A new species and a newly-recorded species in the genus *Amauromyza* (Diptera: Agromyzidae) from China

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Abstract: A new species in the genus *Amauromyza* Hendel, 1931, *Amauromyza* (*Cephalomyza*) *wuyuanensis* Fu & Shi **sp. nov.**, is described and illustrated. *A.* (*Cephalomyza*) *karli* (Hendel, 1927) is newly discovered from China. So far, five species in the genus *Amauromyza* have been reported from China. A key to these species and a checklist with host plants and distributions are presented.

Key words: leaf-mining flies; taxonomy; key

中国暗潜蝇属一新种及一新记录种记述（双翅目：潜蝇科）

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摘要：记述中国暗潜蝇属 1 新种：五原暗潜蝇 *Amauromyza wuyuanensis* Fu & Shi **sp. nov.**，及 1 中国新记录种：卡氏暗潜蝇 *A.* (*Cephalomyza*) *karli* (Hendel, 1927)，迄今中国已记录暗潜蝇属 5 种；文中提供了中国暗潜蝇属分种检索表，以及其寄主植物和分布信息。

关键词：潜蝇；分类；检索表

Introduction

The genus *Amauromyza* Hendel, 1931 includes 62 known species (https://sdei.senckenberg.de/tschirnhaus-agromyzidae/) and is distributed in all zoogeographical Regions except for the Antarctic Region. They are mainly distributed in the Palaearctic and Nearctic Regions (Lonsdale & Tschirnhaus 2021). A checklist of 60 species in this genus in the worldwide was presented by Boucher (2012), including two unnamed species (Spencer & Stegmaier 1973; Spencer & Steyskal 1986), but *Amauromyza* (*Cephalomyza*) *epistomella* Zlobin, 2007 was not included. Three species: *Amauromyza* (*Amauromyza*) *ramosa* Sasakawa, 2013, *A.* (*Cephalomyza*) *paragyrans* Papp, 2020 and *A.* (*Amauromyza*) *stachysi* Guglya, 2021, were subsequently discovered (Sasakawa 2013; Papp & Černý 2020; Guglya 2021).

Amauromyza is represented by three subgenera and defined entirely by male genitalic characters, making it difficult to identify based on external morphology alone. However, this genus can be identified by combining the following characteristics: fronto-orbital setulae erect or reclinate; wing extending to apex of M_{1+2}, and R_{4+5} ending nearer wing tip than M_{1+2};

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calypter fringe usually brown or black; halter usually black (subgenus *Amauromyza*) or yellow (subgenus *Cephalomyza*); distiphallus surrounded by a spinulose membrane; bowl-shaped sperm pump. In China, three *Amauromyza* species have been recognized: *A.* (*Amauromyza*) *aliena* (Malloch, 1914) from Taiwan, *A.* (*Cephalomyza*) *acuta* Sasakawa & Fan, 1986 from Qinghai and *A.* (*C.*) *bifida* Sasakawa & Fan, 1986 from Xinjiang (Sasakawa & Fan 1986). During our study of the Agromyzidae from Inner Mongolia, northern China, a species, *A.* (*C.*) *wuyuanensis* Fu & Shi **sp. nov.**, is found new to science and a species *A.* (*C.*) *karli* (Hendel, 1927) is newly-recorded from China. The detailed descriptions and photographs of these two species are provided and a key to all known Chinese species is presented. Type specimens are deposited in Inner Mongolia Agricultural University.

Material and methods

The general terminology follows Spencer & Steyskal (1986), Lonsdale & Tschirnhaus (2021) and Shi & Gaimari (2015). Genitalia preparations were made by removing and macerating the apical portion of the abdomen in warm lactic acid for 10–20 min, then rinsing them with purified water for dissection and study. After examination in glycerin, genitalia were transferred and stored in a microvial with glycerin. Specimens were examined with a Nikon 1270 dissection microscope. Adult images were taken with a Nikon DS-Fi3 digital camera and the series of images montaged using Helicon Focus (©HeliconSoft). Genitalia images were taken with a DMC6200 digital camera on a Leica M205FA dissection microscope with the series of images montaged using Leica Application Suite X 5.0.2.24429. All images were further processed with Adobe Photoshop CS 6.0.

Taxonomy

A checklist of the known species in the genus *Amauromyza* in China

1. ***A.* (*Cephalomyza*) *wuyuanensis* Fu & Shi sp. nov.**

   Host plant. Unknown.

   Distribution. China (Inner Mongolia).

2. ***A.* (*Amauromyza*) *aliena* (Malloch, 1914)**

   Agromyza aliena Malloch, 1914: 328.

   Amauromyza aliena: Sasakawa, 1972: 65; Spencer, 1961: 85 (as *Phytobia* (*Amauromyza*)).

   Host plant. *Callicarpa formosana* Rolfe.

   Distribution. China (Taiwan); Thailand.

3. ***A.* (*Cephalomyza*) *acuta* Sasakawa & Fan, 1986**

   Amauromyza (Cephalomyza) acuta Sasakawa & Fan, 1986: 290.

   Host plant. Unknown.

   Distribution. China (Qinghai).

4. ***A.* (*Cephalomyza*) *bifida* Sasakawa & Fan, 1986**

   Amauromyza (Cephalomyza) bifida Sasakawa & Fan, 1986: 288.

   Host plant. Unknown.

Distribution. China (Xinjiang).

5. ***A.* (*Cephalomyza*) *karli* (Hendel, 1927)**

Dizygomyza karli Hendel, 1927: 253.

Dizygomyza (*Cephalomyza*) *karli*. Hendel 1931: 34.

Amauromyza karli. Spencer 1969: 158, 1977: 242, Lonsdale 2021: 213.

Amauromyza (*Cephalomyza*) *karli*. Boucher 2012: 746; Černý 2018: 123; Černý *et al*. 2020: 201.

Host plant. Amaranthaceae *Chenopodium vulvaria*, *C. album*, *C. quinoa*.

Distribution. China (Inner Mongolia); Canada; Croatia; Czech Republic; Finland; France; Germany; Greece; Hungary; Mongolia; Poland; Romania; Russia; Slovakia; South Korea; Spain; Sweden; Switzerland; USA.

Key to known species of the genus *Amauromyza* in China

1. Halter black or at least black at tip; gena only about 1/9 height of eye; sperm pump greatly enlarged, with distinctive bowl-shaped base (Sasakawa 1972: fig. 24)···*A.* (*A.*) *aliena*

-. Halter yellow or light yellow; gena deeper, at least 1/5 height of eye; sperm pump not as above··········· 2

2. Antenna black, axe-shaped in profile; r-m at apical 1/3 point of discal cell (Sasakawa 1986: figs 20, 21)*A.* (*C.*) *acuta*

-. Antenna yellow, first flagellomere blunt; r-m near middle of discal cell ······································ 3

3. 4-5 inferior orbital inclinate, 2 superior orbital reclinate (see Sasakawa 1986: fig. 17); acrostichal setulae in 4 rows; base of distiphallus bifided and on membranous surface armed with many minute spinules (Sasakawa 1986: fig. 19)··· *A.* (*C.*) *bifida*

-. 3-4 inferior orbital inclinate, 1 superior orbital reclinate; acrostichal setulae in 2 rows; distiphallus not as above ·· 4

4. Legs dark at most, apices of femora less than 1/3 light yellow, tibiae and tarsus brownish black (Fig. 3A); distiphallus C-sharped from lateral view, with one tuft of setae on one side (Figs 4A, 4D)······*A.* (*C.*) *karli*

-. Legs light at most, apices of femora nearly 1/2 light yellow, tibiae and tarsus pale yellow to brown (Fig. 1A); distiphallus not as above and closed to C-shape with larger opening (Figs 2A, 2D) ······················ ··· *A.* (*C.*) *wuyuanensis* Fu & Shi **sp. nov.**

1. ***Amauromyza* (*Cephalomyza*) *wuyuanensis* Fu & Shi sp. nov.** (Figs 1, 2)

Description. Male. Body length 1.5–2.2 mm. Wing length 1.8–2.0 mm.

Head yellow. Cephalic setae slender and relatively short, yellow to light brown (female darker). Three inclinate inferior orbitals, one superior orbital reclinate (one specimen with two superior orbitals). Orbital setulae few and scattered or even absent. Postocellar stronger than ocellar setae. Fronto-orbital plate and parafacial produced and strongly projecting anteriorly. Head light yellow, posterolateral corner of frons with brown spot encompassing vertical setae. Eye height divided by gena height: 1.3–2.0. Gena distinctly broad, highest posteriorly. First flagellomere 1/3 longer than high with anterodistal corner somewhat angulate, sometimes slightly shorter, and more rounded, pale yellow. Arista pubescent, pale brown. Lunule height less than 1/2 width. Facial keel narrow and slightly raised. Clypeus and palpus yellow. Vibrissa slightly larger than genal setae. Epistoma conspicuously broad, extending half distance to base of antennae.

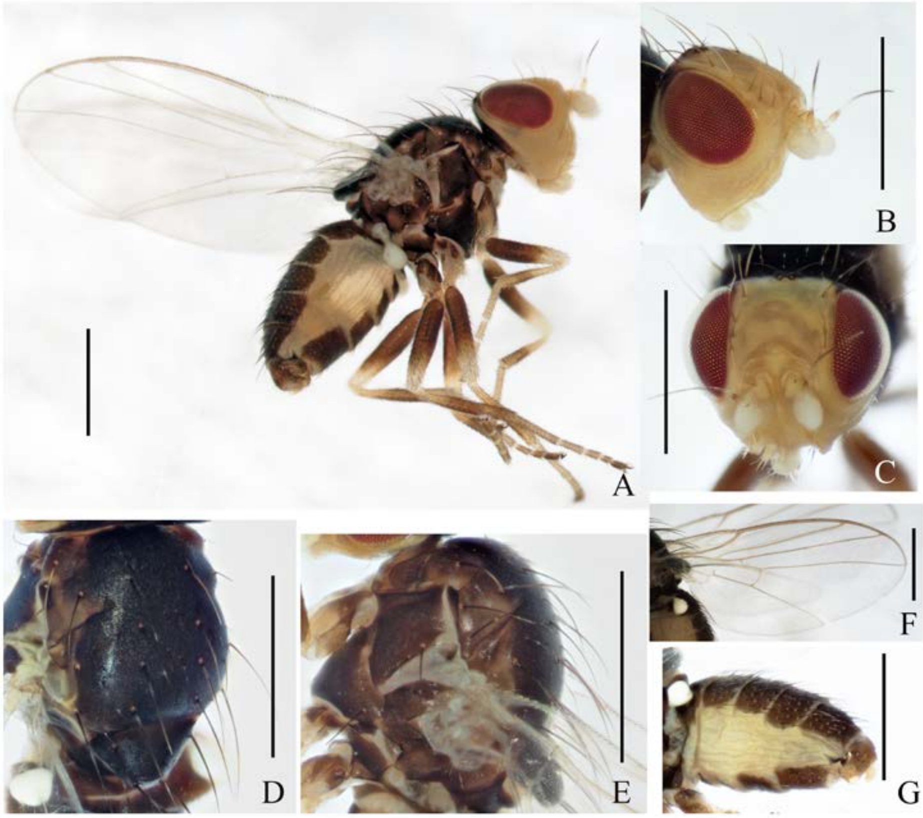

Figure 1. *Amauromyza wuyuanensis* **sp. nov.** A. Body, lateral view; B, C. Head, lateral and anterior views; D, E. Thorax, dorsal and lateral views; F. Wing; G. Abdomen, lateral view. Scale bars = 0.5 mm.

Thorax dark brown (notopleuron paler) with colour largely obscured by silvery pruinosity (female darker). Four dorsocentrals with one presutural (sometimes two presutural). Acrostichal setulae in 2–3 straight to scattered rows. Halter yellowish white. Length of ultimate section of vein CuA_1 divided by penultimate section: 1.6–2.3. Distance between cross-veins slightly longer than dm-cu. Calypter white with margin and fringe often pale yellow. Legs yellow to brown with fore coxa light brown, and trochanters, apices of femora (distal more than 1/3) and apices and base of tibiae light yellow; tibiae, tarsi and pretarsus light brown (female tibiae and pretarsus darker). Base of fore femur with one lateral seta.

Abdomen brownish black with shine (female black with strong shining). Male genitalia: hypandrium rounded and broad. Distiphallus black, both ends brown, closed to C-shape with larger opening, surrounding membrane with black spines ventrally. Epandrium without spine. Ejaculatory apodeme very large, length closed to whole aedeagus, blade narrowing towards the base and with enlargement of the stem, sperm pump hemispherical, broad.

Female. Body length 2.2–2.3 mm. Wing length 2.2–2.4 mm.

Holotype. ♂, **China**, Inner Mongolia, Bayannur City, Wuyuan County, Xingongzhong Town, Guangsheng Village, Third Group, Oilseed sunflower intercropping, Malaise trap-2, 02-VIII-2021, Hushuan FAN & Zhiwei WANG. **Paratypes. China**, 1♂, Inner Mongolia, Bayannur City, Wuyuan County, Xingongzhong Town, Guangsheng Village, Third Group, Edible sunflower monoculture, Malaise trap-3, 02-VIII-2021, Hushuan FAN & Zhiwei WANG; 1♀, same as holotype; 1♂, Inner Mongolia, Bayannur City, Wuyuan County, Xingongzhong Town, Guangsheng Village, Third Group, Edible sunflower monoculture, Malaise trap-2, 09-IX-2021, Hushuan FAN & Zhiwei WANG; 1♀, Inner Mongolia, Bayannur City, Wuyuan County, Xingongzhong Town, Guangsheng Village, Third Group, Edible sunflower monoculture, Malaise trap-2, 02-VIII-2021, Hushuan FAN & Zhiwei WANG; 1♀, Inner Mongolia, Bayannur City, Wuyuan County, Xingongzhong Town, Guangsheng Village, Third Group, Oilseed sunflower intercropping, Malaise trap-3, 02-VIII-2021, Hushuan FAN & Zhiwei WANG; 2♂, Inner Mongolia, Bayannur City, Wuyuan County, Xingongzhong Town, Guangsheng Village, Third Group, Oilseed sunflower intercropping, Malaise trap-3, 09-IX-2021, Hushuan FAN & Zhiwei WANG; 2♂, Inner Mongolia, Bayannur City, Wuyuan County, Xingongzhong Town, Guangsheng Village, Third Group, Edible sunflower monoculture, Malaise trap-3, 02-VIII-2021, Hushuan FAN & Zhiwei WANG.

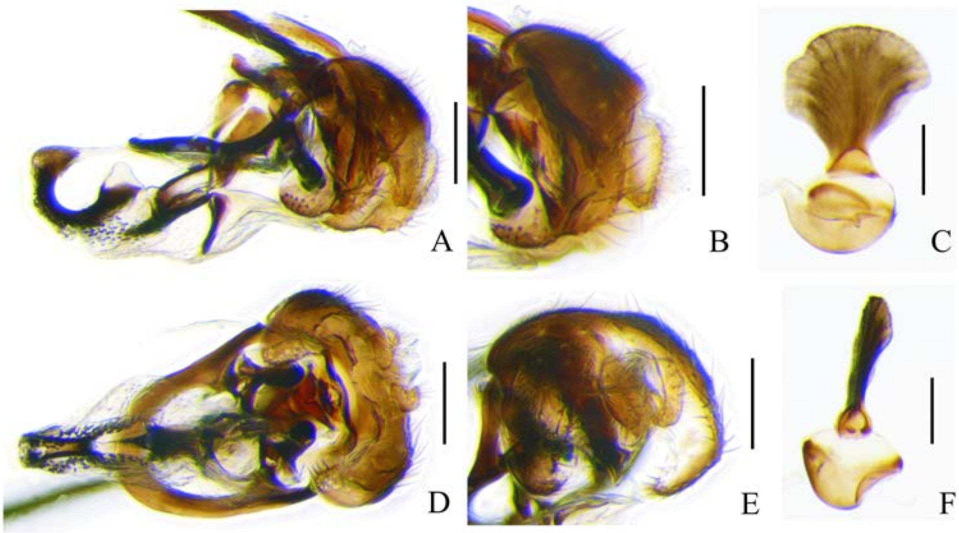

Figure 2. *Amauromyza wuyuanensis* **sp. nov.** A, D. Phallic complex, lateral and ventral views; B, E. Epandrial complex, lateral and posterolateral views; C, F. Ejaculatory apodeme, lateral and dorsal views. Scale bars = 0.1 mm.

Etymology. This new species is named after the type locality Wuyuan, Bayannur, Inner Mongolia, China.

Diagnosis. Head yellow with setae yellow to light brown. three inclinate inferior orbital and one reclinate superior orbital. Fronto-orbital plate and parafacial produced, visible laterally and strongly projecting anteriorly. Orbital setulae few and scattered or even absent. Eye height no more than twice gena height. Thorax dark brown (notopleuron paler) with colour largely obscured by silvery pruinosity. Mesonotum brown with 3+1–2 strong dorsocentrals. Acrostichal setulae in 2–3 straight to scattered rows. Halter yellowish white.

Legs brown with fore coxa light brown, and trochanters, apices of femora (distal more than 1/3) and apices and base of tibiae light yellow; base of fore femur with one lateral seta; tibiae, tarsi and pretarsus light brown.

Remarks. This species is similar to *A.* (*Cephalomyza*) *karli*, but is easily distinguishable by the more extensive yellow tarsi and pretarsus and distiphallus closeto C-shaped with wider opening and without one tuft of setae present on both sides.

2. ***Amauromyza (Cephalomyza) karli* (Hendel, 1927)** (Figs 3, 4), new record to China

Dizygomyza karli Hendel, 1927: 253.

Dizygomyza (*Cephalomyza*) *karli*. Hendel 1931: 34.

Amauromyza karli. Spencer 1969: 158, 1977: 242.

Amauromyza (*Cephalomyza*) *karli*. Boucher 2012: 746; Černý 2018: 123; Černý *et al*. 2020: 201, Lonsdale 2021: 213.

Specimens examined. 5♂2♀, **China**, Inner Mongolia, Bayannur City, Wuyuan County, Xingongzhong Town, Guangsheng Village, Third Group, Oilseed sunflower intercropping, Malaise trap-1, 3, 09-IX-2021, Hushuan FAN & Zhiwei WANG; 2♂1♀, **China**, Inner Mongolia, Bayannur City, Wuyuan County, Xingongzhong Town, Guangsheng Village, Third Group, Edible sunflower monoculture, Malaise trap-2, 3, 09-IX-2021, Hushuan FAN & Zhiwei WANG.

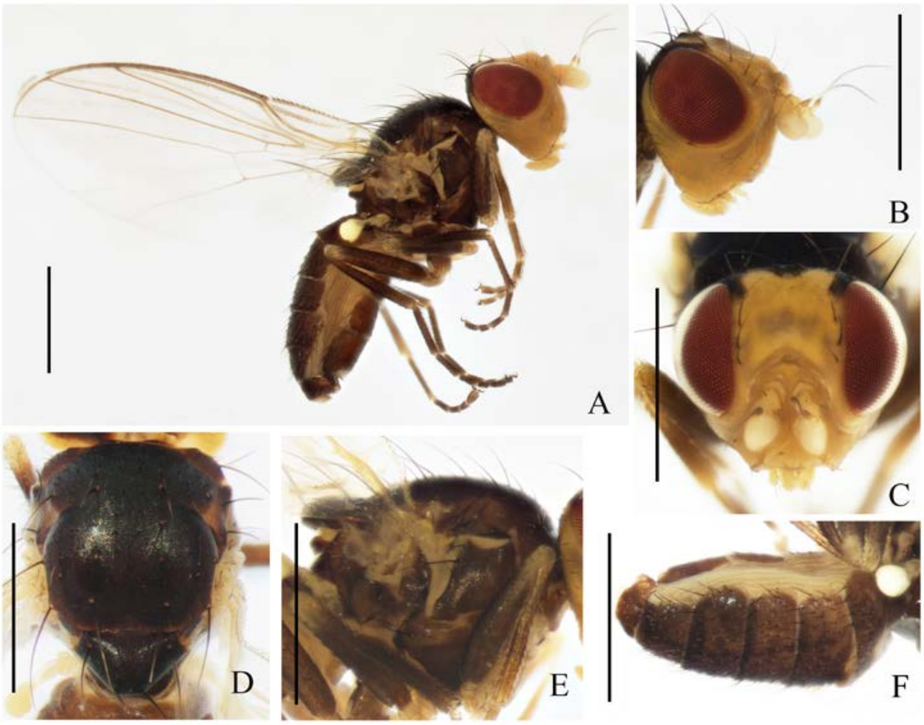

Figure 3. *Amauromyza karli* (Hendel, 1927). A. Body, lateral view; B, C. Head, lateral and anterior views; D, E. Thorax, dorsal and lateral views; F. Abdomen, lateral view. Scale bars = 0.5 mm.

Diagnosis. Head yellow with three inclinate inferior orbitals and one reclinate superior orbital. Fronto-orbital plate and parafacial produced, visible laterally and strongly projecting anteriorly. Gena broad and high. First flagellomere yellow and rounded slightly, arista thickened in basal 1/5, brown except basal light yellow. Lunule height less than 1/2 width. Thorax dark brown (notopleuron paler) with colour largely obscured by silvery pruinosity. Mesonotum with 4–6 dorsocentrals. Acrostichal setulae in 2 straight to scattered rows. Halter yellow. Calypter white with margin and fringe often pale yellow. Legs mostly brown with fore coxa light brown, trochanters, apices of femora (about a fifth) and apices of coxae light yellow; base of tibiae yellow. Male genitalia: distiphallus brownish black, C-shaped from lateral view, with one tuft of setae on one side (more obvious from ventral view).

Distribution. China (Inner Mongolia); Canada; Croatia; Czech Republic; Finland; France; Germany; Greece; Hungary; Mongolia; Poland; Romania; Russia; Slovakia; South Korea; Spain; Sweden; Switzerland; USA.

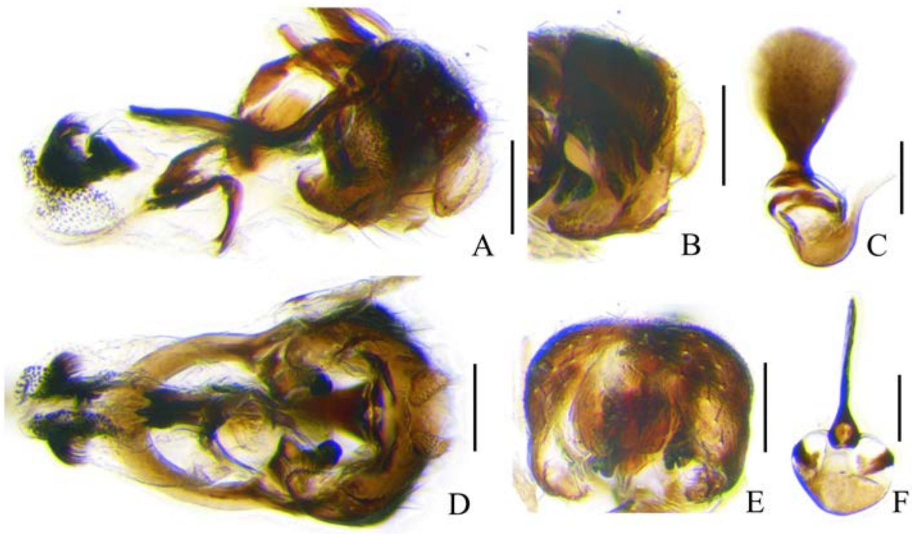

Figure 4. *Amauromyza karli* (Hendel, 1927). A, D. Phallic complex, lateral and ventral views; B, E. Epandrial complex, lateral and posterior views; C, F. Ejaculatory apodeme, lateral and dorsal views. Scale bars = 0.1 mm.

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