering *Rosa* (Rosaceae), which is likely *R. moyesii* (Fig. 3e), or a closely related species. A few other specimens, most of them being males, were collected in Hubei (Shennongjia National Forest) on *R. sericea* (Fig. 3b). No host specificity can be established thus far for this species, based on a lack of larval data and definitive identifications of the *Rosa* species for the adult specimens from Kangding.

***Meligethes (Meligethes) macrofemoratus* Liu, Yang, Huang, Jelínek & Audisio, 2016**

Examined material. China, Hubei, Shennongjia National Forest Park, Shennong peak Scenic Area, 2800–2950 m a.s.l., 31.441944° 110.2925°, 16.vi.2017, M. Liu, M. Huang & P. Audisio lgt, sparsely forested and bushy area, beating flowering *Rhododendron* sp. (Ericaceae), 2 ♂, 8 ♀ (NWAU, CAR-MZUR); 2400–2600 m a.s.l., 31.454444° 110.285278°, 16.vi.2017, M. Liu, M. Huang & P. Audisio lgt, sparsely forested and bushy area, on flowering shrubs of *Rosa sericea*, 2 ♀ (NWAU, CAR-MZUR).

Distribution. Central China (Ningxia, Shaanxi, Hubei). This species was previously known only from a series of specimens collected in northern Shaanxi and the neighboring Ningxia Hui Autonomous Region (Liu *et al.* 2016). Material from the same collecting efforts were the basis for the incorrect records of *Meligethes (M.) flavimanus* (Stephens, 1830) from central China by Chen (2013) and by Lin *et al.* (2015). The new data presented herein considerably extends the known geographic range southwards (Fig. 5a).

Host-plants. Most specimens at higher altitudes (2800–2950 m) were collected in the above recorded locality in Hubei on shrubs of a large, white flowering *Rhododendron* sp. (Ericaceae), which likely represents a locally preferred adult food-plant, which is utilized until *Rosa* spp. begin flowering at this altitude in middle June. At lower altitudes (2400–2600 m), a few female specimens have been collected on flowering shrubs of *R. sericea* (Fig. 3b), in conjunction with other *Meligethes* species (e.g. *M. (M.) semenovi* Kirejtshuk, 1979, *M. (M.) hammondi* Kirejtshuk, 1980, and *M. (M.) auropilosus* Liu, Yang, Huang, Jelínek & Audisio, 2016). No definitive insect host-plants relationships can be established based on available data. *Meligethes macrofemoratus* appears to be confined to middle-high altitude habitats (ca. 1600–3000 m) at the edge of semi-forested habitats.

***Meligethes (Meligethes) aurifer* Audisio, Sabatelli & Jelínek, 2015**

Examined material. China, Shaanxi, Mt. Hua, 1250 m a.s.l., 34.495833° 110.079722°, 12.vi.2017, P. Audisio & M. Liu lgt, 2 ♂, 5 ♀ (NWAU, CAR-MZUR).

Distribution. Central China (Shaanxi, Shanxi). This species was previously known from a small series of specimens collected in Shaanxi and Shanxi, mostly in the area of the Mt. Hua (Audisio *et al.* 2015) (Fig. 5b).

Host-plants. The above seven specimens from Mt. Hua, Shaanxi, were collected on flowering shrubs of *Rosa* sp. (specific identification pending), likely *Rosa giraldii* Crépin, 1897 (Rosaceae). This characteristic *Rosa* species possesses small pink flowers (Fig. 3f), and occurs on the whitish granitic cliffs as typical of Mt. Hua. Larval host-plants relationships cannot be established with certainty, but it is likely that this species, distributed from Sichuan to Shanxi, represents the true host of *M. aurifer*. The specimens are present on this likely host-plant in narrow valleys and granite cliffs at intermediate altitudes (ca. 1200–1500 m).

Taxonomic remarks. The newly collected fresh material enabled us to visualize that the dorsal pubescence of *M. aurifer* exhibits a degree of variability, with some specimens characterized by uniform dark golden to brownish pubescence on the pronotum and elytra (as in the type specimens), and other specimens possess more or less paler (creamy) longitudinal stripes on the elytra, similar to those known in the closely related *Meligethes (M.) aureolineatus* Audisio, Sabatelli & Jelínek, 2015 from Sichuan (Fig. 5b). The male genitalia of these two species are similar but apparently easy to distinguish (see Figs. 9–12 in Liu *et al.* 2016); however, the female ovipositors may also distinguish these two apparently geographically vicariant taxa, but unfortunately the ovipositor of *M. aureolineatus* remains thus far unknown.

***Meligethes (Meligethes) cinereoargenteus* Audisio, Sabatelli & Jelínek, 2015**

Examined material. China, Sichuan, Luding County, Moxi town, Mt. Gongga, Hailuogou, 2780 m a.s.l., ca. 29.566667° 102°, 5.v.2017, X. Chen lgt, 3 ♂, 4 ♀ (NWAU, CAR-MZUR, NMPC).

Distribution. SW China (Sichuan); known thus far only from Sichuan, on the basis of two seriously damaged male specimens collected near Luding (Audisio *et al.* 2015) (Fig. 5b).

Host-plants. Unknown; however, the host is likely *Rosa* sp. or a related Rosaceae genus. This species occurs in bushy/shrubby areas at high altitudes (2500–2800 m).

Taxonomic remarks. Due to the poor state of preservation of the type material from Luding, this species, although being only superficially similar to *Meligethes (M.) nepalensis* Easton, 1968, from Nepal (in the *Meligethes nepalensis* species group), was misinterpreted by Audisio *et al.* (2015) as belonging to this clade. Based on the fresh material reported above (Fig. 1c), this taxon is definitively a member of the *Meligethes auripilis* species group, and can be now transferred to this clade, and apparently related to *M. aurifer* (from E Shaanxi and W Shanxi) and *M. aureolineatus* (from N Sichuan). These three taxa form the here established *M. aurifer* species complex. *Meligethes cinereoargenteus* is well-characterized by its distinctive male genitalia, specifically a peculiarly shaped aedeagal apex (Figs. 7i, j in Audisio *et al.* 2015). The strongly expanded male protarsi also differentiate this species (Fig. 1c). The previously unknown ovipositor of this species is not considerably different in its general shape from that of *M. aurifer*, but does exhibit a shallower apical excision of the combined gonocoxal apices (Fig. 2l); ratio OVPL/GONL \approx 2.25. Females differ from males mainly by the much narrower protarsal plates (ratio WFTA/LFTA \approx 0.33 in females and \approx 0.45 in males), and by the much shallower impression on the posterior portion of the metaventricle.

Meligethes (Meligethes) auropilosus Liu, Yang, Huang, Jelinek & Audisio, 2016

Examined material. China, Hubei, Shennongjia National Forest Park, Shennong peak Scenic Area, 2800–2950 m a.s.l., 31.441944° 110.2925°, 16.vi.2017, M. Liu, M. Huang & P. Audisio lgt, sparsely forested and bushy area, beating flowering *Rhododendron* sp. (Ericaceae), 11 ♂, 14 ♀ (NWAU, CAR-MZUR); 2400–2600 m a.s.l., 31.454444° 110.285278°, 16.vi.2017, M. Liu, M. Huang & P. Audisio lgt, sparsely forested and bushy area, on flowering shrubs of *Rosa sericea*, 2 ♀ (NWAU, CAR-MZUR, NMPC, ARCC); Sichuan, Kangding County, 3200 m a.s.l., 29.991667° 101.887222°, 21.vi.2017, P. Audisio lgt, by sweeping, 1 ♀ (CAR-MZUR); 3515 m a.s.l., 30.013333° 101.861667°, 21.vi.2017, P. Audisio lgt, by sweeping, 1 ♀ (CAR-MZUR).

Distribution. SW and Central China (Xizang, Sichuan, Hubei, Shaanxi). This species was previously known only from a couple of male specimens collected in SE Xizang (Shigatse District), although a female specimen referred to as *M. auropilosus* was also recorded from S Shaanxi (Liu *et al.* 2016). The new data above considerably extend the known geographic range eastward (Fig. 5a), thereby extending the eastward range of the entire *M. nepalensis* species group, based on the new taxonomic position suggested above for *M. cinereoargenteus* from Sichuan (Audisio *et al.* 2015) that was moved to the *M. auripilis* species group.

Host-plants. Most specimens at higher altitudes (2800–2950 m) were collected in the above locality in Hubei on a large and white flowering *Rhododendron* sp. (Ericaceae), which likely represents an adult food-plant, which was utilized pending the flowering of *Rosa* sp. at this altitude in middle June. At lower altitudes (2400–2600 m), a few female specimens have been collected on flowering shrubs of *Rosa sericea*, in conjunction with other *Meligethes* species (e.g. *M. semenovi*, *M. hammondi* Kirejtshuk, 1980, *M. macrofemoratus*), but no definitive insect host-plant relationships can be established based on available data. *Meligethes auropilosus* appears to be confined to high altitude habitats (ca. 2000–3600 m) at the edge of semi-forested habitats.

Taxonomic notes. The populations from both Hubei and Sichuan do not differ significantly in the shape of the male genitalia from the type specimens described from Xizang. These specimens also appear to partially fill the previously purported distribution gap of this species from Xizang to S Shaanxi (Liu *et al.* 2016). The previously unknown ovipositor of this species, although based on material collected far from the type locality (SW Xizang), is represented in Fig. 2g. Ratio STLE/DSIA \approx 0.54; ratio STLE/CGOW \approx 0.07; ratio GONL/CGOW \approx 1.42. Basal portions of the gonocoxites transverse, with laterally directed apices acute. Ratio OVPL/GONL \approx 2.35. This species appears to be variable in size, with specimens ranging in both sexes from ca. 2.6 to ca. 3.3 mm in length.

Meligethes (Odonthogethes) flavicollis Reitter, 1873

Examined material. China, Chongqing, Shizhu County, Huangshui town, near Huangshui Medicinal Botanical Garden, 10.vi.2016, M. Liu lgt, on *Photinia serratifolia* (Desf.) Kalkman (Rosaceae), 7 ♂, 12 ♀ (NWAU, CAR-MZUR, NMPC).

Distribution. Russia, Japan, North Korea, SW, SE and Central China (Chongqing, Zhejiang, Jiangxi, Taiwan, Henan) (Audisio *et al.* 2015; new data above).

Host-plants. The host-plants of this common and widespread species are known only from poor data that suggests some adult specimens collected in Taiwan from *Prunus phaeosticta* and *Rubus* sp. (Rosaceae) (S.-T. Hisamatsu 2009). The relatively large number of specimens collected on *Photinia serratifolia* (Desf.) Kalkman (Rosaceae), reported above (Fig. 4c), could be important, however the true larval host-plants of this strongly isolated species remain unknown. The species occurs in open spaces at the edge of forested and semi-forested habitats, slopes, and roadsides as well as tea plantations from sea level up to ca. 2500 m.

***Meligethes (Odonthogethes) wagneri* Rebmann, 1956**

Examined material. China, Shaanxi, Mt. Hua, ca. 950 m a.s.l., 34.506944° 110.076389°, 12.vi.2017, P. Audisio, M. Liu & M. Huang lgt, on flowering bushes of *Sorbaria arborea* C.K. Schneid (Rosaceae), 12 ♂, 10 ♀ (NWAU, CAR-MZUR).

Distribution. SE and Central China (Fujian, Zhejiang, Taiwan, E Shaanxi). This species was previously known only from a series of specimens collected in Fujian, Zhejiang, and Taiwan (Rebmann 1956a; Kirejtshuk 2005; S.-T. Hisamatsu 2009; Audisio *et al.* 2015). The new data from E Shaanxi considerably extends the geographic range westward and northward (Fig. 6b).

Host-plants. All of the above cited specimens from Mt. Hua, Shaanxi, were collected on flowering bushes of *Sorbaria arborea* C.K. Schneider (Rosaceae; Fig. 4e), but definitive larval host-plants relationships cannot be established. S.-T. Hisamatsu (2009) reported several records of this species (under the specific epithet *Meligethes shirozui* S. Hisamatsu, 1965, a synonym of *M. wagneri*: Audisio *et al.* 2015) from Taiwan on flowers of *Viburnum* sp. (Caprifoliaceae), *Callicarpa formosa* Rolfe (Lamiaceae), and *Prunus phaeosticta* (Hansen) Maxim. (Rosaceae). Only the latter plant represents a possible larval host. *Meligethes wagneri* occurs in bushy areas, close to river edges and valleys, at intermediate altitudes (ca. 1000–2300 m) (Rebmann, 1956a; S.-T. Hisamatsu 2009; Audisio *et al.* 2015; data above).

***Meligethes (Odonthogethes) trapezithorax* sp. n.**

(Figs. 1e, 2c, d, h, 6a)

Diagnosis. Narrowly elongate, moderately transversely convex, medium-sized (2.6–2.8 mm) (Fig. 1e); similar in external shape and color to the rare *Meligethes (Odonthogethes) brassicogethoides* Audisio, Sabatelli & Jelínek, 2015 from Yunnan (in the *Meligethes (O.) chinensis* species group: Liu *et al.* 2017). Dorsal surface diffusely punctate (spaces between pronotal and elytral punctures 1.2–1.8× their diameter), with smooth and shining interspaces; elytra without distinguishable traces of transverse strigose sculpturing. Pronotum with characteristic trapezoidal shape, and markedly straight lateral sides, at least in posterior two-thirds (Fig. 1e). Pubescence on pronotum and elytra sparse, whitish, but rather long and distinct, each individual seta only slightly shorter than antennomere 2. Body uniformly dark brown with bronze hues, including peripheral margins (pronotal carina) of pronotum; legs uniformly yellowish-orange, antennae brown to dark brown, with antennomere 2 paler, yellowish. Male genitalia distinctly shaped, with elongate and subparallel-sided tegmen (Fig. 2c), aedeagal median lobe peculiarly large, >2.3× longer than wide, with maximum width near distal fifth; aedeagal apex narrowly arcuately incised (Fig. 2d), longer and narrower than in any other known species of the *M. chinensis* species group. Ovipositor large and well-sclerotized, exhibiting a moderately acute distal apex (Fig. 2h); styli long, distinct in shape from other related species (Audisio *et al.* 2015; Liu *et al.* 2017), including the closely related *M. brassicogethoides*.

Description. *Size* (male holotype): body length 2.6 mm, width 1.35 mm.

Body color and pubescence: uniformly dark brown, tegument shiny, including lateral sides of pronotum, with faint bronze hues on dorsal surface. Legs yellowish-orange, antennae brown to dark brown with yellowish to orange antennomere 2. Pubescence silvery-whitish, rather long and sparse, not concealing tegument, each individual seta slightly shorter than antennomere 2 (Fig. 1e).

Dorsal habitus: body shape (Fig. 1e) similar to that of *M. brassicogethoides* (Fig. 21f in Audisio *et al.* 2015). Clypeus with truncate anterior margin. Dorsal punctures on pronotum rather fine and deep, each puncture separated

from another by ca. 1.2–1.7 diameters; space between punctures smooth and shining. Dorsal punctures on elytra rather fine and shallow, separated by ca. 1.3–1.8 diameters; space between punctures smooth and shining. Ratio LPR1/LELY = 0.44; ratio WPR1/LPR1 = 1.87; ratio WPR2/LPR1 = 1.77; ratio WPR2/WPR1 = 0.95; ratio LELY/WELY = 1.08–1.15; ratio WPR1/WPRA = 1.55; ratio WPR1/WELY = 0.90; ratio WPR2/WELY = 0.86.

Ventral habitus: combined outer edges of antennal grooves almost straight, but slightly and regularly convergent posteriorly along most of length. Mediolongitudinal ridge of mesoventrite bluntly carinate, carina not reaching posterior margin of mesoventrite. Male metaventrite flattened posterior to midlength, with moderately wide and deep mediolongitudinal impression.

Appendages: antennae moderately long (Fig. 1e); ratio ANLE/HWEA = 0.78; ratio CLLE/W10J = 1.11; ratio L03J/W03J = 2.40; ratio L03J/L02J = 1.00; ratio L03J/L04J = 2.20; ratio WFTA/LFTA = 0.31; ratio LETI/WITI ≈ 3.80.

Male genitalia: distinctly shaped, with elongate and subparallel-sided tegmen (Fig. 2c); median lobe of aedeagus large and long, ratio LEAE/WIAE = 2.30–2.40 (Fig. 2d). Tegmen rather narrow and parallel-sided, widest in middle, medial distal excision deep, V-shaped (ratio DTIN/LETE ≈ 0.33–0.35), excision inner margins without any projection; ratio LETE/WITE = 1.53–1.55. Ratio THLE/LETE ≈ 0.21. Median lobe of aedeagus exhibiting maximum width near distal fifth, with narrowly arcuately incised apex (Fig. 2d). Main sclerites of internal sac (endophallus) long and rod-shaped in both dorsal and lateral view.

Female: protarsi slightly narrower than in male (ratio WFTA/LFTA = 0.25); metaventrite almost flat, with a barely distinct longitudinal impression. Ovipositor distinctly shaped (Fig. 2h), with apex rather pointed, moderately sclerotized; ratio STLE/DSIA ≈ 0.70; ratio STLE/CGOW ≈ 0.12; ratio GONL/CGOW ≈ 2.01. Basal portions of gonocoxites transverse, apices laterally directed and bluntly rounded. Ratio OVPL/GONL ≈ 2.00.

Variation: body sizes 2.6–2.8 mm (length) and 1.35–1.47 mm (width).

Examined material. Holotype, ♂: **China**: Hubei, Shennongjia National Forest Park, Shennong peak Scenic Area, 2850–2900 m a.s.l., 31.441944° 110.2925°, 16.vi.2017, P. Audisio, M. Liu & M. Huang lgt, sparsely forested and bushy area, beating flowering *Rhododendron* sp. (Ericaceae), (NWAU). Paratypes: same data as holotype, 1 ♂, 2 ♀ (NWAU, CAR-MZUR); 2600 m a.s.l., 31.454444° 110.285278°, P. Audisio lgt, sparsely forested and bushy area, beating flowering bushes of *Rubus rosifolius* Sm. (Rosaceae), 1 ♀ (NWAU).

Distribution. **Central China** (Hubei) (Fig. 6a). The possible host-plant in Shennong Peak Scenic area, *Rubus rosifolius*, is widespread also in SE China, chiefly in Hunan, Guangxi, Jiangxi and Fujian.

Host-plants. Unknown. *Rubus rosifolius* (Fig. 4a) could represent the local host-plant in Shennong Peak Scenic area, but no definitive larval host-plants relationships have been established. Four type specimens were collected on *Rhododendron* sp. (Ericaceae), however several small bushes of *Rubus* spp., including *Rubus rosifolius*, were present in the area although they were not in flower at the time.

Habitat. Locality data indicates that this species appears to prefer the edges of high altitude sparsely forested and bushy areas. As reported above, four specimens of the type series were collected by sweeping flowering shrubs of *Rhododendron* sp. (Ericaceae; frequently used by several adult *Meligethes* as occasional food-plants before or after the flowering season of their larval hosts), in conjunction with several specimens of *M. auropilosus*, *M. macrofemoratus*, *M. semenovi*, *M. hammondi*, *M. (Odonthogethes) luteomaculatus* sp. n., and *M. (O.) tricuspispidatus* sp. n.

Phenology. The few available specimens were collected in middle June, which likely indicates adult activity at least from late May to July.

Etymology. The specific epithet is derived from the late Latin *trapezium* (= trapezoid) and *thorax*, due to its peculiarly shaped thorax, with almost straight sides along its posterior two-thirds (Fig. 1e).

Taxonomic remarks. As reported above, this new species is similar in external shape to *M. brassicogethoides* from Yunnan (see Audisio *et al.* 2015). Male specimens of the latter species are thus far unknown, but marked differences in the shape of ovipositor, shape of the thorax, and dorsal pubescence, leave no doubts about their specific distinction.

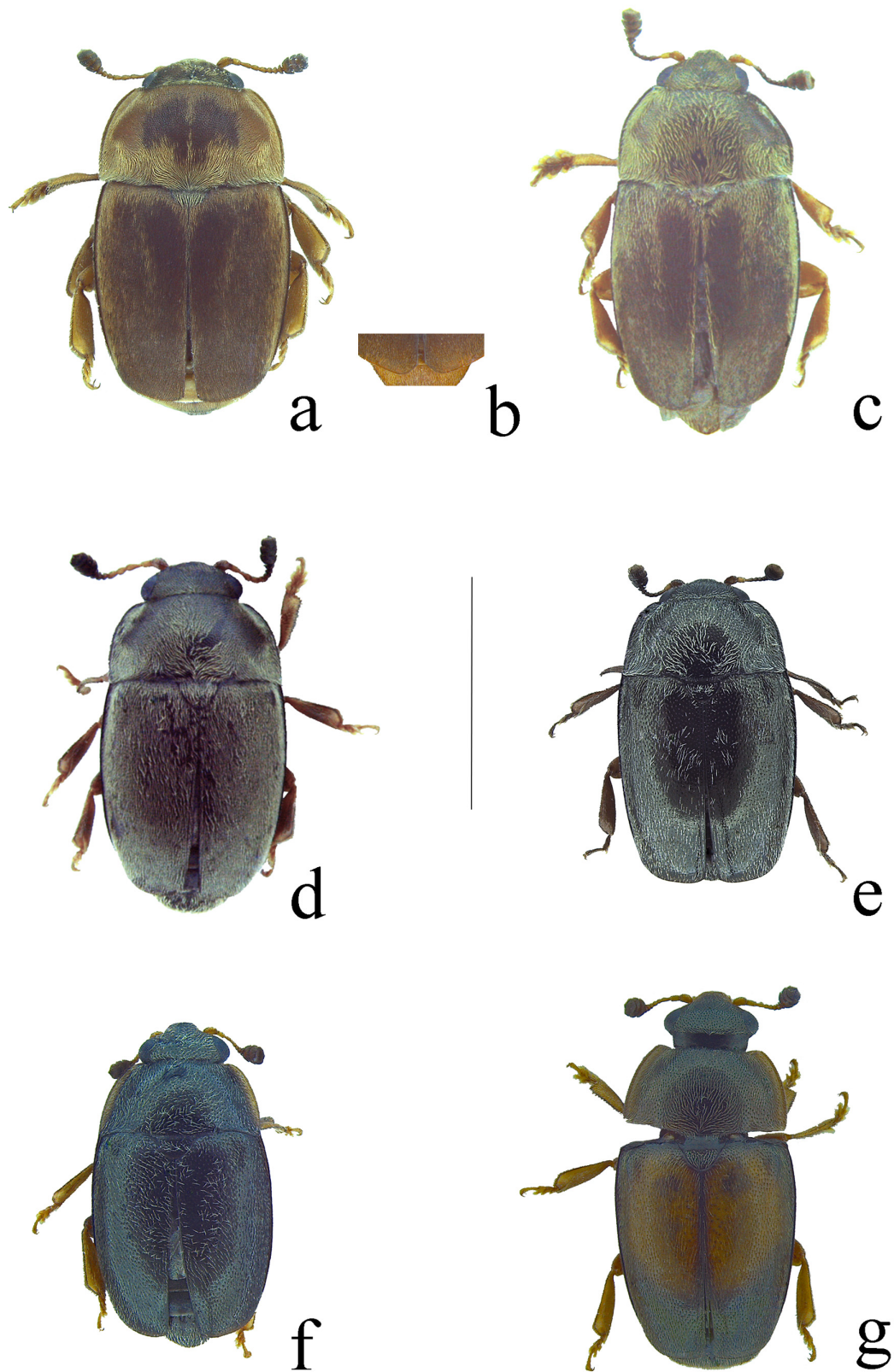


FIGURE 1. Habitus (a, c, d, e, f, g) or female elytral apex (b) of *Meligethes* species: a (♂), b (♀) *M. (Meligethes) elytralis* Audisio, Sabatelli & Jelinek, 2015 from Sichuan; c, *M. (M.) cinereoargenteus* Audisio, Sabatelli & Jelinek, 2015, ♂ from Sichuan; d, *M. (M.) auropilosus* Liu, Yang, Huang, Jelinek & Audisio, 2016, ♂ from Hubei; e, *M. (Odonthogethes) trapezithorax* sp. n., ♂ paratype from Hubei; f, *M. (O.) tricuspis* sp. n., ♀ holotype from Hubei; g, *M. (O.) luteomaculatus* sp. n., ♂ paratype from Hubei. Scale bar: 2 mm.

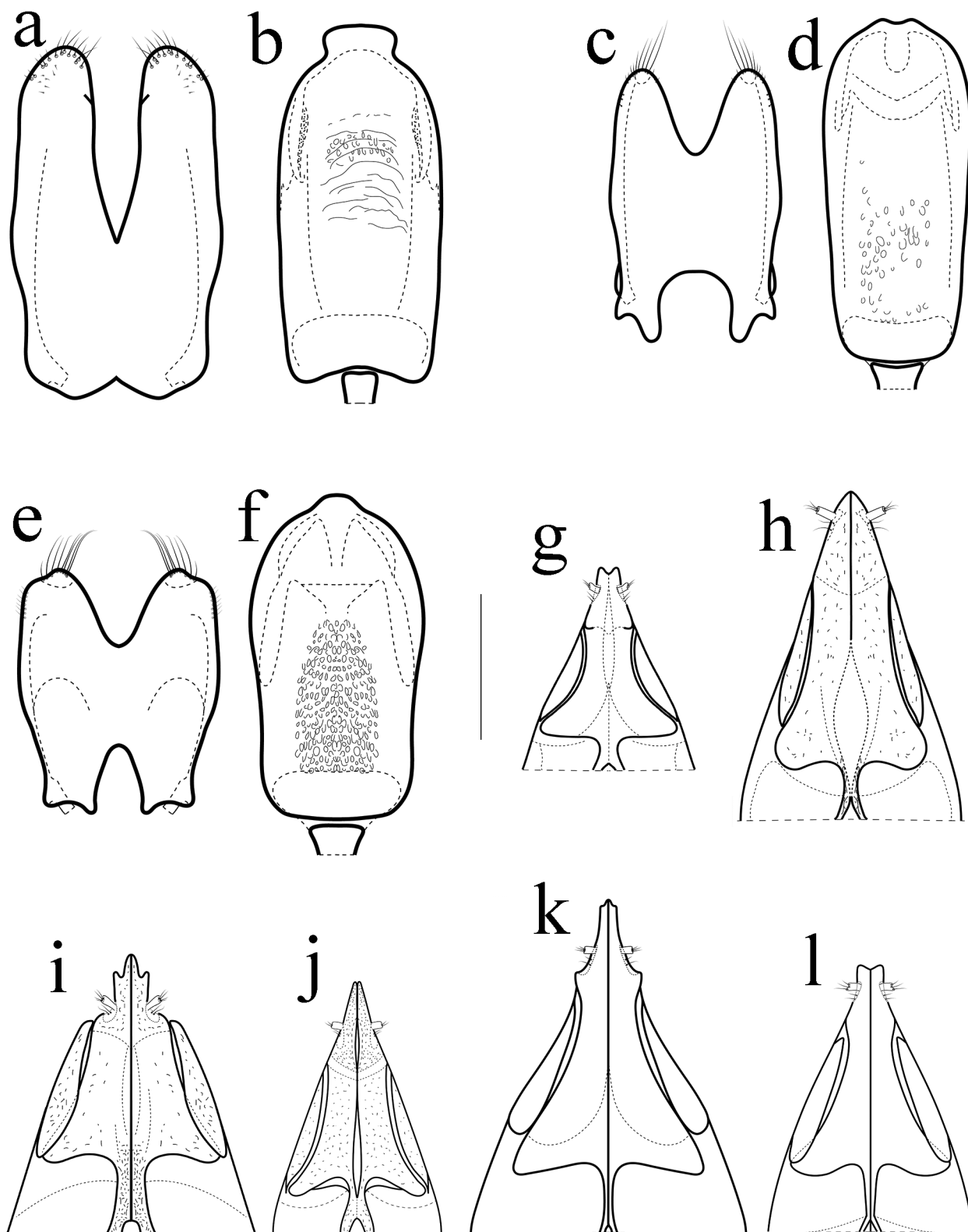


FIGURE 2. Male (a–f) and female (g–l) genitalia of *Meligethes* species (a, c, e, tegmen, dorsal view; b, d, f, median lobe of aedeagus, dorsal view); a, b, *M. (Meligethes) elytralis* Audisio, Sabatelli & Jelínek, 2015, ♂ from Sichuan; c, d, *M. (Odonthogethes) trapezithorax* sp. n., ♂ paratype from Hubei; e, f, *M. (O.) luteomaculatus* sp. n., ♂ paratype from Hubei; g, *M. (M.) auropilosus* Liu, Yang, Huang, Jelínek & Audisio, 2016, ♀ from Hubei; h, *M. (O.) trapezithorax* sp. n., ♀ paratype from Hubei; i, *M. (O.) tricuspидatus* sp. n., ♀ holotype from Hubei; j, *M. (O.) luteomaculatus* sp. n., ♀ paratype from Hubei; k, *M. (O.) pallidoelytrorum* Chen & Kirejtshuk, 2013, ♀ from Sichuan; l, *M. (M.) cinereoargenteus* Audisio, Sabatelli & Jelínek, 2015, ♀ from Sichuan. Scale bar: 0.2 mm.

***Meligethes (Odonthogethes) tricuspoidatus* sp. n.**

(Figs. 1f, 2i, 6a)

Diagnosis. Narrowly elongate, moderately transversely convex and medium-sized (2.6–2.8 mm) (Fig. 1f); similar in external shape and color to the rare *Meligethes (Odonthogethes) luteoornatus* Audisio, Sabatelli & Jelínek, 2015 from Yunnan and also closely related to *M. (O.) occultus* Audisio, Sabatelli & Jelínek, 2015 from Yunnan and to *M. (O.) schuelkei* Audisio, Sabatelli & Jelínek, 2015 from Sichuan and Shaanxi (all in the *M. chinensis* species group: Liu *et al.* 2017). This new species differs from the three related species in the complex by its distinctive ovipositor, which is unmistakable due to its sharply tricuspid apex (Fig. 2i; ovipositor of *M. luteoornatus*, *M. occultus* and *M. schuelkei* as in Figs. 16f, 16k and 17k, respectively, in Audisio *et al.* 2015). Additionally, *M. schuelkei* exhibits a pronotum transversely more convex, and more parallel-sided in the posterior two-thirds (Fig. 21e in Audisio *et al.* 2015).

Description. *Size* (female holotype): body length 2.8 mm, width 1.6 mm.

Body color and pubescence: body dark brown, shiny, peripheral margins of pronotum (pronotal carina) markedly paler, yellowish, without metallic hues on dorsal surface (Fig. 1f). Legs yellowish-orange, antennae yellowish to orange, with brown to dark brown club. Pubescence on pronotum and elytra rather sparse, cream colored, moderately distinct, each individual seta nearly as long as antennomere 4.

Dorsal habitus: body shape (Fig. 1f) similar to that in *M. luteoornatus* (Fig. 21g in Audisio *et al.* 2015), moderately convex. Clypeus with truncate anterior margin. Pronotum trapezoidal in shape, and arcuately convergent distad (Fig. 1f); elytra without distinguishable traces of transverse strigose sculpturing. Dorsal surface diffusely punctate, punctures on pronotum and elytra fine and moderately deep, separated from each other by ca. 1.2–1.5 diameters; space between punctures smooth and shining. Ratio LPR1/LELY = 0.42; ratio WPR1/LPR1 = 2.09; ratio WPR2/LPR1 = 2.01; ratio WPR2/WPR1 = 0.95; ratio LELY/WELY = 1.01; ratio WPR1/WPRA = 1.71; ratio WPR1/WELY = 0.90; ratio WPR2/WELY = 0.86.

Ventral habitus: combined outer edges of antennal grooves almost straight and subparallel-sided along most of length. Mediolongitudinal ridge of mesoventrite bluntly carinate, carina not reaching posterior margin of mesoventrite. Metaventrite (female) flattened posterior to midlength, with barely distinct and shallow mediolongitudinal impression.

Appendages: antennae short (Fig. 1f); ratio ANLE/HWEA = 0.76; ratio CLLE/W10J = 1.24; ratio L03J/W03J \approx 2.40; ratio L03J/L02J = 0.90; ratio L03J/L04J \approx 1.50; ratio WFTA/LFTA \approx 0.27; ratio LETI/WITI \approx 3.70.

Female genitalia: ovipositor distinctly shaped (Fig. 2i), apex markedly tricuspid-shaped, the central vertex longer than lateral ones, moderately sclerotized; ratio STLE/DSIA \approx 0.70; ratio STLE/CGOW \approx 0.11; ratio GONL/CGOW \approx 1.48. Basal portions of gonocoxites transverse, laterally directed apices acutely rounded. Ratio OVPL/GONL \approx 2.10.

Male: unknown.

Variation: body sizes 2.8–2.9 mm (length) and 1.60–1.70 mm (width). One of the paratypes appears almost glabrous, which is likely due to pubescence loss inside the collecting vial containing pure ethanol.

Examined material. Holotype, ♀: **China:** Hubei, Shennongjia National Forest Park, Shennong peak Scenic Area, 2850–2900 m a.s.l., 31.441944° 110.2925°, 16.vi.2017, P. Audisio, M. Liu & M. Huang lgt, sparsely forested and bushy area, beating flowering *Rhododendron* sp. (Ericaceae), (NWAU). Paratypes: same data as holotype, 1 ♀ (CAR-MZUR); ca. 2500 m a.s.l., ca. 31.454444° 110.285278°, P. Audisio lgt, sparsely forested and bushy area, beating flowering bushes of *Rubus rosifolius*, 1 ♀ (NWAU).

Distribution. **Central China** (Hubei) (Fig. 6a). The possible host-plant in Shennong Peak Scenic area, *Rubus rosifolius*, is widespread in SE China, chiefly in Hubei, Hunan, Guangxi, Jiangxi and Fujian (Lu *et al.* 2003).

Host-plants. *Rubus rosifolius* (Fig. 4a) could represent a local host-plant in Shennong Peak Scenic area, but no definitive larval host-plant relationships have been established. However, where the holotype and a paratype of the new species were collected on *Rhododendron* sp. (Ericaceae), several small bushes of *Rubus* spp., including *Rubus rosifolius*, were present although they were not in flower at the time.

Habitat. Locality data indicates that this species appears to prefer the edges of high altitude sparsely forested and bushy areas. As above reported, two specimens of the type series were collected by sweeping flowering shrubs of *Rhododendron* sp. (Ericaceae) in company with several specimens of *M. auropilosus*, *M. macrofemoratus*, *M. semenovi*, *M. hammondi*, *M. (Odonthogethes) luteomaculatus* sp. n, and *M. (O.) trapezithorax* sp. n.

Phenology. The few available specimens were collected in middle June, which likely indicates adult activity at least from late May to July.

Etymology. The specific epithet is derived from the peculiarly tricuspid-shaped (*tricuspidatus* in late Latin) ovipositor apex (Fig. 2i).

Taxonomic remarks. As reported above, this new species is similar in external shape and color to *M. luteornatus* from Yunnan and *M. occultus* from Yunnan, and to *M. schuelkei* from Sichuan and Shaanxi (see Audisio *et al.* 2015), which are all in the *M. chinensis* species group (Liu *et al.* 2017), chiefly in the here defined *M. occultus* species complex (see species checklist below). Female specimens of *M. schuelkei* from the type locality in Sichuan are thus far unknown, but differences in the shape of pronotum of the female holotype confirm its specific distinction from the new species; however, a female specimen from S Shaanxi tentatively attributed to *M. schuelkei* exhibits a distinctly different ovipositor (Fig. 17k in Audisio *et al.* 2015). The authors are assembling fresh material for molecular analyses on the whole group, in order to better define the phylogenetic and taxonomic relationships inside this difficult clade; its evolutionary scenario, in fact, probably parallels the situation recently evidenced elsewhere in some species groups of the related genus *Brassicogethes* Audisio & Cline (Audisio *et al.* 1999, 2001a, b, 2002, 2006, 2011; De Biase *et al.* 2003, 2012; Mancini *et al.* 2016).

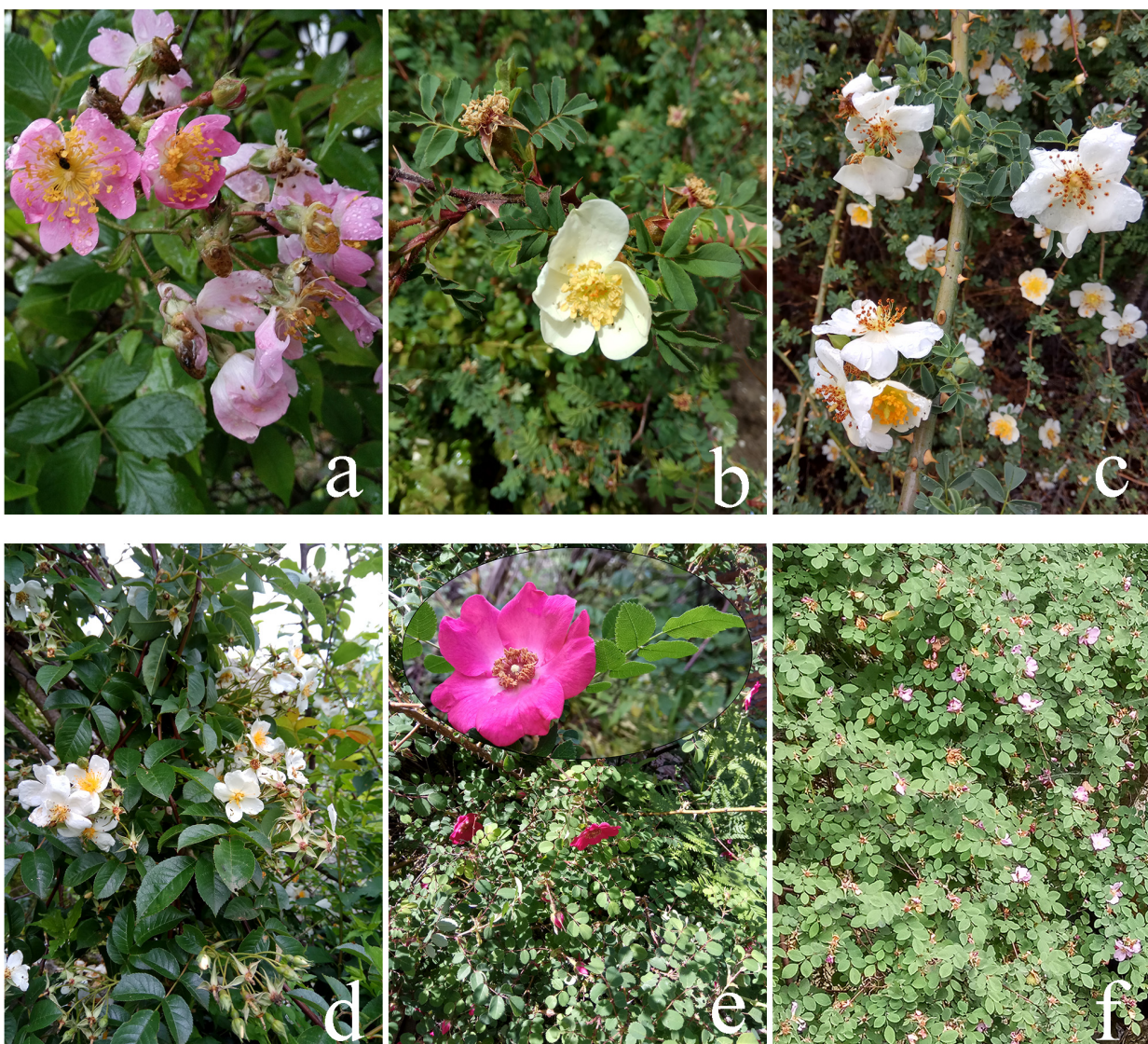


FIGURE 3. Actual and/or putative Rosaceae larval host plants of *Meligethes* (*Meligethes*) species: **a**, *Rosa multiflora* from Zhejiang (host plant of *M. (M.) violaceus*); **b**, *Rosa sericea* from Sichuan (host plant of *M. (M.) elytralis* and probably also of *M. (M.) macrofemoratus*); **c**, *Rosa soulieana* from Sichuan (host plant of *M. (M.) binotatus*); **d**, *Rosa cymosa* from Sichuan (likely host plant of *M. (M.) transmissus*); **e**, *Rosa moyesii* from Sichuan (likely host plant of *M. (M.) semenovi*); **f**, *Rosa giraldii* from Shaanxi (probably the host plant of *M. (M.) aurifer*).

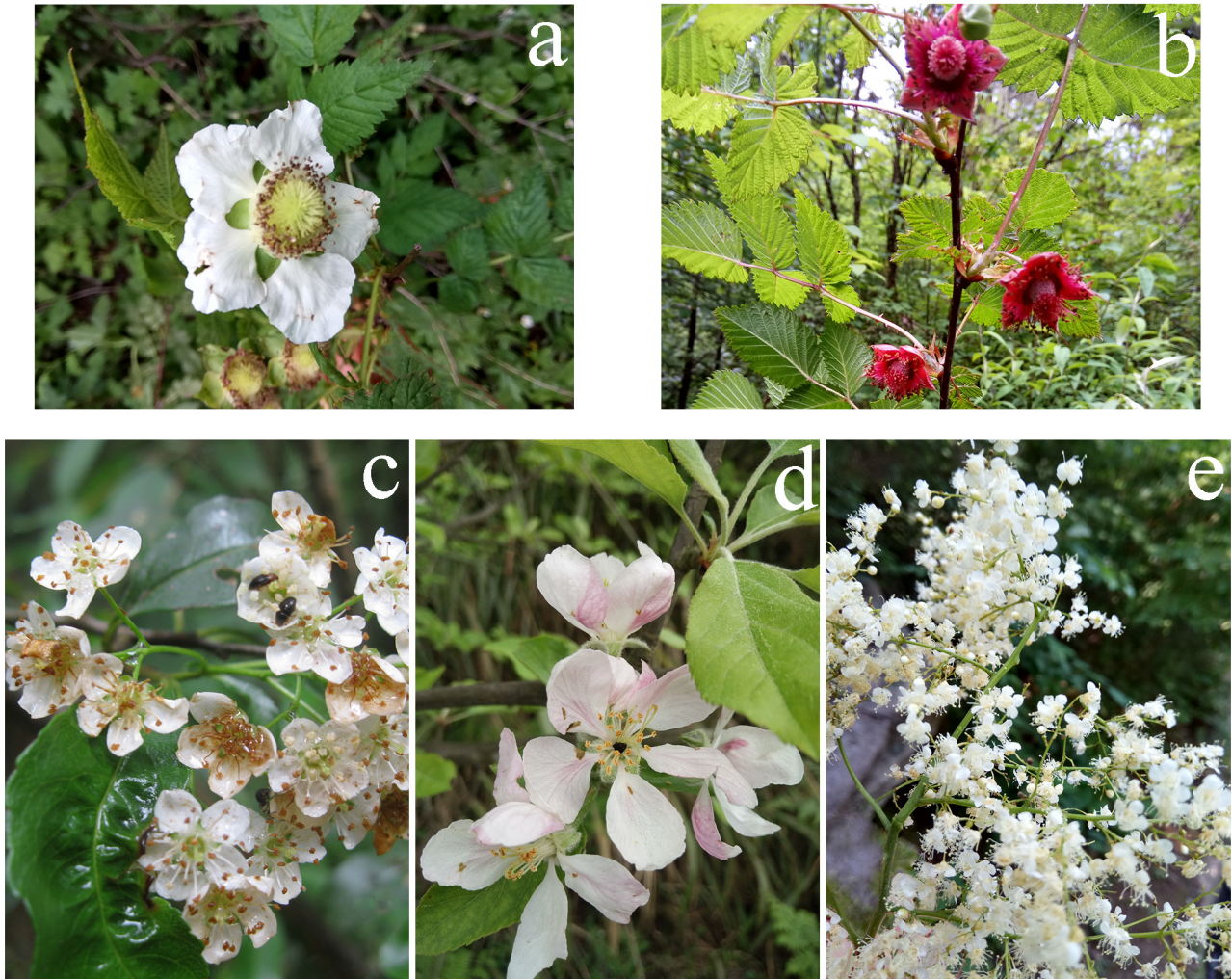


FIGURE 4. Actual and/or putative Rosaceae larval host plants of *Meligethes* (*Odonthogethes*) species: **a**, *Rubus rosifolius* from Hubei (likely host plant of *M. (O.) trapezithorax* sp. n., *M. (O.) tricuspoidatus* sp. n., and *M. (O.) luteomaculatus* sp. n.); **b**, *Rubus niveus* from Sichuan (host plant of *M. (O.) pallidoelytrorum*); **c**, *Photynia serratifolia* from Chongqing (likely host plant of *M. (O.) flavicollis*); **d**, *Malus asiatica* from Guizhou (likely host plant of *M. (O.) pectoralis*); **e**, *Sorbaria arborea* from Shaanxi (likely host plant of *M. (O.) wagneri*).

***Meligethes* (*Odonthogethes*) *luteomaculatus* sp. n.**

(Figs. 1g, 2e, f, j, 6a)

Diagnosis. Narrowly elongate, moderately transversely convex and medium-sized (2.6–3.3 mm) (Fig. 1g), with characteristic brownish dorsal coloration combined with large yellowish spots on pronotal sides and elytra. This species is similar in external shape and color to *Meligethes* (*Odonthogethes*) *simulator* Audisio, Sabatelli & Jelínek, 2015 from Shaanxi, Gansu and *M. (O.) pallidoelytrorum* Chen & Kirejtshuk, 2013 from Sichuan (both in the *M. chinensis* species group: Liu *et al.* 2017). The species can be easily separated from both of the other species in the complex by the distinctly shaped male genitalia, characterized by a wide tegmen (Fig. 2e), and elongated median lobe of the aedeagus, the latter exhibiting its maximum width near the distal third, and a narrowly and obtusely spatulate apex (Fig. 2f; *M. simulator* is characterized by a median lobe of the aedeagus strongly narrowed and distinctly incised distad, while *M. pallidoelytrorum* exhibits a median lobe sharply pointed distad; see Liu *et al.* 2017).

Description. *Size* (male holotype): body length 2.9 mm, width 1.55 mm.

Body color and pubescence: mostly brown, rather shiny, peripheral lateral portions of pronotum yellowish, with large yellowish rounded spot occupying the proximal two thirds of elytra (Fig. 1g), no metallic hues on dorsal surface. Legs and antennae yellowish-orange, antennal club normally darker brown. Pubescence golden, moderately long and sparse, not concealing tegument, each individual seta usually slightly shorter than antennomere 2 (Fig. 1g).

Dorsal habitus: body shape (Fig. 1g) similar to that of *M. pallidoelytrorum* and *M. simulator* (Figs. 21i and 22a in Audisio *et al.* 2015). Clypeus with truncate anterior margin. Dorsal punctures on pronotum fine and moderately deep, separated from each other by ca. 1.1–1.4 diameters; space between punctures smooth and shining. Dorsal punctures on elytra slightly finer and shallower than those on pronotum, separated from each other by ca. 1.2–1.5 diameters; space between punctures slightly less shining. Ratio LPR1/LELY = 0.46; ratio WPR1/LPR1 = 1.86; ratio WPR2/LPR1 = 1.78; ratio WPR2/WPR1 = 0.96; ratio LELY/WELY = 1.07; ratio WPR1/WPRA = 1.68; ratio WPR1/WELY = 0.92; ratio WPR2/WELY = 0.88.

Ventral habitus: combined outer edges of the antennal grooves almost straight and parallel along most of length. Mediolongitudinal ridge of mesoventrite bluntly carinate, carina not reaching posterior margin of mesoventrite. Metaventricle (male) flattened posterior to midlength, with moderately wide and deep mediolongitudinal impression, widened posteriad.

Appendages: antennae rather short (Fig. 1g); ratio ANLE/HWEA = 0.73; ratio CLLE/W10J = 1.09; ratio L03J/W03J \approx 2.70; ratio L03J/L02J = 0.94; ratio L03J/L04J = 2.00; ratio WFTA/LFTA \approx 0.32 (male); ratio LETI/WITI \approx 3.20.

Male genitalia: distinctly shaped (Figs. 2e, f). Tegmen (Fig. 2e) rather wide, widest at middle, medial distal excision deep, V-shaped (ratio DTIN/LETE \approx 0.32–0.33), inner margins without any projection; ratio LETE/WITE \approx 1.19–1.20. Ratio THLE/LETE \approx 0.21. Median lobe of aedeagus moderately elongate, ratio LEAE/WIAE = 1.90–1.95, exhibiting maximum width nearly at distal third, with narrowly and obtusely spatulate apex (Fig. 2f). Main sclerites of internal sac (endophallus) long and rod-shaped in both dorsal and lateral view.

Female: protarsi slightly narrower than in male (ratio WFTA/LFTA = 0.26); metaventricle almost flat, with barely distinct longitudinal impression. Ovipositor (Fig. 2j) with apex acute, moderately sclerotized; ratio STLE/DSIA \approx 0.25; ratio STLE/CGOW \approx 0.08; ratio GONL/CGOW \approx 1.60. Basal portions of gonocoxites transverse, laterally directed apices narrowly rounded and slightly directed proximad. Ratio OVPL/GONL \approx 2.35.

Variation: body sizes 2.6–3.3 mm (length) and 1.48–1.70 mm (width). Basic body color from nut brown to dark brown; antennal club brown to yellowish.

Examined material. Holotype, ♂: **China:** Hubei, Shennongjia National Forest Park, Shennong peak Scenic Area, 2850–2900 m a.s.l., 31.441944° 110.2925°, 16.vi.2017, P. Audisio, M. Liu & M. Huang lgt, sparsely forested and bushy area, beating flowering *Rhododendron* sp. (Ericaceae), (NWAU). Paratypes: same data as holotype, 12 ♂, 16 ♀ (NWAU, CAR-MZUR).

Distribution. **Central China** (Hubei) (Fig. 6a).

Host-plants. All type specimens of the new species were collected on *Rhododendron* sp. (Ericaceae), however several small bushes of *Rubus* spp., including *Rubus rosifolius* (Fig. 4a), were present in the area although they were not in flower at the time.

Habitat. Locality data indicates that this species appears to prefer the edges of high altitude sparsely forested and bushy areas. As reported above, most specimens of the type series were collected by sweeping flowering shrubs of *Rhododendron* sp. (Ericaceae), frequently used by several adult *Meligethes* spp. as occasional food-plants before or after the flowering season of their larval hosts. The species were collected in conjunction with several specimens of *M. auropilosus*, *M. macrofemoratus*, *M. semenovi*, *M. hammondi*, *M. trapezithorax* sp. n., and *M. tricuspoidatus* sp. n.

Phenology. The few available specimens were collected in middle June, which likely indicates adult activity at least from late May to July.

Etymology. The specific epithet of the new species is derived from the Latin *luteus* (= yellowish) and *maculatus* (= spotted), due to its dorsal body color, brownish with pronotal sides and anterior portion of elytra widely yellowish-colored (Fig. 1g).

Taxonomic remarks. As reported above, this new species is similar in external shape to the related *M. simulator* from Shaanxi, Gansu and *M. pallidoelytrorum* from Sichuan (both in the *M. chinensis* species group: Audisio *et al.* 2015; Liu *et al.* 2017). However, both male and female genitalia of the new species strongly differ from those of the two related taxa (Figs. 2e, f, j, k herein and Figs. 2a–d, 3g in Liu *et al.* 2017).

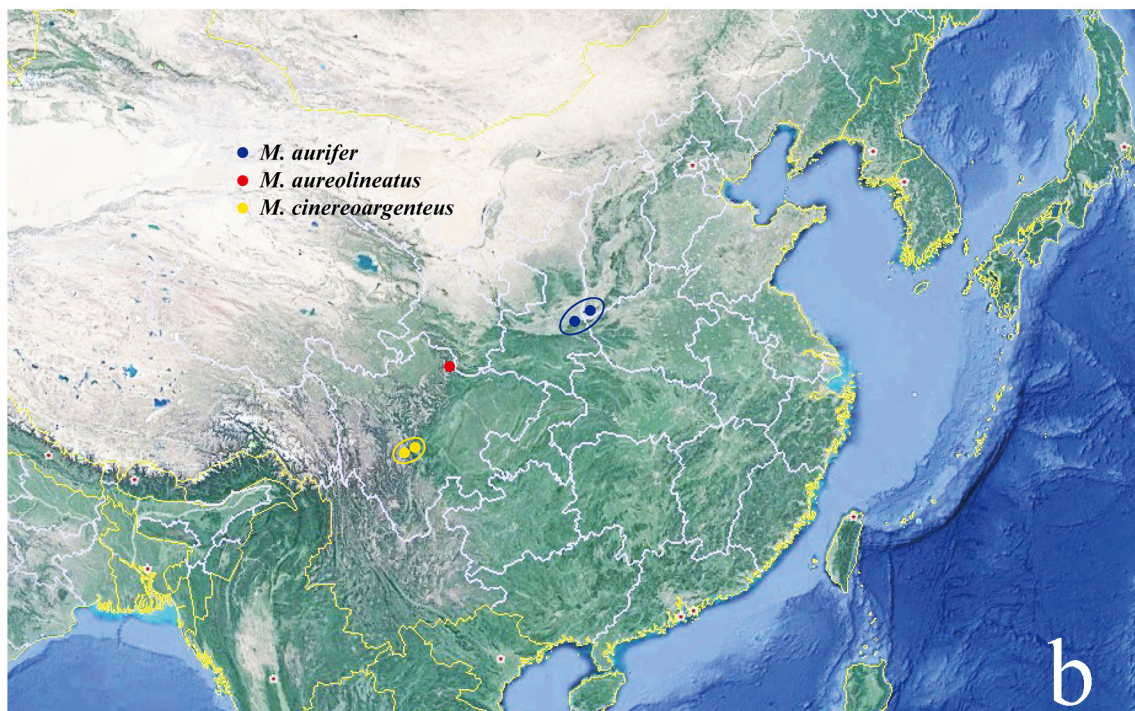
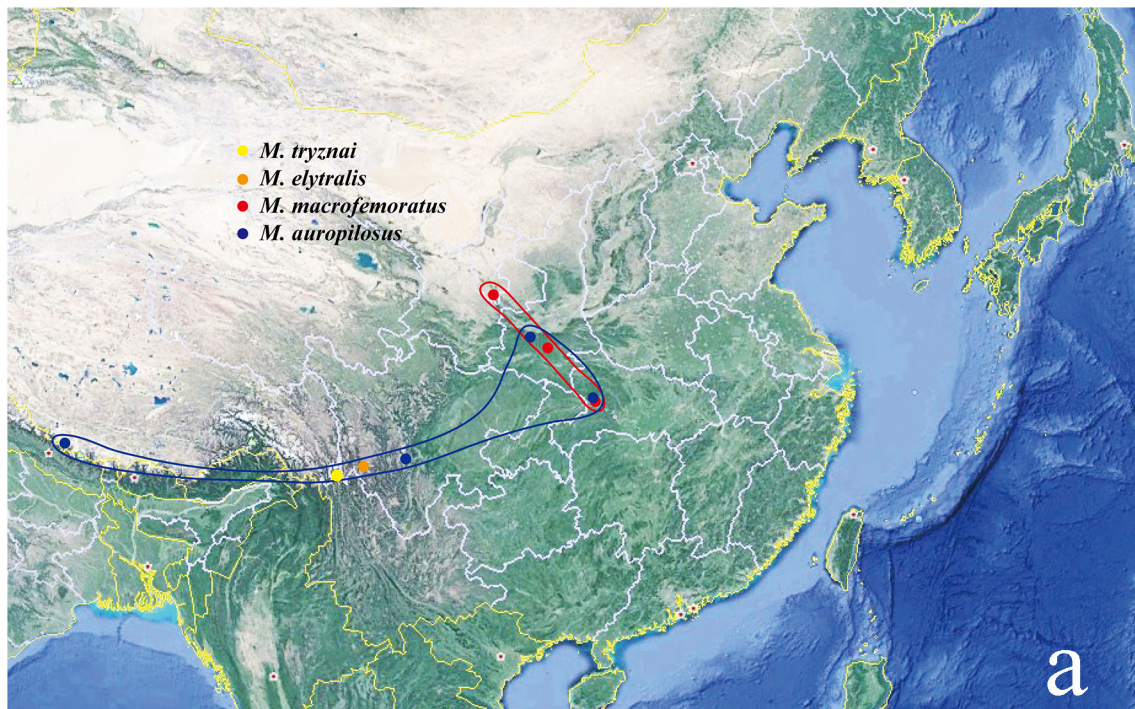


FIGURE 5. Distribution maps of *Meligethes* (*Meligethes*) species; **a** (*M. tryznai*, *M. elytralis*, *M. macrofemoratus*, *M. auropilosus*); **b** (*M. aurifer*, *M. aureolineatus*, *M. cinereoargenteus*).

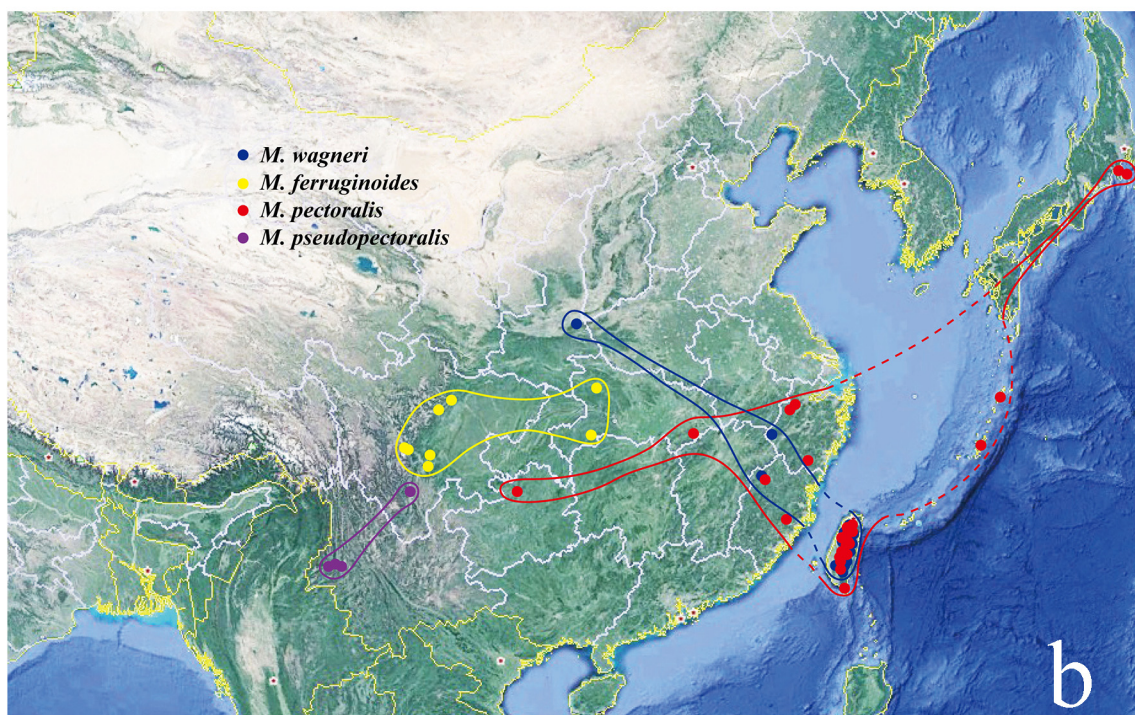
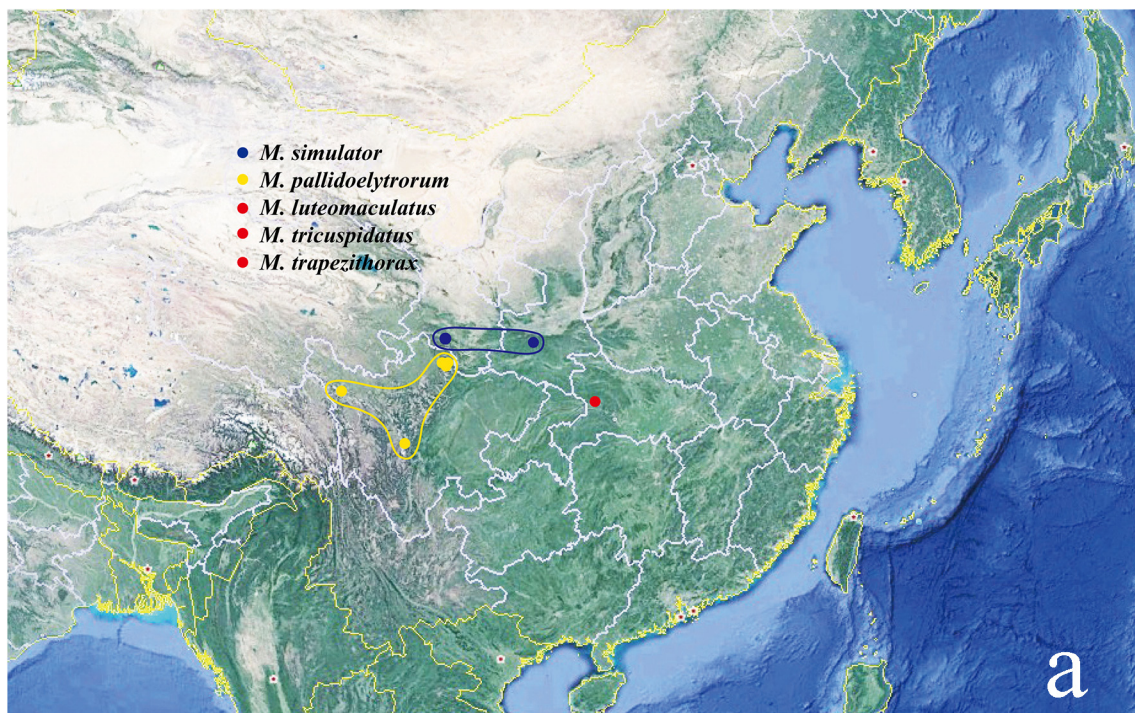


FIGURE 6. Distribution maps of *Meligethes* (*Odonthogethes*) species; **a** (*M. simulator*, *M. pallidoelytrorum*, *M. luteomaculatus* sp. n., *M. tricuspидatus* sp. n., and *M. trapezithorax* sp. n.); **b** (*M. wagneri*, *M. ferruginoides*, *M. pectoralis*, *M. pseudopectoralis*).

***Meligethes (Odonthogethes) pallidoelytrorum* Chen & Kirejtshuk, 2013, in Chen *et al.* 2013**

(Male genitalia as in Figs. 2a, b in Liu *et al.* 2017. The ovipositor of this species is illustrated in Fig. 3f in Liu *et al.* 2017.)

Examined material. China, Sichuan, Luding County, Moxi town, Mt. Gongga, Hailuogou, 2950–2970 m a.s.l., 29.575° 101.996667°, 22.vi.2017, Liu & Audisio lgt, on *Rubus niveus* Thunb. (Rosaceae), 7 ♂, 9 ♀ (NWAU, CAR-MZUR, NMPC, ARCC).

Distribution. Known thus far with certainty only from Sichuan province (Chen *et al.* 2013; Audisio *et al.* 2015) (Fig. 6a).

Host-plants. Several adult specimens and two larvae have been recently collected (see above: Mt. Gongga, Sichuan, June 2017) on reddish flowers of the shrub *Rubus niveus* Thunb. (Rosaceae) (Fig. 4b), which represents a true larval host-plant. Combined locality data indicates that this species appears to prefer the edges of middle-high altitude forested areas (2000–3000 m), in rather shady and humid places, frequently at the edges of river banks and small streams.

Taxonomic remarks. Despite its external similarity to *M. simulator* from Shaanxi, Gansu and to *M. luteomaculatus* sp. n. from Hubei, this species is well-characterized by its distinctive male genitalia (Figs. 2a–d in Liu *et al.* 2017). Female specimens of *M. pallidoelytrorum* on the contrary share a similar appearing ovipositor as *M. simulator* (Fig. 2k herein and Fig. 3g in Liu *et al.* 2017).

***Meligethes (Odonthogethes) ferruginoides* Audisio, Sabatelli & Jelínek, 2015**

Examined material. China, Sichuan, Luding County, Moxi town, Mt. Gongga, Hailuogou, 2950–2970 m a.s.l., 29.575° 101.996667°, 22.vi.2017, Liu & Audisio lgt, by sweeping on shrubs at forest edges, 1 ♂, 2 ♀ (NWAU, CAR-MZUR, NMPC); Sichuan, Luding County, Moxi town, Mt. Gongga, Swallow-Gully, 2450–2570 m a.s.l., 29.689167° 102.066944°, 23.vi.2017, Liu & Audisio lgt, on *Pyracantha fortuneana* (Maximowicz) H. L. Li (Rosaceae), 3 ♂, 5 ♀ (NWAU, CAR-MZUR, NMPC, ARCC).

Distribution. Central and SW China (Hubei, Sichuan) (Audisio *et al.* 2015) (Fig. 6b).

Host-plants. Conclusive specific host data remains somewhat problematic, but some adult specimens have been collected (see above: Swallow-Gully, Moxi town, Sichuan, June 2017) on flowers of the shrub *Pyracantha fortuneana* (Maximowicz) H. L. Li (Rosaceae), which was recently recognized as the likely larval host-plant of *Meligethes (Odonthogethes) pseudochinensis* Audisio, Sabatelli & Jelínek, 2015 (Fig. 6 in Liu *et al.* 2017). Additional collecting events are needed that focus on obtaining larval material.

***Meligethes (Odonthogethes) pectoralis* Rebmann, 1956**

Examined material. China, Guizhou, Zunyi city, Tongzi County, Loushanguan, Wanmuhuahai, 1122 m a.s.l., 16.iv.2017, X. Chen lgt, on *Malus asiatica* Nakai in Matsumura (Rosaceae), 15 ♂, 12 ♀ (NWAU, CAR-MZUR, NMPC, ARCC); Zhejiang, Hangzhou city, Linan District, Qingliangfeng Nature Reserve, 14.iv.2017, X. Chen lgt, 2 ♀ (NWAU).

Distribution. Known thus far with certainty only from SW, SE and Central China (Guizhou, Hubei, Fujian, Zhejiang, Taiwan) and S Japan (Rebmann 1956b; Kirejtshuk 2005; S.-T. Hisamatsu 2009; Audisio *et al.* 2015) (Fig. 6b). The new records above from Guizhou represent the westernmost known limit of the geographical distribution of this species. This species is a member of the *Meligethes (Odonthogethes) pectoralis* species group, and includes a short series of mostly vicariant taxa distributed from Nepal, China and Japan (Audisio *et al.* 2015).

Host-plants. Conclusive specific host data remains uncertain, and additional collecting events are needed that focus on obtaining larval material. A long series of adult specimens, several being females, have been collected (see above: Guizhou, April 2017) on flowers of the small tree *Malus asiatica* (Rosaceae) (Fig. 4d). This plant may represent the true local larval host plant of this species, but additional collecting efforts are needed to validate this as the larval host. *Meligethes pectoralis* was listed by S.-T. Hisamatsu (2009) as frequently collected in Taiwan on *Prunus phaeosticta* (Hance) Maxim. (Rosaceae), in conjunction with the related and endemic *Meligethes (Odonthogethes) sadanarii* S.-T. Hisamatsu, 2009. Therefore, all members of the *Meligethes (O.) pectoralis*

species group may be able to develop as larvae on flowers of small trees of the related host plant genera *Prunus* and *Malus* (Rosaceae).

***Meligethes (Odonthogethes) pseudopectoralis* Audisio, Sabatelli & Jelínek, 2015**

Examined material. China, Sichuan, Liangshan Yi Autonomous Prefecture, Zhaojue County, Mt. Hou, 28.iv.2017, X. Chen lgt, 1 ♀ (NWAU).

Distribution. SW China (Yunnan, Sichuan) (Audisio *et al.* 2015; new data above) (Fig. 6b); the above specimen is a new regional record in China and expands the species range northward.

Host-plants. Unknown.

Checklist of known species of the genus *Meligethes* Stephens, 1830

1. Subgenus *Meligethes* s.str. (= *Meligethes atratus* lineage):

1.1. *Meligethes atratus*-group

<i>flavimanus</i> Stephens, 1830	W Palearctic Region, China, Russia
<i>asperrimus</i> Guillebeau, 1897	
<i>borealis</i> Motschulsky, 1845	
<i>foersteri</i> Reitter, 1871	
<i>foveifrons</i> Reitter, 1871	
<i>lumbaris</i> Sturm, 1845	
<i>ogumae</i> Matsumura, 1911	
<i>sibiricus</i> Rebmann, 1956	
<i>atratus</i> (Olivier, 1790)	W Palearctic Region, N China, Russia
<i>rufipes</i> (Marsham, 1802)	
<i>hammondi</i> Kirejtshuk, 1980	W and central China (Shaanxi, Sichuan, Shanxi, Henan, Hubei)
<i>torquatus</i> Jelínek, 1997	SE China (Taiwan)
<i>violaceus</i> Reitter, 1873	China (Anhui, Shaanxi, Hubei, Zhejiang, Fujian, Guizhou, Jiangxi, Yunnan, Sichuan), SE Russia (Ussuri), Japan
<i>cyaneus</i> Easton, 1957	Japan
<i>violaceus</i> auct., partim, nec Reitter, 1873	

1.2. *Meligethes vulpes*-group

<i>vulpes</i> Solsky, 1876	Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, NW China (Xinjiang)
<i>melanocephalus</i> Rebmann, 1956	
<i>subopacus</i> (Reitter, 1891)	
<i>transmutatus</i> Grouvelle, 1913	
<i>melleus</i> Grouvelle, 1908	Myanmar, N India, N Pakistan, Afghanistan, S Tajikistan, Nepal
<i>vulpes</i> auct., partim, nec Solsky, 1876	
<i>stultus</i> Grouvelle, in litteris (nomen in coll.)	
<i>lutra</i> Solsky, 1876	Uzbekistan
<i>martes</i> Audisio, Sabatelli & Jelínek, 2015	SW and N China (Shaanxi, Shanxi, Sichuan)

1.3. *Meligethes nepalensis*-group

<i>nepalensis</i> Easton, 1968	Nepal, N India
<i>volkovichi</i> Audisio, Sabatelli & Jelínek, 2015	SW China (Yunnan)
<i>auripilosus</i> Liu, Yang, Huang, Jelínek & Audisio, 2016	SW and Central China (Xizang, Sichuan, Hubei, Shaanxi)

<i>cinereus</i> Jelínek, 1978	Bhutan
<i>griseus</i> Jelínek, 1978	Bhutan
1.4. <i>Meligethes auripilis/binotatus</i>-group	
(<i>binotatus</i>-complex)	
<i>binotatus</i> Grouvelle, 1894	NE India, Nepal, SW China (Yunnan, Sichuan), N Myanmar, Bhutan
<i>semenovi</i> Kirejtshuk, 1979	SE Russia (Ussuri), Central, SW and NW China (Sichuan, Hubei, Shaanxi)
<i>transmissus</i> Kirejtshuk, 1988	SW China (Sichuan, Yunnan)
<i>stenotarsus</i> Audisio, Sabatelli & Jelínek, 2015	SW China (N Yunnan, Xizang)
<i>tryznai</i> Audisio, Sabatelli & Jelínek, 2015	SW China (Yunnan/Xizang border)
<i>elytralis</i> Audisio, Sabatelli & Jelínek, 2015	SW China (Sichuan)
<i>auricomus</i> Rebmann, 1956	SE China (Fujian, Jiangxi)
<i>nivalis</i> Audisio, Sabatelli & Jelínek, 2015	SW China (Xizang, Yunnan, Chongqing)
<i>yak</i> Liu, Yang, Huang, Jelínek & Audisio, 2016	SW China (Sichuan)
<i>topali</i> auct., partim, nec Kirejtshuk, 1988	
<i>marmota</i> Audisio, Sabatelli & Jelínek, 2015	Nepal
(<i>auripilis</i>-complex)	
<i>auripilis</i> Reitter, 1889	SW and NW China (Sichuan, Yunnan, Gansu, Shanxi, Shaanxi)
<i>brevipilus</i> Kirejtshuk, 1980	
<i>argentithorax</i> Audisio, Sabatelli & Jelínek, 2015	W and SW China (Qinghai, Sichuan)
<i>auripilis</i> auct., partim, nec Reitter, 1889	
<i>clinei</i> Audisio, Sabatelli & Jelínek, 2015	SW China (Yunnan)
<i>macrofemoratus</i> Liu, Yang, Huang, Jelínek & Audisio, 2016	Central China (Ningxia, Shaanxi, Hubei)
<i>flavimanus</i> auct., partim, nec Stephens, 1830	
(<i>aurifer</i>-complex)	
<i>aurifer</i> Audisio, Sabatelli & Jelínek, 2015	Central China (Shaanxi, Shanxi)
<i>aureolineatus</i> Audisio, Sabatelli & Jelínek, 2015	SW China (Sichuan)
<i>cinereoargenteus</i> Audisio, Sabatelli & Jelínek, 2015	SW China (Sichuan)
2. Subgenus <i>Odonthogethes</i> Reitter, 1871 (= <i>Meligethes denticulatus</i> lineage):	
2.1. <i>Meligethes flavicollis</i>-group	
<i>flavicollis</i> Reitter, 1873	Russian, Japan, North Korea, SW, SE and Central China (Henan, Zhejiang, Chongqing, Jiangxi, Taiwan)
<i>perversecoloratus</i> Roubal, 1943	
<i>semirufus</i> Reitter, 1879	
2.2. <i>Meligethes denticulatus</i>-group	
<i>denticulatus</i> (Heer, 1841)	W Palearctic Region, N China, Russia
<i>hebes</i> Erichson, 1845	
<i>honshuensis</i> Easton, 1956	
<i>marginatus</i> Gredler, 1870	
<i>marginalis</i> Motschulsky, 1860	
<i>olivaceus</i> (Heer, 1841)	
<i>wagneri</i> Rebmann, 1956	SE and Central China (Fujian, Zhejiang, Taiwan, E Shaanxi)
<i>shirozui</i> S. Hisamatsu, 1965	
2.3. <i>Meligethes chinensis</i>-group	
(<i>chinensis</i>-complex)	
<i>bourdilloni</i> Easton, 1968	E Nepal

<i>chinensis</i> Kirejtshuk, 1979	W and Central China (Xizang, Yunnan, Sichuan, Chongqing, Gansu, Shaanxi, Henan, Hubei)
<i>henan</i> Audisio, Sabatelli & Jelínek, 2015	Central China (Henan)
<i>scrobescens</i> Chen, Lin, Huang & Yang, 2015	SW China (Sichuan, Hubei, Chongqing)
<i>inexpectatus</i> Liu, Huang, Cline, Sabatelli & Audisio, 2017	SW China (Sichuan)
<i>pseudochinensis</i> Audisio, Sabatelli & Jelínek, 2015	Central China (Chongqing, Shaanxi, Hubei)
(occultus-complex)	
<i>brassicogethoides</i> Audisio, Sabatelli & Jelínek, 2015	SW China (Yunnan)
<i>trapezithorax</i> sp. n.	Central China (Hubei)
<i>occultus</i> Audisio, Sabatelli & Jelínek, 2015	SW China (Yunnan)
<i>tricuspidatus</i> sp. n.	Central China (Hubei)
<i>schuelkei</i> Audisio, Sabatelli & Jelínek, 2015	W China (Sichuan, Shaanxi?)
<i>nigroaeneus</i> Audisio, Sabatelli & Jelínek, 2015	SW China (Yunnan)
<i>luteornatus</i> Audisio, Sabatelli & Jelínek, 2015	SW China (Yunnan)
(pallidoelytrorum-complex)	
<i>simulator</i> Audisio, Sabatelli & Jelínek, 2015	Central China (Gansu, Shaanxi)
<i>pallidoelytrorum</i> Chen <i>et</i> Kirejtshuk, 2013	SW China (Sichuan)
<i>luteomaculatus</i> sp. n.	Central China (Hubei)
2.4. <i>Meligethes pectoralis</i>-group	
<i>pectoralis</i> Rebmann, 1956	S Japan, SW, SE and Central China (Guizhou, Hubei, Fujian, Zhejiang, Taiwan)
<i>lloydi</i> Easton, 1968	Nepal, SW China (Yunnan)
<i>pseudopectoralis</i> Audisio, Sabatelli & Jelínek, 2015	SW China (Yunnan, Sichuan)
<i>sadanarii</i> S.-T. Hisamatsu, 2009	SE China (Taiwan)
2.5. <i>Meligethes ferrugineus</i>-group	
<i>ferrugineus</i> Reitter, 1873	N India (Sikkim)
<i>ferruginoides</i> Audisio, Sabatelli & Jelínek, 2015	Central and SW China (Hubei, Sichuan)
<i>castanescens</i> Grouvelle, 1903	N India (Darjeeling), SW China (Yunnan)
<i>xenogynus</i> Audisio, Sabatelli & Jelínek, 2015	SW and central China (Sichuan, Shaanxi)
<i>shirakii</i> S. Hisamatsu, 1956	S Japan (Kyū-Shū), SE China (Guizhou, Zhejiang, Taiwan)
<i>zakharenkoi</i> Kirejtshuk, 2005	
2.6. <i>Meligethes aurantirugosus</i>-group	
<i>aurantirugosus</i> Audisio, Sabatelli & Jelínek, 2015	W Nepal
<i>aurorugosus</i> Liu, Yang, Huang, Jelínek & Audisio, 2016	W China (Xizang)

Acknowledgements

This research was supported by the Fundamental Research Funds for Chinese Central Universities (Z109021305) and by funds from the State Administration of Foreign Experts Affair for Recruitment Program of High-end Foreign Experts (Popular Republic of China). The authors greatly appreciate the valuable comments on an earlier version of this manuscript received from our dear friend and colleague Josef Jelínek, Department of Entomology, National Museum, Horní Počernice, Czech Republic, and another anonymous reviewer. The senior author (M.L.) thanks the China Scholarship Council for financial support for her stay in Rome (November, 2016–December, 2017), in collaboration with coauthor P.A. Authors are grateful to Prof. Xinfen Gao, Curator of the Herbarium (CDBI), Chengdu Institute of Biology, Chinese Academy of Sciences, and to the Chinese amateur botanist Shuanlu Dong (Meixian, Shaanxi) for cooperation and assistance in identifying several host plants of the discussed species.

References

- Audisio, P. & Antonini, G. (2015) Traiettorie evolutive in insetti fitofagi specializzati. *Atti dell'Accademia nazionale di Entomologia*, 62 (2014), 107–114.
- Audisio, P., Belfiore, C., De Biase, A. & Antonini, G. (2001a) Identification of *Meligethes matronalis* Audisio and Spornraft, 1990 and *M. subaeneus* Sturm, 1845, based on morphometric and bionomic characters (Coleoptera: Nitidulidae). *European Journal of Entomology*, 98, 87–97.
<https://doi.org/10.14411/eje.2001.012>
- Audisio, P., Cline, A.R., De Biase, A., Antonini, G., Mancini, E., Trizzino, M., Costantini, L., Strika, S., Lamanna, F. & Cerretti, P. (2009) Preliminary re-examination of genus-level taxonomy of the pollen beetle subfamily Meligethinae (Coleoptera: Nitidulidae). *Acta Entomologica Musei Nationalis Pragae*, 49 (2), 341–504.
- Audisio, P., Cline, A.R., Mancini, E., Trizzino, M., Avgin, S.S. & De Biase, A. (2011) Four new Palearctic *Brassicogethes* (Coleoptera, Nitidulidae, Meligethinae), and phylogenetic inference on the *B. coracinus* group. *Rendiconti Lincei*, 22 (3), 235–268.
<https://doi.org/10.1007/s12210-011-0126-4>
- Audisio, P., Cline, A.R., Solano, E., Mancini, E., Lamanna, F., Antonini, G. & Trizzino, M. (2014) A peculiar new genus and species of pollen-beetle (Coleoptera, Nitidulidae) from eastern Africa, with a molecular phylogeny of related Meligethinae. *Systematics and Biodiversity*, 12 (1), 77–91.
<https://doi.org/10.1080/14772000.2013.877539>
- Audisio, P., De Biase, A., Antonini, G., Belfiore, C. & Oliverio, M. (2001b) Morphological, molecular, and ecological evidence of a new Euro-Anatolian species of the *Meligethes coracinus* complex (Coleoptera: Nitidulidae). *Insect Systematics and Evolution*, 31 (4), 361–385.
<https://doi.org/10.1163/187631200X00426>
- Audisio, P., De Biase, A., Antonini, G., Oliverio, M., Ketmaier, V. & De Matthaes, E. (2002) Specific distinction by allozymic data of sympatric sibling species of the pollen beetle genus *Meligethes* (Coleoptera: Nitidulidae). *Italian Journal of Zoology*, 69 (1), 65–69.
<https://doi.org/10.1080/11250000209356440>
- Audisio, P., De Biase, A. & Mancini, E. (2006) A new species of the pollen-beetle genus *Meligethes* (Coleoptera: Nitidulidae) of the *M. aeneus* group from Greece, with review of the *M. subaeneus* complex. *Zootaxa*, 1275, 43–60.
- Audisio, P., De Biase, A., Romanelli, P., Angelici, M.C., Ketmaier, V. & De Matthaes, E. (1999) Molecular re-examination of the taxonomy of the *Meligethes viridescens* species complex (Coleoptera: Nitidulidae). *Biochemical Systematics and Ecology*, 28 (1), 1–13.
[https://doi.org/10.1016/S0305-1978\(99\)00039-3](https://doi.org/10.1016/S0305-1978(99)00039-3)
- Audisio, P., Sabatelli, S. & Jelinek, J. (2015) Revision of the pollen beetle genus *Meligethes* Stephens, 1830 (Coleoptera: Nitidulidae). *Fragmenta entomologica*, 46 (2014), 19–112.
<https://doi.org/10.4081/fe.2014.71>
- Chen, Y. (2013) *Taxonomical study of Meligethinae (Coleoptera: Cucujoidea: Nitidulidae) from China [in Chinese, English Abstract]*. Entomological Museum, Northwest A&F University, Yangling, Master Degree Dissertation in Insect Systematics and Biodiversity, 107 pp.
- Chen, Y., Kirejtshuk, A.G. & Huang, M. (2013) A new species of the subgenus *Meligethes* Stephens (Coleoptera: Nitidulidae) from Sichuan, China. *Entomotaxonomia*, 35 (1), 35–40.
- Chen, Y., Lin, X.L., Huang, M. & Yang, X.K. (2015) A new species of *Lamiogethes* and a new species of *Meligethes* from China (Coleoptera: Nitidulidae: Meligethinae). *Zootaxa*, 3999 (3), 413–420.
<https://doi.org/10.11646/zootaxa.3999.3.6>
- De Biase, A., Antonini, G., Mancini, E. & Audisio, P. (2003) Molecular taxonomy of two sympatric sibling species of the pollen-beetle genus *Meligethes* (Coleoptera: Nitidulidae). *Zootaxa*, 190 (1), 1–16.
<https://doi.org/10.11646/zootaxa.190.1.1>
- De Biase, A., Antonini, G., Mancini, E., Trizzino, M., Cline, A.R. & Audisio, P. (2012) Discordant patterns in the genetic, ecological, and morphological diversification of a recently radiated phytophagous beetle clade (Coleoptera: Nitidulidae: Meligethinae). *Rendiconti Lincei*, 23 (2), 207–215.
<https://doi.org/10.1007/s12210-012-0174-4>
- Hayashi, N. (1978) A contribution to the knowledge of the larvae of Nitidulidae occurring in Japan (Coleoptera: Cucujoidea). *Insecta Matsumurana*, New Series, 14, 1–97.
- Hisamatsu, S.-T. (2009) Revision of the Meligethinae of Taiwan (Coleoptera, Nitidulidae). *Japanese Journal of Systematic Entomology*, 15 (1), 17–46.
- Kirejtshuk, A.G. (1992) 59, 61. Sem. Nitidulidae – Blestyanki. [Family Nitidulidae – Sap beetles.]. In: Ler, P.A. (Ed.), *Opredelitel' nasekomykh Dal'nego Vostoka SSSR v shesti tomakh. Tom III. Zhestkokrylye, ili zhuki. Chast' 2. [Identification key to Insects of Far East of the USSR]. III. Coleoptera, or Beetles. Part 2*. Nauka, St. Petersburg, pp. 114–210.
- Kirejtshuk, A.G. (2005) On the fauna of Nitidulidae (Coleoptera, Nitidulidae) from Taiwan with some taxonomical notes. *Annales Historico-Naturales Musei Nationalis Hungarici*, 97, 217–279.

- Lin, X.L., Chen, Y., Huang, M. & Yang, X.K. (2015) A new species of the genus *Meligethes* Stephens (Coleoptera: Nitidulidae: Meligethinae) from China. *Zoological Systematics*, 40 (3), 268–289.
- Liu, M.K., Yang, X.K., Huang, M., Jelínek, J. & Audisio, P. (2016) Four new species of *Meligethes* from China and additional data on other species of the genus (Coleoptera: Nitidulidae: Meligethinae). *Zootaxa*, 4121 (2), 101–116.
<https://doi.org/10.11646/zootaxa.4121.2.1>
- Liu, M.K., Huang, M., Cline, A.R., Sabatelli, S. & Audisio, P. (2017) A new species of *Meligethes* Stephens from China and additional data on members of the *M. chinensis* species-complex (Coleoptera: Nitidulidae, Meligethinae). *Fragmenta entomologica*, 49 (1), 79–84.
<https://doi.org/10.4081/fe.2017.234>
- Lu, L.D., Gu, C.Z., Li, C.L., Crinan, A., Bartholomew, B., Brach, A.R., Boufford, D.E., Ikeda, H., Ohba, H., Robertson, K.R. & Spongberg, S.A. (2003) Rosaceae. In: Wu, Z.Y., Ravan, P.H. & Hong, D.Y. (Eds.), *Flora of China*. Vol. 9. Science Press/Missouri Botanical Garden Press, Beijing/St. Louis, pp. 46–434.
- Mancini, M., De Biase, A., Cline, A.R., Antonini, G., Trizzino, M., Clayhills, T., Sabatelli, S., Cerretti, P. & Audisio, P. (2016) Morphological, genetic and host-plant diversification in pollen-beetles of the *Brassicogethes coracinus* group (Coleoptera: Nitidulidae: Meligethinae). *Rendiconti Lincei*, 27 (2), 321–339.
<https://doi.org/10.1007/s12210-015-0482-6>
- Rebmann, O. (1956a) Revision der Gattung *Meligethes* Subgenus *Odonthogethes* (Col. Nitid.). (6. Beitrag zur Kenntnis der Nitiduliden). *Entomologische Blätter*, 52, 42–48.
- Rebmann, O. (1956b) Revision der Gattung *Meligethes* (Col. Nitid.). Die paläarktischen Arten der Gruppe des *M. atratus* Ol. (7. Beitrag zur Kenntnis der Nitiduliden). *Entomologische Blätter*, 52, 124–135.
- Trizzino, M., Audisio, P., Antonini, G., De Biase, A. & Mancini, E. (2009) Comparative analysis of sequences and secondary structures of the rRNA internal transcribed spacer 2 (ITS2) in pollen-beetles of the subfamily Meligethinae (Coleoptera, Nitidulidae): potential use of slippage-derived sequences in molecular systematics. *Molecular Phylogenetics and Evolution*, 51 (2), 215–226.
<https://doi.org/10.1016/j.ympev.2008.11.004>
- Wei, X.M., Gao, X.F. & Zhang, L.B. (2008) A systematic study of *Rosa sericea* (Rosaceae) complex: Are *R. omeiensis* and *R. sericea* conspecific? *Journal of Systematics and Evolution (formerly Acta Phytotaxonomica Sinica)*, 46 (6), 919–928.