

Four new species of *Hilara* (Diptera: Empididae) from Jiangxi, China

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Abstract: The genus *Hilara* Meigen, 1822 with about 405 known species is one of the genera with the greatest species richness in Empididae. This is the first report of *Hilara* from Jiangxi with four species described as new to science: *Hilara densisetosa* sp. nov., *Hilara latidentata* sp. nov., *Hilara sparsisetosa* sp. nov., and *Hilara tenuidentata* sp. nov. A key to separate these species in the genus *Hilara* is presented.

Key words: dance fly; taxonomy; key

中国江西喜舞虻属 *Hilara* 四新种 (双翅目: 舞虻科)

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摘要: 喜舞虻属 *Hilara* Meigen 已知约 405 种, 是舞虻科物种数量最多的属之一。本文是江西喜舞虻属的首次报道, 记述 4 新种: 密毛喜舞虻 *Hilara densisetosa* sp. nov., 宽齿喜舞虻 *Hilara latidentata* sp. nov., 寡毛喜舞虻 *Hilara sparsisetosa* sp. nov. 和窄齿喜舞虻 *Hilara tenuidentata* sp. nov.。编制了江西省喜舞虻属分种检索表。

关键词: 舞虻; 分类; 检索表

Introduction

The genus *Hilara* Meigen, 1822 with over 405 known species is one of the genera with the greatest species richness in Empididae (Yang *et al.* 2007; Xiao *et al.* 2018; Cao *et al.* 2022). It is characterized by the following features: eyes in both sexes distinctly separated on frons; orb present, mostly short hair-like, but often just with one penultimate long bristle-like; male fore tarsomere 1 usually thickened; and vein R₁ slightly thickened apically (Chvála 2005). Saigusa (1963), Straka (1987), and Chvála (2002, 2005) mainly studied the Palaearctic species of *Hilara*. The Oriental species were mainly studied by Frey (1952), Straka & Obuch (1983) and Grootaert & Kiatsoonthorn (2001). Until now, 73 species were known to occur in

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China (Grootaert *et al.* 2003; Yang *et al.* 2007, 2010, 2018; Xiao & Yang 2016, 2017; Xiao *et al.* 2018; Cao *et al.* 2022).

Material and methods

Type specimens are deposited in the Biological Museum of Sun Yat-sen University (SYSU), Guangdong. The specimens were examined and illustrated using a ZEISS Stemi 2000–C Stereo Microscope. All the species are pinned specimens. Genitalic preparations were made by soaking the apical portion of the abdomen in hot water and then macerating in cold 10% NaOH for about 8 hours. The following abbreviations are used for bristles: acr — acrostichal; ad — anterodorsal; av — anteroventral, dc — dorsocentral; h — humeral; ih — inner humeral; npl — notopleural; oc — ocellar; orb — orbital; pd — posterodorsal; ph — posterior humeral; prsc — prescutellar; psa — postalar; pv — posteroventral; sa — supraalar; sc — scutellar.

Taxonomy

Key to species of *Hilara* from Jiangxi

1. Fore tarsomere 1 long, slightly thicker than tibia, and with 1–2 long pd subapically; hypandrial process with four lateral denticles 2
- . Fore tarsomere 1 short, rather thick, without pd subapically; hypandrial process without lateral denticles 3
2. Fore tarsomere with 1 long pd subapically; legs mostly dark brownish yellow, but all tarsi dark brown except tarsomere 1 brownish; epandrial lamella dorsally bent inward; cercus not visible in lateral view; hypandrial process apically with two wide antero-lateral denticles *H. latidentata* **sp. nov.**
- . Fore tarsomere 1 with 2 long pd subapically; legs mostly dark brown, but tarsi blackish brown; epandrial lamella dorsally projected; cercus visible in lateral view; hypandrial process apically with two narrow antero-lateral denticles *H. tenuidentata* **sp. nov.**
3. Legs partly brownish yellow; surstylus thin, apically weakly curved forward, with very short and sparse hairs at extreme tip *H. sparsisetosa* **sp. nov.**
- . Legs entirely black; surstylus wide, apically distinctly curved forward, with long to very long and dense hairs at extreme tip *H. densisetosa* **sp. nov.**

1. *Hilara densisetosa* **sp. nov.** (Fig. 1)

Description. Male. Body length 5.4 mm, wing length 8.8 mm.

Head black with greyish brown pollen; hairs and bristles black, bristles rather long. Upper occiput with short or long postocular bristles. Eyes dark brown, distinctly separated; ocellar tubercle weak, ocelli dark brownish yellow, with 2 very long oc and 4 short posterior hairs. 6 orb mostly short-haired, only penultimate one very long (slightly shorter than oc). Antenna with two basal segments dark brownish yellow; 1st segment dorsally and 2nd segment apically with black bristles; 3rd segment long subconical, 2.4 times longer than wide; apical style 0.8 times as long as 3rd segment. Proboscis pale blackish brown with black hairs, 0.6 times as long as head height; palpus black with black hairs, apically with 1 very long black ventral bristle near base and 1 very long black ventral bristle near tip.

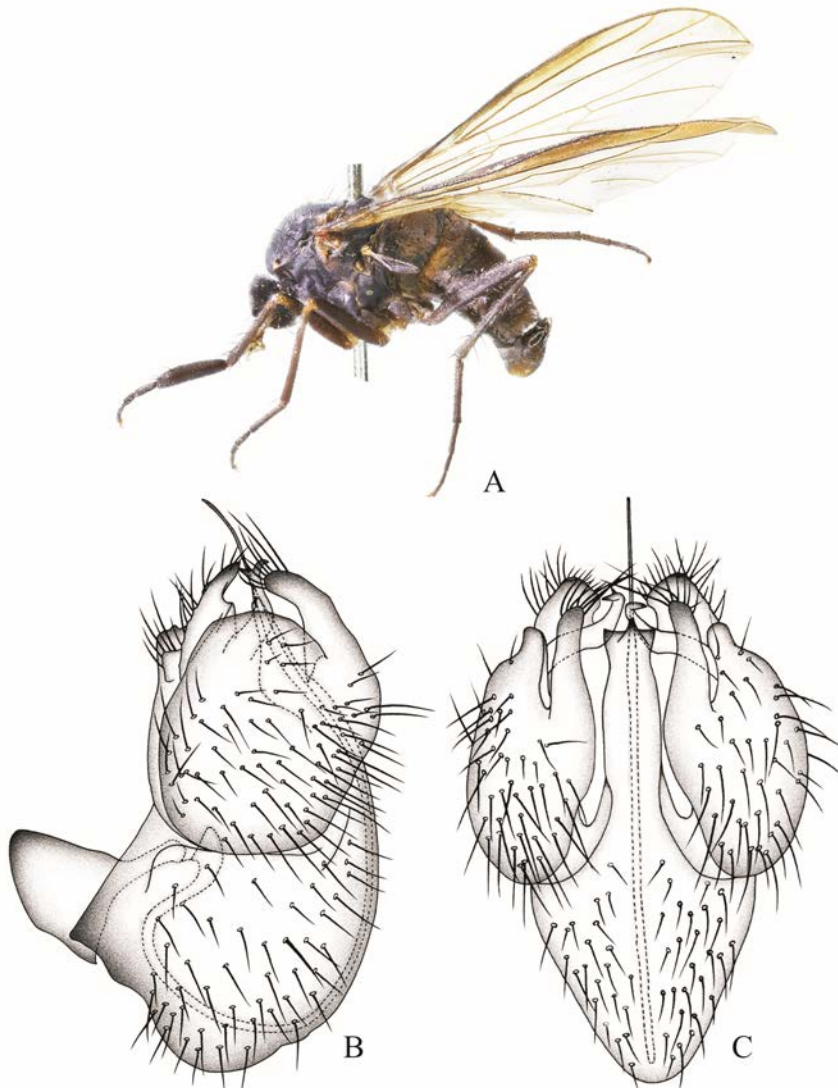


Figure 1. *Hilara densisetosa* sp. nov. A. Male habitus, lateral view; B, C. Male genitalia, lateral and posterior views.

Thorax black with greyish brown pollen. Hairs and bristles on thorax black, hairs mostly somewhat long, bristles rather long. Prosternum with blackish hairs. Pronotum with 1 bristle laterally. 1 h, 1 ih, 1 ph, 3–4 npl; acr and dc somewhat long; acr irregularly biseriate; dc uniseriate, nearly as long as acr; 2 presc, 1 sa, 1 psa; scutellum with 2 pairs of very long sc, basal pair slightly shorter than apical pair. Legs black except knees brownish yellow. Hairs and bristles on legs blackish to black, bristles rather long and thick. Mid femur with 5–6 very long ad, and with 1 very long thin pv at extreme base. Hind femur with dorsal bristles, apically with 4 av (2 av short, 2 av long). Fore tibia with 5 ad and 3 pd, thickened with 3 long apical bristles. Fore tarsomere 1 somewhat long and weakly thickened, 1.2 times thicker than fore tibia, 0.75 times as long as fore tibia. Fore tarsomere 1 with 1 long pd subapically and

with 1 short ad and 1 long pd at extreme tip. Mid tibia with 3 ad, 2 pd, 3 av and 2 pv, apically with 4 bristles. Hind tibia with 1 ad, 6 pd and 7 av; apically with 4 bristles (1 long thick subapical pd). Wing hyaline, slightly tinged brownish; pterostigma long and narrow, brown; veins dark brown. Halteres dark brown with dark brownish yellow base.

Abdomen apically slightly curved downward, dark brownish yellow with gray pollen; hypopygium blackish brown, nearly as thick as pregenital segments. Hairs and bristles on abdomen black.

Male genitalia. Epandrial lamella distinctly convex dorsally, indistinctly separated from surstylus; surstylus thick finger-like, distinctly curved forward, with long to very long dense hairs at extreme tip; cercus long, somewhat narrow, apically acute; hypandrial process rather wide, apically with two weak lateral processes.

Female. Unknown.

Holotype. ♂, **China**, Jiangxi, Jinggangshan, Xiajing, 28-IV-2011, leg. Fenglong JIA (SYSU).

Etymology. The specific epithet is from the Latin *densus* (“dense”) and *setosus* (“hair”), referring to the surstylus with dense hairs at extreme tip.

Diagnosis. Legs black; surstylus narrow, apically curved forward, with long dense hairs at extreme tip.

Remarks. This new species is somewhat similar to *H. triangulata* Yang & Yang, 1997 from Hubei, but can be separated from the latter by the surstylus long, thick and curved forward with the long to very long hairs at extreme tip. In *H. triangulata*, the surstylus is short, thin and nearly erect with the very short hairs at extreme tip (Yang & Yang 1997).

2. *Hilara latidentata* sp. nov. (Fig. 2)

Description. Male. Body length 5.0 mm, wing length 6.5 mm.

Head black with greyish brown pollen; hairs and bristles black, bristles rather long. Upper occiput with long postocular bristles. Eyes dark brown, distinctly separated; ocellar tubercle weak, ocelli brownish yellow, with 2 long thin oc and 4 short posterior hairs. 5 orb mostly short-haired, only penultimate one very long (slightly shorter than oc). Antennal two basal segments dark brownish yellow; 1st segment dorsally and 2nd segment apically with black bristles; 3rd segment and apical style broken. Proboscis brown with black hairs, nearly as long as head height; palpus dark yellow with black hairs, apically with 1 long black ventral bristle near base and 1 very long black ventral bristle near tip.

Thorax blackish with greyish brown pollen except pleuron brown. Hairs and bristles on thorax black, hairs mostly somewhat long, bristles rather long. Prosternum with blackish hairs. Pronotum with 1 bristle laterally. 1 h, 1 ih, 1 ph, 2 npl; acr and dc somewhat long; acr irregularly biseriate; dc uniseriate, nearly as long as acr; 2 presc, 1 sa, 1 psa; scutellum with 2 pairs of very long sc, basal pair slightly shorter than apical pair. Legs mostly dark brownish yellow, but all coxae brownish, all tarsi dark brown except tarsomere 1 brownish. Hairs and bristles on legs blackish to black, bristles rather long and thick. Mid femur with 5 very long ad, and with 1 very long thin pv at extreme base. Hind femur with dorsal bristles, apically with 2 av. Fore tibia with 4 ad and 3 pd, thickened with 3 long apical bristles. Fore tarsomere 1 long and weakly thickened, 1.1 times thicker than fore tibia, 0.75 times as long as fore tibia. Fore tarsomere 1 with 1 long pd subapically and with 1 short ad and 1 long pd at extreme tip.

Mid tibia with 2 ad, 1 pd and 1 av, apically with 4 bristles. Hind tibia with 1 ad, 4 pd and 4 av; apically with 4 bristles (1 long thick subapical pd). Wing hyaline, slightly tinged brownish; pterostigma long and narrow, brown; veins dark brown. Halteres dark brown with brownish yellow base.

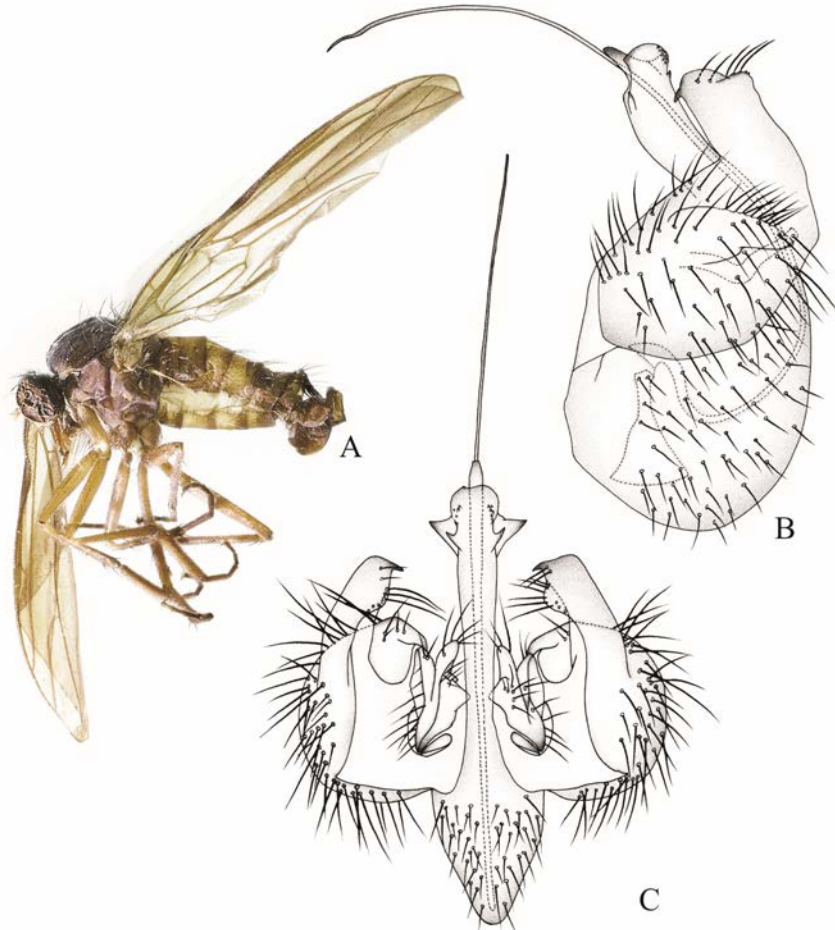


Figure 2. *Hilara latidentata* sp. nov. A. Male habitus, lateral view; B. Male genitalia, lateral and posterior views.

Abdomen nearly straight, dark brownish yellow with gray pollen, but apically dark brown; hypopygium nearly as thick as pregenital segments. Hairs and bristles on abdomen black.

Male genitalia. Epandrial lamella dorsally bent inward; cercus hidden by epandrial lamella, not visible in lateral view; surstylus basally not distinctly separated from surstylus, rather wide, with a short acute anterior process at tip; hypandrial process rather wide with four lateral denticles (two anterior denticles wide).

Female. Unknown.

Holotype. ♂, China, Jiangxi, Jinggangshan, Xiangzhou, 26-IV-2011, leg. Yan MEI (SYSU).

Etymology. The specific epithet is from Latin *latus* (“wide”) and *dentatus* (“denticle”), referring to the hypandrial process having four wide apical denticles.

Diagnosis. Palpus dark yellow. Fore tarsomere 1 long, slightly thicker than tibia, and with 1 long pd subapically and with 1 short ad and 1 long pd at extreme tip. Abdomen dark brownish yellow. Legs mostly dark brownish yellow, but all tarsi dark brown except tarsomere 1 brownish; epandrial lamella dorsally bent inward; surstylus rather long, erect, apically strongly sclerotized; cercus not visible in lateral view.

Remarks. The new species is somewhat similar to *H. tenuidentata* **sp. nov.**, but can be separated from the latter by the following features: fore tarsomere with 1 long pd subapically; legs mostly dark brownish yellow, but all tarsi dark brown except tarsomere 1 brownish; epandrial lamella dorsally bent inward; cercus not visible in lateral view; hypandrial process apically with two wide antero-lateral denticles.

3. *Hilara sparsisetosa* **sp. nov.** (Fig. 3)

Description. Male. Body length 3.5 mm, wing length 5.3 mm.

Head black with greyish brown pollen; hairs and bristles black, bristles rather long. Upper occiput with short or long postocular bristles. Eyes dark brown, distinctly separated; ocellar tubercle weak, ocelli dark yellow, with 2 very long oc and 4 short posterior hairs. 5 orb mostly short haired, only penultimate one very long (nearly as long as oc). Antenna black except two basal segments brownish; 1st segment dorsally and 2nd segment apically with black bristles; 3rd segment long subconical, 2.4 times longer than wide; apical style 0.8 times as long as 3rd segment. Proboscis brownish yellow with black hairs, 0.7 times as long as head height; palpus dark yellow with black hairs, apically with 1 very long black ventral bristle near tip.

Thorax blackish with greyish brown pollen except pleuron brown. Hairs and bristles on thorax black, hairs mostly somewhat long, bristles rather long. Prosteronum with blackish hairs. Pronotum with 1 bristle laterally. 1 h, 1 ih, 1 ph, 3 npl (anterior one short); acr and dc somewhat long; acr irregularly biseriate; dc uniseriate, nearly as long as acr; 2 presc, 1 sa, 1 psa; scutellum with 2 pairs of very long sc, basal pair slightly shorter than apical pair. Legs mostly dark brown; all coxae brownish yellow; fore femur brownish yellow, but brown dorsally, mid femur with brownish base; tarsi blackish brown. Hairs and bristles on legs blackish to black, bristles rather long and thick. Mid femur with 6–7 ad (3 very long), and with 1 very long thin pv at extreme base. Hind femur without dorsal bristles, apically with 4 av (1 av rather long). Fore tibia with 3 ad and 1 pd very long, distinctly thickened with 4 apical bristles (1 ad and 1 pd very long). Fore tarsomere 1 distinctly thickened, 1.1 times thicker than fore tibia, 0.6 times as long as fore tibia. Fore tarsomere 1 with 1 short ad and 1 long pd at extreme tip. Mid tibia with 1 ad and 2 av, apically with 4 bristles. Hind tibia with 1 ad, 3 pd and 4 av; apically with 3 bristles (1 long thick subapical pd). Wing hyaline, slightly tinged brownish; pterostigma long and narrow, brown; veins dark brown. Halteres dark brownish yellow with dark brown knob.

Abdomen nearly straight, dark brown with gray pollen, but segments 1–4 brownish; hypopygium nearly as thick as pregenital segments. Hairs and bristles on abdomen black.

Male genitalia. Epandrial lamella distinctly convex dorsally, shallowly separated from surstylus; surstylus thin finger-like, weakly curved forward, with very short sparse hairs at extreme tip; cercus long thick, apically narrowed; hypandrial process rather wide, apically with two subtriangular lateral processes.

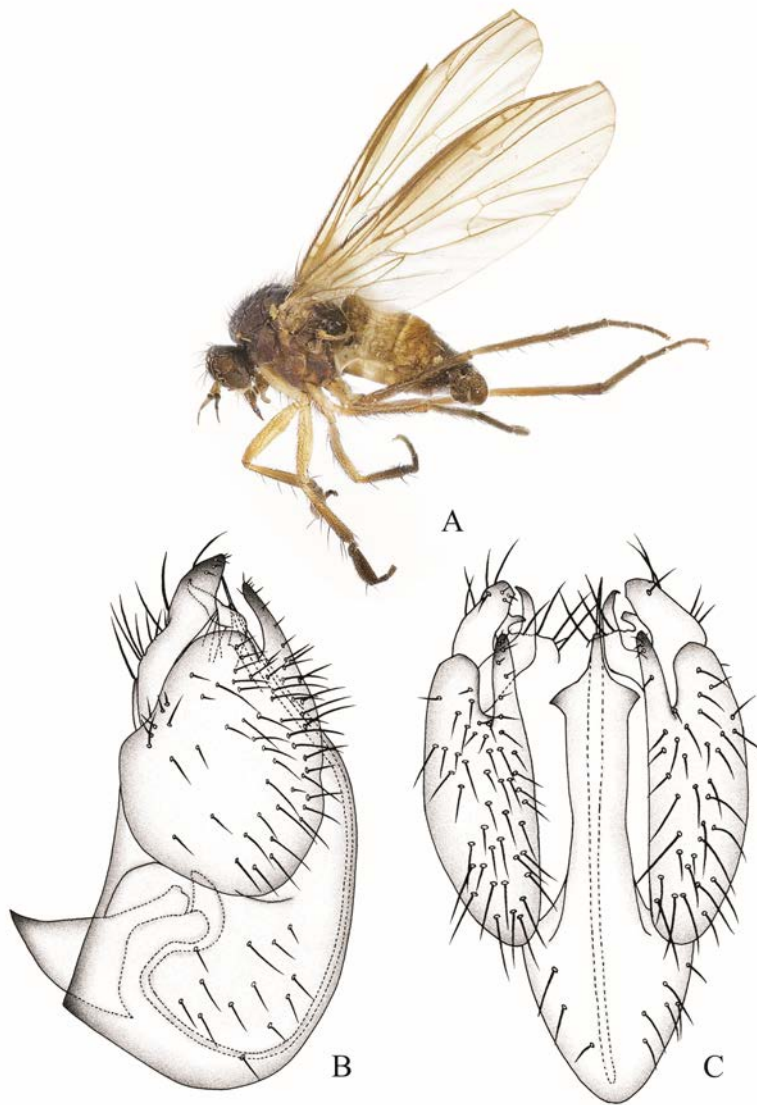


Figure 3. *Hilara sparsisetosa* sp. nov. A. Male habitus, lateral view; B, C. Male genitalia, lateral and posterior views.

Female. Unknown.

Holotype. ♂, China, Jiangxi, Jinggangshan, Xiangzhou, 26-IV-2011, leg. Yan MEI (SYSU).

Etymology. The specific epithet is from Latin *sparsus* (“sparse”) and *setosus* (“hair”), referring to the surstylus with sparse hairs at extreme tip.

Diagnosis. Palpus dark yellow. Hairs and bristles on head and thorax rather long. Fore tarsomere 1 thick only with 1 short ad and 1 long pd at extreme tip. Legs mostly dark brown; all coxae brownish yellow; fore femur dark brownish yellow, but brown dorsally; mid and femora brown to dark brown, mid femur with brownish base.

Remarks. This new species is somewhat similar to *H. dingae* Xiao & Yang, 2017 from Gansu, but can be separated from the latter by the coxae brownish yellow and male cercus thick with the subtriangular tip. In *H. dingae*, the coxae are black; and male cercus is narrow with a finger-like tip (Xiao & Yang 2017).

4. *Hilara tenuidentata* sp. nov. (Fig. 4)

Description. Male. Body length 5.9 mm, wing length 8.1 mm.

Head black with greyish brown pollen; hairs and bristles black, bristles rather long. Upper occiput with short or long postocular bristles. Eyes dark brown, distinctly separated; ocellar tubercle weak, ocelli brownish yellow, with 2 long thin oc and 4 short posterior hairs. 6 orb mostly short-haired, only penultimate one very long (slightly shorter than oc). Antenna with two basal segments brownish; 3rd segment long subconical, 2.3 times longer than wide; apical style 0.9 times as long as 3rd segment; 1st segment dorsally and 2nd segment apically with black bristles. Proboscis dark brown with black hairs, nearly as long as head height; palpus dark brown with black hairs, apically with 4 long black ventral bristles at base and 1 very long black ventral bristle near tip.

Thorax blackish with greyish brown pollen except pleuron brown. Hairs and bristles on thorax black, hairs mostly somewhat long, bristles rather long. Prothorax with blackish hairs. Pronotum with 1 bristle laterally. 1 h, 1 ih, 1 ph, 3 npl; acr and dc somewhat long; acr irregularly biseriate; dc uniseriate, nearly as long as acr; 2 presc, 1 sa, 1 psa; scutellum with 2 pairs of very long sc, basal pair slightly shorter than apical pair. Legs mostly dark brown, but all coxae brownish, all femora brown except knees brownish yellow, all tarsi blackish brown. Hairs and bristles on legs blackish to black, bristles long and rather thick. Mid femur with 6–7 very long ad, and with 1 very long thin pv at extreme base. Hind femur without dorsal bristles, with 4 long av on apical 2/5 (2 av thick, 2 av weak). Fore tibia with 5–6 ad and 4 pd, thickened with 4 long apical bristles. Fore tarsomere 1 long and weakly thickened, 1.1 times thicker than fore tibia, 0.65 times as long as fore tibia. Fore tarsomere 1 with 2 long pd subapically, and with 1 short ad and 1 long pd at extreme tip. Mid tibia with 3 ad, 3 pd and 1 av, apically with 4 bristles. Hind tibia with 2 ad, 6–7 pd and 6 av; apically with 4 bristles (1 long subapical pd). Wing hyaline, slightly tinged brownish; pterostigma long and narrow, brown; veins dark brown. Halteres dark brown with brownish yellow base.

Abdomen nearly straight, dark brownish yellow with gray pollen; hypopygium mostly blackish brown, epandrium mostly dark brownish yellow, thicker than pregenital segments. Hairs and bristles on abdomen black.

Male genitalia. Epandrial lamella convex at dorsal margin, not distinctly separated from surstylus; surstylus rather wide, with a short acute anterior process at tip; cercus short thick, apically obtuse; hypandrial process somewhat wide with four lateral denticles (two anterior denticles narrow).

Female. Unknown.

Holotype. ♂, China, Jiangxi, Jinggangshan, Xiangzhou, 26-IV-2011, leg. Yan MEI (SYSU).

Etymology. The specific epithet is from Latin *tenuis* (“narrow”) and *dentatus* (“denticle”), referring to the hypandrial process with two narrow apical denticles.

Diagnosis. Fore tarsomere 1 long, slightly thicker than tibia, with 2 long pd subapically,

and with 1 short ad and 1 long pd at extreme tip; abdomen dark bronwish yellow. Legs mostly dark brown; all tarsi blackish brown.

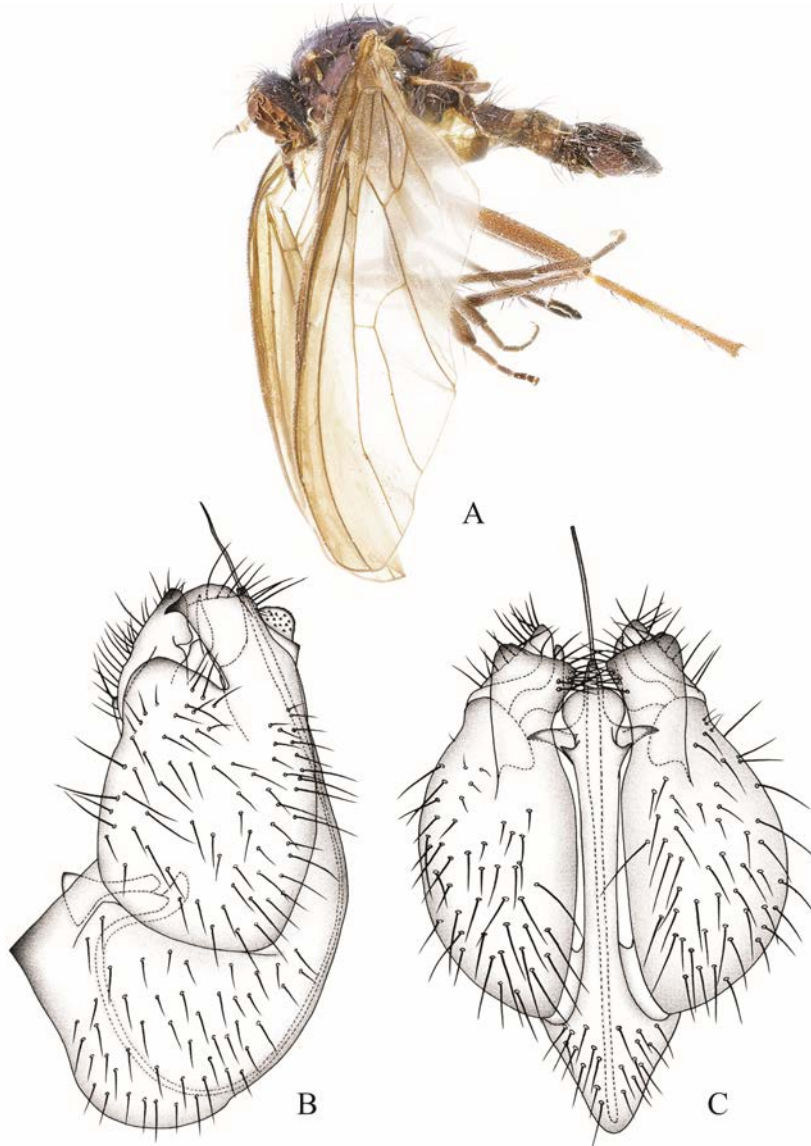


Figure 4. *Hilara tenuidentata* **sp. nov.** A. Male habitus, lateral view; B. Male genitalia, lateral and posterior views.

Remarks. This new species is very similar to *H. latidentata* **sp. nov.**, but may be separated from the latter by the following features: fore tarsomere 1 with 2 long pd subapically; legs mostly dark brown, but tarsi blackish brown; abdomen dark brownish yellow; epandrial lamella dorsally projected; cercus visible in lateral view; hypandrial process apically with two narrow antero-lateral denticles.

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References

- Cao WQ, Zhou H, Zhang CM & Yang D. 2022. Five new species of *Hilara* (Diptera: Empididae) from Shalulishan, China. *Entomotaxonomia*, 44(4): 1–11.
- Chvala M. 2002. Revision of European species of the *Hilara* “*quadrivittata*” group (Diptera: Empididae). *Acta Universitatis Carolinae Biologica*, 46: 229–276.
- Chvala M. 2005. *The Empidoidea (Diptera) of Fennoscandia and Denmark. IV. Genus Hilara. Fauna Entomologica Scandinavica*. Scandinavian Science Press, Copenhagen, 234 pp.
- Frey R. 1952. Studien uber ostasiatische *Hilara*-Arten (Diptera, Empididae). *Notulae Entomologicae*, 32: 119–143.
- Grootaert P & Kiatsoonthorn V. 2001. First records of the dance fly genus *Hilara* in Thailand with descriptions of five new species (Insecta, Diptera, Empididae). *Natural History Bulletin of the Siam Society*, 49: 17–27.
- Grootaert P, Yang D & Zhang LL. 2003. New species of *Hilara* (Diptera: Empididae: Empidinae) from Guangdong Province in China. *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique Entomologie*, 73: 77–84.
- Meigen JW. 1822. *Systematische Beschreibung der bekannten europaischen zweiflugeligen Insekten*. Schulz-Wundermann, Hamm, 416 pp.
- Saigusa T. 1963. Three new species of the genus *Hilara* from Japan (Diptera, Empididae). *Sieboldia*, 3(1): 177–182.
- Straka V. 1987. New species of the genus *Hilara* Meigen (Diptera, Empididae) from the Amur region of the USSR. *Annotationes Zoologicae et Botanicae*, 179: 1–15.
- Straka V & Obuch J. 1983. A new species of *Hilara* (Diptera, Empididae) from the Himalaya. *Annotationes Zoologicae et Botanicae*, 157: 1–4.
- Xiao WM, Dong H & Yang D. 2018. Ten new species of *Hilara* from Laohegou Nature Reserve, Sichuan (Diptera: Empididae). *Transactions of the American Entomological Society*, 144(3): 598–624.
- Xiao WM & Yang D. 2016. *Hilara* newly recorded from Shaanxi with seven new species (Diptera: Empididae). *Transactions American Entomological Society*, 142: 131–153.
- Xiao WM & Yang D. 2017. *Hilara* newly recorded from Gansu with descriptions of ten new species (Diptera: Empididae). *Transactions American Entomological Society*, 143: 267–298.
- Yang D & Yang C. 1997. Diptera: Empididae. In: Yang XK (Ed.), *Insects of the Three Gorges Reservoir Area of Yangtze River*. Chongqing Publishing House, Chongqing, pp. 1469–1476.
- Yang D, Zhang KY, Yao G & Zhang JH. 2007. *World Catalog of Empididae (Insecta: Diptera)*. China Agricultural Press, Beijing, 599 pp.
- Yang D, Wang MQ, Zhu YJ & Zhang LL. 2010. *Insect Fauna of Henan* (Diptera: Empidoidea). Science Press, Beijing, 418 pp.
- Yang D, Zhang LL & Zhang KY. 2018. *Species Catalog of China. Vol. 2. Animals, Insecta (VI), Diptera (2), Orthorrhaphous Brachycera*. Science Press, Beijing, 387 pp.