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Taxonomic notes on the genus *Myolepta* Newman (Diptera: Syrphidae) from China

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Abstract. The saprophagous hoverfly genus *Myolepta* Newman, 1838 (Syrphidae: Eristalinae), which consists of three species in China, is revised. So far, the distribution of these species have been limited to their type localities in Nanjing Province, as indicated in the original descriptions published in 1992. In this study, we re-describe *Myolepta sinica* Chu & He, 1992, a rarely documented species since its original description, and extend its known distribution range to Beijing. For the first time, we provided field photographs of both male and female, digital illustrations of male genitalia, and information on its host plant. Additionally, a taxonomic key is provided to help in the identification of known *Myolepta* species in China.

Keywords. distribution, Diptera, diversity, morphology, new record, taxonomy

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Introduction

The saprophagous hoverfly genus *Myolepta*, belonging to the tribe Brachyopini of the subfamily Eristalinae, was originally established by Newman in 1838 with *Musca luteola* Gmelin, 1790, as its type species. This relatively small hoverfly genus currently represents 49 extant validly described species with representatives in all biogeographical regions of the world except Australia (Thompson & Vockeroth 1989; Reemer *et al.* 2005; Mengual 2022). Among these biogeographical regions, the Palaearctic region represents the largest number of species (18), followed by Neotropical (12), Oriental (9), Nearctic (7), and Afrotropical (3) regions (Thompson 1974; Wiegmann 1986; Reemer *et al.* 2005; Gharali & Reemer 2008; Gilasian *et al.* 2016; van Steenis 2020; Hassan *et al.* 2020; Mengual 2022).

Adult *Myolepta* species are small to medium-sized (5–12 mm), dark-brown to black in colour with orange-yellow abdominal markings in several species; sexually dimorphic eyes, holoptic in males, dichoptic in females; the face with distinct facial tubercle in males (except lacking a prominent facial tubercle in *Myolepta graciliventris* Wiegmann, 1986), absent in females; postpronotum pilose; crossvein r-m proximal to mid of cell dm, vein R_{4+5} straight; femora enlarged, all with strong ventral setae on the apical half (Mengual 2022). The adults usually occur in mature deciduous or evergreen forests. It has also been observed on the flowers of *Ailanthus altissima*, *Crataegus* spp., *Cistus* spp., and *Prunus spinosa*. The larvae inhabit water-filled tree holes of a wide range of broadleaved trees, e.g., *Aesculus*, *Fagus*, *Populus*, *Quercus*, and *Ulmus* (Reemer *et al.* 2005; van Veen 2004; Hassan *et al.* 2020; Mengual 2022).

So far, no comprehensive taxonomic revision of the genus *Myolepta* has been conducted in China. The only study on this genus from the region was Chu & He (1992), which reports the genus *Myolepta* for the first time with a description of three new species. Thereafter, these species have not been recorded, except as cited in published literature from China (Yang *et al.* 2020). The present study aims to revise the taxonomy of *Myolepta* species in China, providing the second record of *Myolepta sinica* Chu & He, 1992, along with its re-description based on fresh specimens. Field photographs of both male and female specimens, digital illustrations of male genitalia, and host plant data are presented.

Material and Methods

Adult specimens were collected between May and July from 2019 to 2022 and were observed hovering around tree holes on *Populus* species in the lower parts of the trees (Figs 1A–C).

Morphological terminology follows Mengual (2022) and van Steenis *et al.* (2023).

External body morphology was observed under a NIKON SMZ–800N stereomicroscope. The species was identified by using Chu & He (1992). The genital segments of the examined specimen were macerated in 10% NaOH for 7–10 h (or boiled for 1–3 min), then transferred to glycerine after rinsing in distilled water for further examination. Photographs of external body morphology and male genitalia were taken with a KEYENCE VHX-6000 system. Illustrations were imported into Adobe Photoshop CS8 for labelling and plate composition.

The specimens are deposited in the Institute of Entomology, Guizhou University, Guiyang, China (GUGC).

Results

Taxonomy

Family Syrphidae Latreille, 1802
Subfamily Eristalinae Newman, 1834
Genus *Myolepta* Newman, 1838

Myolepta Newman, 1838: 373. Type species. *Musca luteola* Gmelin, 1790. Monotypy.
Xylotaeja Rondani, 1845: 457. Type species. *Syrphus vara* Panzer, 1798. Original designation.
Sarolepta Hull, 1941: 436. Type species. *Sarolepta dolorosa* Hull, 1941. Original designation.
Protolepidostola Hull, 1949: 333 (as a subgenus of *Myolepta*). Type species. *Lepidostola scintillans* Hull, 1946. Original designation.

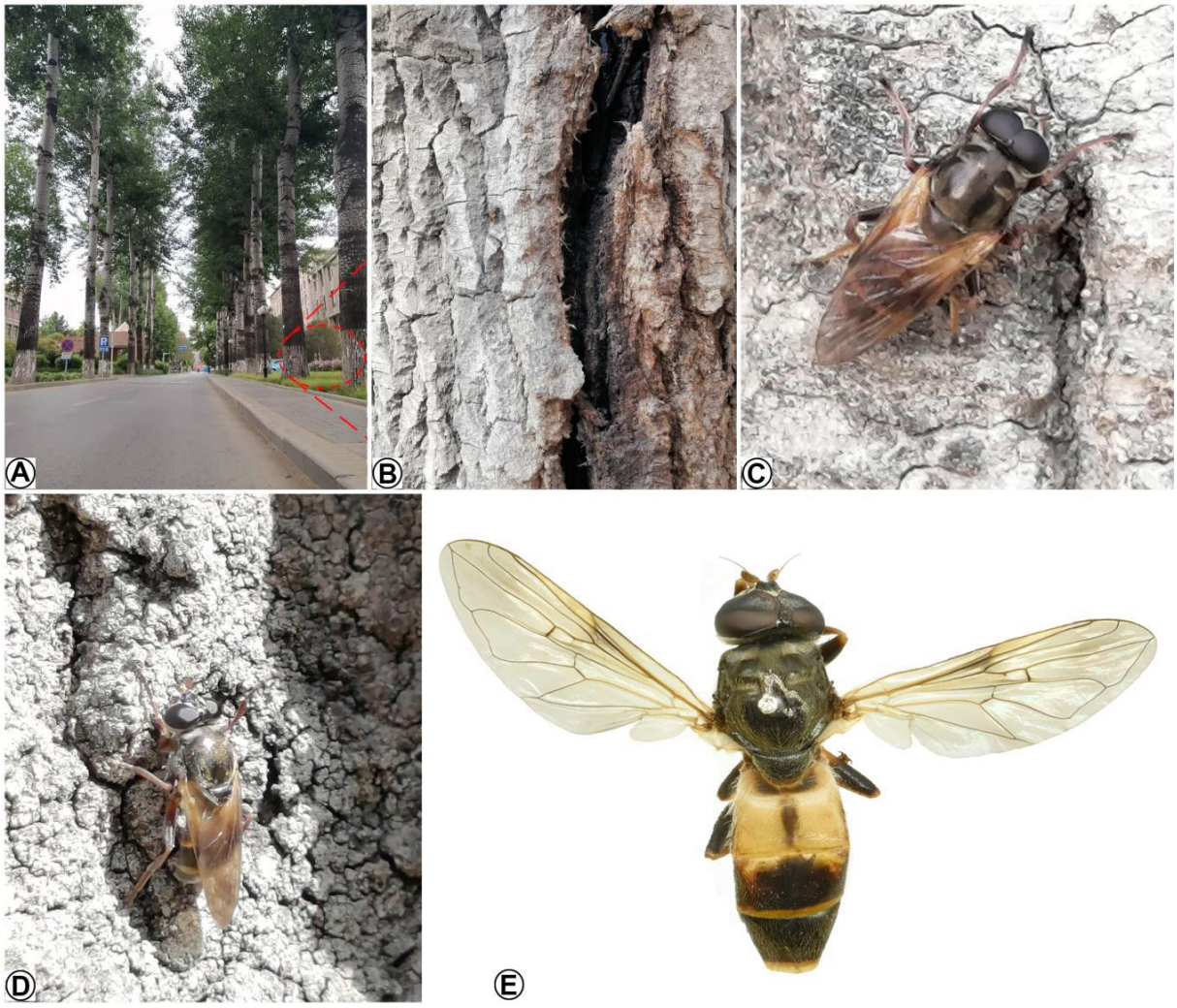

Figure 1. A. Habitat photo of *Myolepta sinica* Chu & He, 1992; **B.** Close-up view of host plant (*Populus* sp.); **C.** Field photograph of a male, dorsal view; **D.** Field photograph of a female, dorsolateral view; **E.** Male specimen, dorsal view.

Diagnosis of the genus. Sexually dimorphic, face with facial tubercle in males (Chu & He 1992: figs 1-3A) while concave in females (Chu & He 1992: figs 1-3B); eye bare; postpronotum pilose; cross vein r-m proximal to mid of cell dm; vein R_{4+5} straight; femora with strong ventral setae (Mengual 2022).

Key to the Chinese species of *Myolepta* Newman, 1838

1. Face black; abdominal tergum II with a pair of small basal yellow maculae or posteriorly narrowly yellow 2
- Face with ventral part of mala yellow (Fig. 2D); abdominal tergum II largely yellow (Chu & He 1992: figs 1C-D; Fig. 1E) . . . . . ***Myolepta sinica* Chu & He**
2. Thorax with four distinct blackish vittae; abdominal tergum II with a pair of small yellow macula (Chu & He 1992: fig. 3C) . . . . . ***Myolepta bimaculata* Chu & He**
- Thorax with indistinct blackish vittae; abdominal tergum II without yellow macula, except posteriorly with a narrow yellow fascia . . . . . ***Myolepta vittata* Chu & He**

Myolepta bimaculata Chu & He, 1992

Myolepta bimaculata Chu & He, 1992: 80. Type locality: China (Nanjing: Jiangsu).

Differential diagnosis. This species is similar to *Myolepta sinica* in having yellow macula on abdominal tergite II and shares the characteristic black face with *M. vittata*. However, it can be distinguished from both by the presence of two narrow transverse yellow macula on the anterior margin of abdominal tergite II (Chu & He 1992: fig. 3C). In comparison, *M. sinica* has a predominantly yellow tergite II (Fig. 1E), whereas *M. vittata* has tergite II completely black.

Distribution. China: Nanjing (Jiangsu) (Huang & Cheng 2012; Yang *et al.* 2020).

Myolepta sinica Chu & He, 1992

(Figs 1–3)

Myolepta sinica Chu & He, 1992: 78. Type locality: China (Nanjing: Jiangsu).

Material examined. China: Beijing, China Agricultural University, West Campus, 2♂, 2♀, 16.IV.2019, 09.V.2022, leg. M.A. Hassan (GUGC).

Differential diagnosis. This species is similar to *Myolepta bimaculata* in having yellow macula on abdominal tergite II. However, it can be differentiated by the predominantly yellow coloration of tergite II (Fig. 1E), which is completely black in *M. vittata*, and having two narrow transverse yellow macula on the anterior margin of abdominal tergite II in *M. bimaculata*.

Measurements. Body: 7.9–8.1 mm; wing: 8.0–8.8 mm.

Male. Head (Fig. 2D). Eye bare, contiguous over a distance about as long as the length of the ocellar triangle. Face with a distinct facial tubercle, bare medially, shiny black, densely silvery pruinose. Parafacia at ventral half with scattered thick white pile. Gena narrow, shiny black and bare ventrally, dorsally with scattered thick white pile. Mala brownish yellow, densely silvery pruinose. Lunule shiny black, except for a narrow strip of silvery pruinosity along eye margin. Frontal triangle shiny black on ventral half, dorsal 1/3 and lateral margins with silvery pruinosity, with scattered thick white pile. Ocelli brownish. Antenna yellow; scape and pedicel with yellow pile; postpedicel oval-shaped, rounded apically, slightly longer than wide. Arista bare, brown. Occiput covered with silvery pruinosity, with scattered thick white pile.

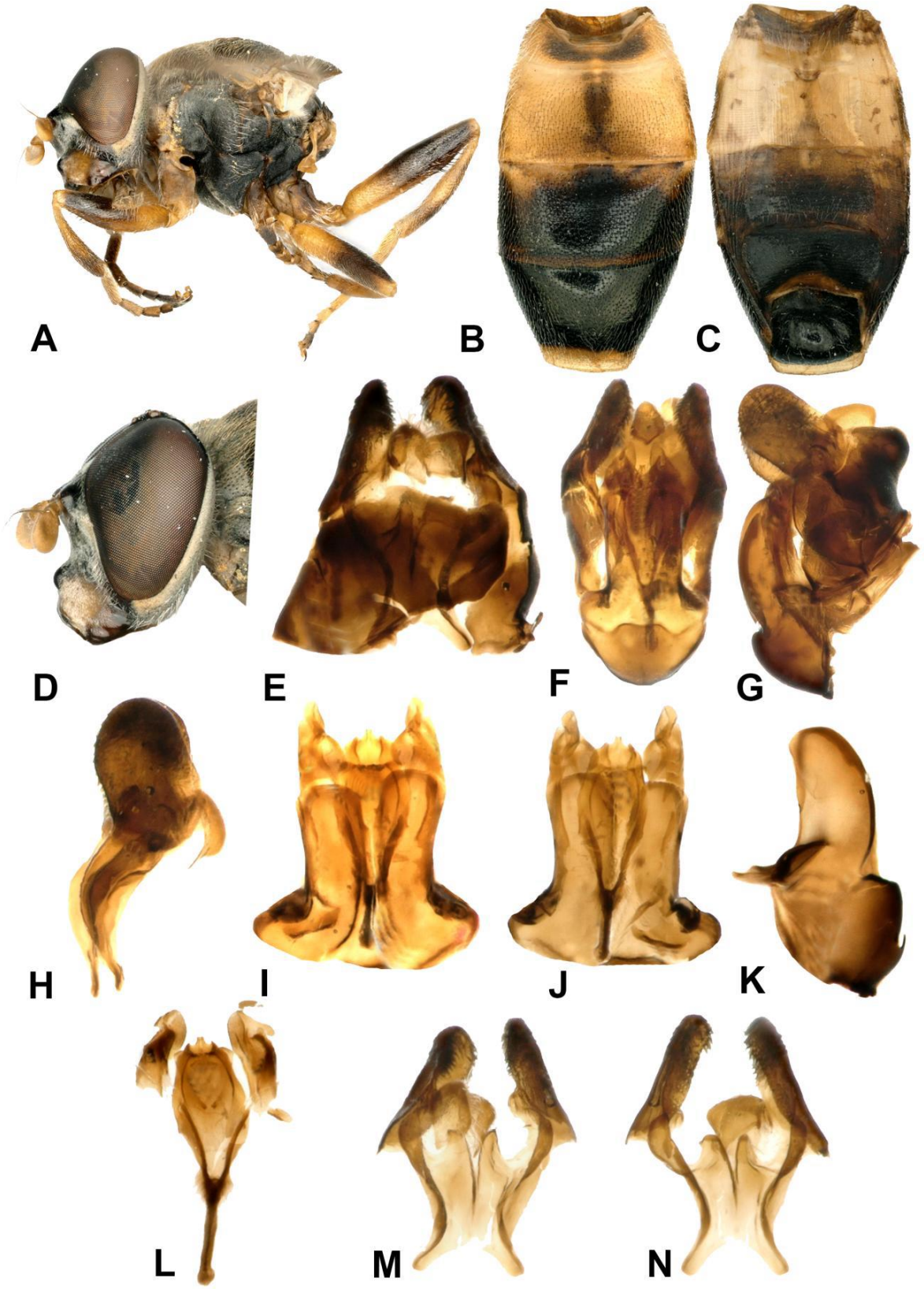

Figure 2. *Myolepta sinica* Chu & He, 1992. Male. **A.** Head and thorax, lateral view; **B.** Abdomen, dorsal view; **C.** Abdomen, ventral view; **D.** Head, lateral view; **E.** Male genitalia, dorsal view; **F.** Male genitalia, ventral view; **G.** Male genitalia, lateral view; **H.** Hypandrium, lateral view; **I.** Hypandrium, dorsal view; **J.** Hypandrium, ventral view; **K.** Postgonites, lateral view; **L.** Phallus, ventral view; **M.** Epandrium, dorsal view; **N.** Epandrium, ventral view.

Thorax (Fig. 1E). Scutum black, with densely grey pruinosity; anterior ½ of postpronotum, notopleuron, and postalar callus black, with densely grey pruinosity. Scutellum rounded, black, except apical margin brownish, with densely grey pruinosity. Pleuron black, with slightly grey pruinosity; posterodorsal part of anterior anepisternum with short white-yellowish pile; posterior anepisternum and dorsomedian part of katepisternum with white pile; meron, anepimeron and katepimeron bare. Posterior spiracular fringes brownish-yellow pile (Fig. 2A).
Wing (Fig. 1E). Membrane hyaline, except a vague brownish macula between the base of pterostigma and branching point of vein Rs, extensively covered with microtrichia. Pterostigma yellow. Veins yellow at proximal 1/3, dark brown in other parts. Vena spuria present. Cell r_{4+5} petiolate; vein R_{4+5}+M_1 with last section shorter than crossvein r-m. Calypterae yellowish white, fringed with long yellow pile. Halter brownish yellow.
Legs (Fig. 2A). Coxae brownish yellow; procoxa with sparse light yellow pile at anterior and distal half on posterior sides; meso- and metacoxae with long light yellow pile on anterior side. Trochanters yellow with short light yellow pile. Femora bicolored, yellow on basal 1/2 to 1/3 and black on apical 1/2 to 2/3, apex yellow; pro- and mesofemora yellow at proximal 1/3, mesofemur yellow at proximal half, covered with yellow pile and two rows of short black setae on ventral side at apical 1/3. Tibiae brownish yellow, covered with short white pile; protibia yellow at basal 1/2, brownish at apical 1/2; mesotibia brownish yellow; metatibia yellow with black macula. Tarsi brownish yellow to yellowish, covered with pale yellow pile; protarsus brownish yellow; first three tarsomeres in meso- and metatarsus yellow, and the last two tarsomeres dark brown.
Abdomen (Figs 2B, C). Broad, almost parallel-sided, with the maximum width between tergites III and IV. Tergite I yellow, dark brown medially, covered with short brown pruinosity, yellow pile at lateral margins; tergite II wider than long, yellow, with a narrow median longitudinal dark vitta, covered with adpressed black pile, yellow pile at lateral margins; tergite III wider than long, black, brownish yellow at antero-lateral margins, covered with adpressed brown pile; tergite IV subtrapezoidal in shape, nearly as long as wide, black with posterior margin yellow, covered with adpressed brown pile. Sterna with adpressed yellow pile; sternum I yellow; sternum II black, basal and lateral margins brownish yellow; sternum III black, apical margin brownish yellow; sterna IV to VII black.
Male genitalia (Fig. 2E–N). Epandrium subquadrate. Cercus rounded, with pale yellow pile. Surstylus rectangular, longer than wide, with distinct black setae at apical margin. Hypandrium in lateral view elongated, distinctly longer than wide, semicircular at basal 1/2, rectangular at apical 1/2; rectangular in ventral view, slightly curved at base, with concavely broadening towards apex.

Distribution. China: Nanjing (Jiangsu) (Huang & Cheng 2012: 464; Yang *et al*. 2020: 32); Beijing (China Agricultural University, West Campus) (**present study**).

Remarks. A significant number of individuals were consistently observed on *Populus* sp. during the months of May to July each year, indicating a peak in activity and possibly a critical period for their life cycles. This observation suggests that these months may play a crucial role in their ecological interactions with the *Populus* species.

Myolepta vittata Chu & He, 1992

Myolepta vittata Chu & He, 1992: 79. Type locality: China (Nanjing: Jiangsu).

Differential diagnosis. This species can be distinguished from its congeners by its shiny black abdomen, with tergite I greyish and the posterior margin of tergite II slightly yellowish.
Distribution. China: Nanjing (Jiangsu) (Huang & Cheng 2012; Yang *et al.* 2020).

Discussion

The genus *Myolepta* is predominantly distributed within the Palaearctic region, which harbours the highest diversity of the genus, with 18 out of 49 valid extant described species. In China, the genus *Myolepta* comprises three species: *M. bimaculata*, *M. sinica*, and *M. vittata*. The Palaearctic region confine all three species, highlighting their stronger preference for temperate environments. *M. vittata* and *M. bimaculata* are only known from their type locality in Nanjing Province. *M. sinica* appears to exhibit a broader distribution, extending northward to Beijing from its type locality in Nanjing Province, the eastern parts of China. However the host plants of *M. vittata* and *M. bimaculata* remain unknown.

In the present study, we observed numerous adult *M. sinica* specimens hovering around *Populus* tree near holes containing plant resins. It is likely that the larvae reside in these tree holes; however, further investigation of these habitats (Fig. 1A-D) may discover the immature stages of this species. The first author attempted to locate photographs of the type specimens but was unable to find them at the institute where they are deposited (personal communication with Dr. Hu Li). Further research on the type specimens, either at the home institute or from the type localities, would be valuable for future taxonomic revisions of the genus *Myolepta* in China.

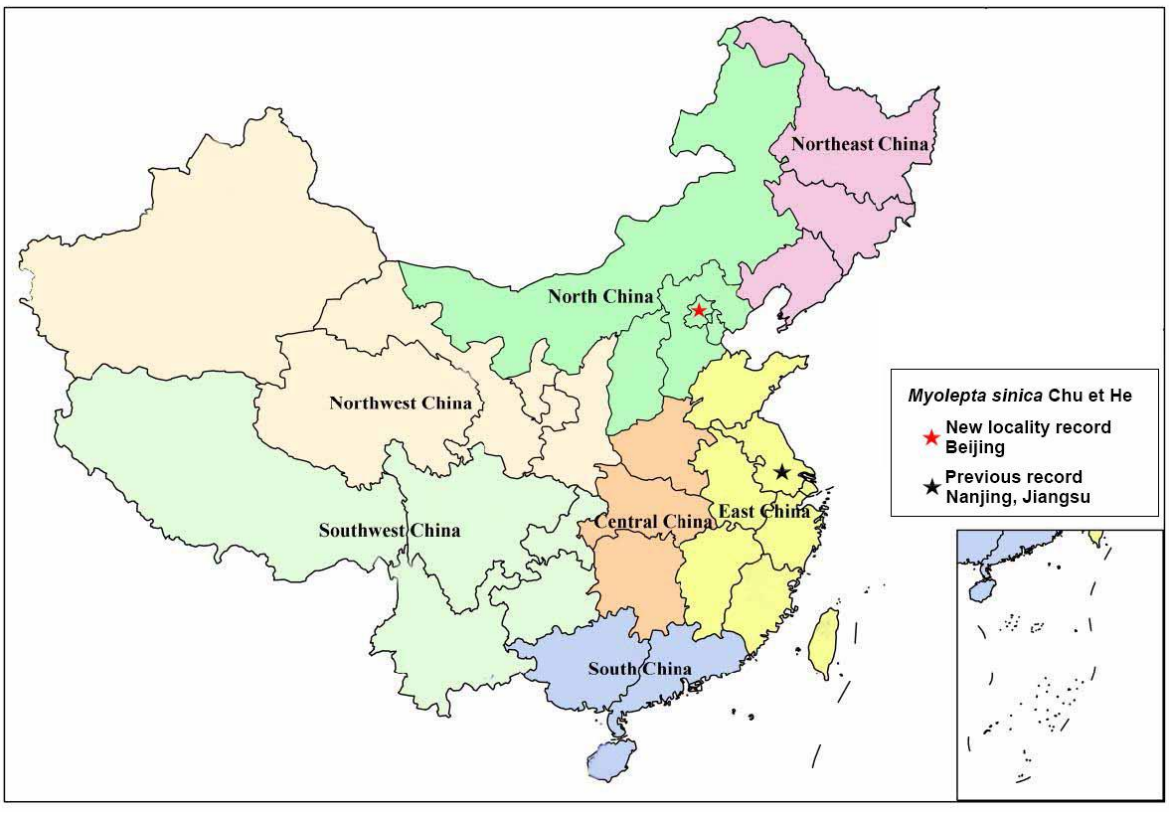

Figure 3. Distribution map of *Myolepta sinica* Chu & He, 1992 in China.

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