

Notes on *Hybos* Meigen (Diptera: Empididae) in Inner Mongolia with description of a new species

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Abstract

Only one species of the genus *Hybos* Meigen was previously known to occur in Inner Mongolia. Here 4 species of *Hybos* are reported from this region. One species, *Hybos daqinggouensis* sp. nov., is described as new to science. A key to the known species of *Hybos* from Inner Mongolia is provided.

Key Words: dance fly, *Hybos daqinggouensis*, *Hybos grossipes*, *Hybos hubeiensis*, *Hybos wudanganus*, Inner Mongolia

Resumen

Sólo una especie del género *Hybos* Meigen se conocía anteriormente de estar presente en el Interior de Mongolia. Aquí se informa de 4 especies de *Hybos*, incluyendo una especie nueva de esta región. Se describe e ilustra la nueva especie, *Hybos daqinggouensis* sp. nov. Se presenta una clave de las especies conocidas del género *Hybos* en el Interior de Mongolia.

Palabras Clave: mosca de la danza, *Hybos daqinggouensis*, *Hybos grossipes*, *Hybos hubeiensis*, *Hybos wudanganus*, Interior de Mongolia

The genus *Hybos* Meigen is highly diversified in Asia. It is distributed worldwide with 217 known species, of which 14 species are distributed in the Palaearctic Region and 181 species in the Oriental Region (Yang et al. 2007; Yang 2008; Li & Yang 2009; Shi et al. 2009; Huo et al. 2010; Jiang et al. 2011; Yang & Li 2011; Plant 2013; Shamshev et al. 2013; Li et al. 2014; Shamshev et al. 2015). The major references dealing with the Palaearctic and Oriental species of the genus *Hybos* are as follows: Brunetti (1920); Melander (1928); Frey (1938, 1953, 1954); Saigusa (1963, 1965); Smith (1965); Chvála (1983); Yang & Yang (2004); Plant (2013); Shamshev et al. (2013); Li et al. (2014); Shamshev et al. (2015). The then known 85 Chinese species including 6 species from Palaearctic China were reviewed by Yang & Yang (2004).

Inner Mongolia bordered with Mongolia belongs to Palaearctic China. *Hybos* from this region remains poorly known with only one recorded species, *Hybos grossipes* (Linnaeus, 1767) (Yang & Yang 2004). In the present paper, the following three species including one new species are added to the fauna of Inner Mongolia: *Hybos daqinggouensis* sp. nov., *H. hubeiensis* Yang & Yang and *H. wudanganus* Yang & Yang. A key to the species of *Hybos* from Inner Mongolia is provided.

Materials and Methods

Type specimens are deposited in the Entomological Museum of China Agricultural University (CAU), Beijing. Morphological terminol-

ogy generally follows Cumming & Wood (2009). The following abbreviations are used: acr = acrostichal seta(e), ad = anterodorsal seta(e), av = anteroventral seta(e), dc = dorsocentral seta(e), npl = notopleural seta(e), oc = ocellar seta(e), pd = posterodorsal seta(e), ppn = postpronotal seta(e), prsc = prescutellar seta(e), psa = postalar seta(e), pv = posteroventral seta(e), sc = scutellar seta(e).

Results

Genus *Hybos* Meigen, 1803

DIAGNOSIS

Large to middle-sized. Eyes usually with upper facets enlarged; eyes narrowly but distinctly separated on face, not virtually contiguous. Proboscis strong, spinose, directed forward; labellum constricted for piercing, without pseudotracheae. Palpus slender, nearly as long as proboscis. Rs rather short (nearly as long as distance between humeral crossvein and extreme base of Rs); anal cell longer than cell bm; anal cell produced posteroapically, inner angle formed between CuA2 and A1 strongly acute with CuA2 usually distinctly curved; basal portion of M (separating basal cells) distinct. Legs strongly bristled. Hind femur distinctly to strongly swollen, with spinose ventral setae (Chvála 1983; Yang & Yang 2004).

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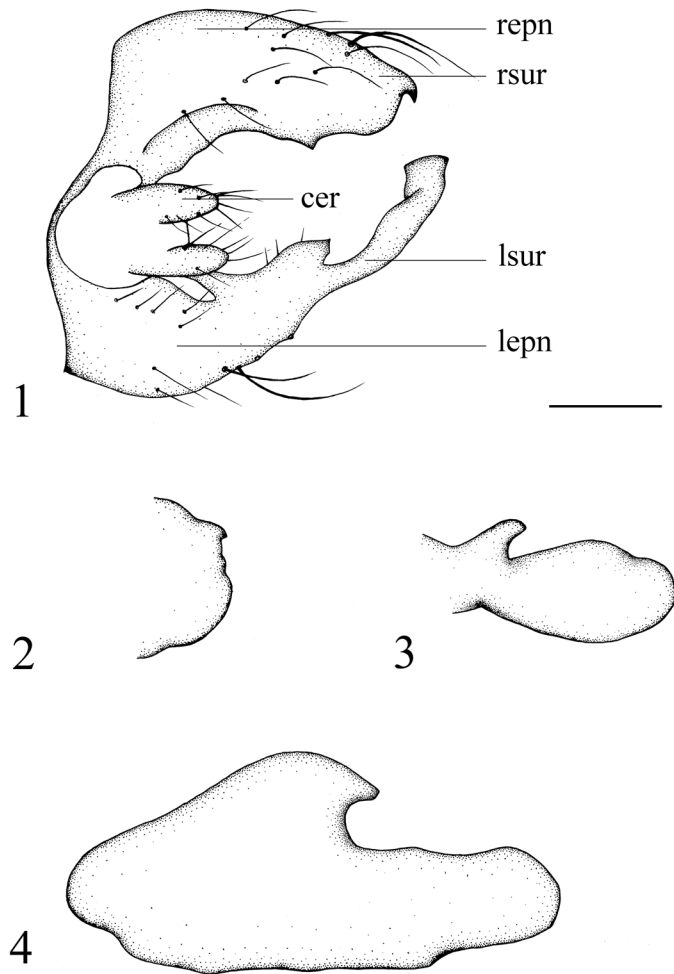
Key to species (males) of *Hybos* from Inner Mongolia

- 1. Hind tibia without ad at middle; right surstylus not furcated 2
- Hind tibia with 2 ad at middle; right surstylus irregularly furcated (Yang & Yang 2004, Fig. 279) *H. hubeiensis* Yang & Yang
- 2. First flagellomere shorter than scape and pedicel combined; hypandrium not as below 3
- First flagellomere elongated, slightly longer than scape and pedicel combined; hypandrium with very short lateral process at middle (Fig. 4) *H. daqinggouensis* sp. nov.
- 3. Hind coxa with 3 spinose anterior setae apically; right surstylus short and wide (Yang & Yang 2004, Fig. 257) *H. grossipes* (Linnaeus)
- Hind coxa without spinose anterior setae; right surstylus long and narrow (Yang & Yang 2004, Fig. 404) *H. wudanganus* Yang & Yang

1. *Hybos daqinggouensis* sp. nov. (Figs. 1-4)

DIAGNOSIS

First flagellomere elongate, slightly longer than scape and pedicel combined, without dorsal setula. Legs entirely black. Mid tibia with 2 ad; apically with 1 av and 1 pv long hair-like and apically curved. Acr irregularly quadriseriate. Hypandrium with short lateral process at middle, apically without long setae.



Figs. 1-4. *Hybos daqinggouensis* sp. nov. (male). 1. Genitalia, dorsal view; 2. right surstylus; 3. left surstylus; 4. hypandrium, ventral view. Abbreviations: cer = cercus; lepn = left epandrial lamella; lsur = left surstylus; repn = right epandrial lamella; rsur = right surstylus. Scale bar = 0.1 mm.

DESCRIPTION

Male. Body length 3.6-3.9 mm, wing length 3.0-3.5 mm.

Head. Black with gray pollinosity. Eyes contiguous on frons, brownish yellow, with distinctly enlarged upper facets. Setulae and setae on head black except postero-ventral setulae yellow; ocellar tubercle distinct, with 2 long oc and 2 short posterior setulae. Antenna black; scape without setulae, pedicel with cirlet of subapical setulae; first flagellomere elongated, slightly longer than scape and pedicel combined, without dorsal setula; arista distinctly longer than basal 3 antennal segments, pubescent except apical 1/4 or so thin and bare. Proboscis slightly shorter than head, blackish or black. Palpus black, with 3 ventral setulae.

Thorax. Black with gray pollinosity. Setulae and setae on thorax black, setulae on scutum short and rather sparse; ppn absent, 2 npl (posterior npl long), irregularly quadriseriate acr, uniseriate hair-like dc nearly as long as acr, 1 long prsc, 1 psa slightly shorter than prsc; scutellum with 8 or 10 short marginal setulae (2 setulae between sc) and 2 long sc. Legs entirely black. Setulae on legs brown or brownish, setae black. Hind coxa apically with 2-3 spinose anterior setae. Fore femur 1.2 times and hind femur 2.7 times as wide as mid femur. Fore and mid femora each with row of very long, thin pv. Hind femur with 2-3 long, thin preapical ad, with about 3 rows of spinose ventral setae on tubercles (av relatively long, only 2-3 pv located at base). Fore and mid tibiae and tarsomere 1 with some long setulae. Fore tibia with 2 weak ad; apically with 1 short av. Mid tibia with 2 ad; apically with 1 av and 1 pv, very long and thin (av nearly as long as tarsomere 1). Hind tibia with row of 6-7 long ad and 8-9 long pd setulae; apically with 1 long erect subapical pd. Hind tarsomeres 1-2 with several short ventral spines. Wing nearly hyaline, slightly tinged grayish; stigma long, dark brown; veins dark brown, R_{4+5} and M_1 weakly divergent apically. Squama brownish yellow with yellow setulae. Halter dark yellow except base brown and knob pale yellow.

Abdomen. Weakly or strongly curved downwards, subshiny black with pale gray pollinosity; hypopygium weakly swollen. Setulae and setae on abdomen dark yellow except hypopygium with some black setae.

Male genitalia (Figs. 1-4). Left epandrial lamella slightly longer than right epandrial lamella, with weakly convex inner margin near middle; left surstylus long and thick, with short basal process. Right epandrial lamella with concave inner margin near middle; right surstylus rather short and wide, with apical margin weakly incised. Hypandrium much longer than wide, deeply cleft with right lobe much shorter and apically pointed; left lobe rounded apically. Long setae on hypandrium lacking.

Female. Body length 3.6-3.9 mm, wing length 3.6-3.9 mm. Similar to male, pv on fore and mid femora shorter. Fore and mid tibiae and tarsomere 1 without long setulae.

TYPE MATERIAL

HOLOTYPE ♂, CHINA, Inner Mongolia, Tongliao, Daqinggou National Nature Reserve, Yuanshisenlin (E 122° 10' 19" N 42° 48' 26"), 180 m, 23.VII.2014, N. Wang & D. Yang (CAU). Paratypes: 2 ♂♂, 8 ♀♀, same data as holotype (CAU).

DISTRIBUTION

China (Inner Mongolia).

REMARKS

The new species is somewhat similar to *H. grossipes* (Linnaeus), but it may be separated from the latter in the following characters: first flagellomere elongated, slightly longer than scape and pedicel combined; mid tibia with 2 ad, apically with 1 av and 1 pv thin hair-like and apically curved; left surstylus with small inner lateral process about 1/5 as long as outer lateral process; hypandrium with very short right lobe about 1/5 as long as left lobe, apically without long setae. In *H. grossipes*, the first flagellomere is shorter than scape and pedicel combined; the mid tibia has 3 ad, but apically with 1 av and 1 pv thick bristle-like and straight; the hypandrium has the long right lobe about 1/2 as long as left lobe and long setae apically; the left surstylus has a long inner lateral process about 1/3 as long as outer lateral process (Yang & Yang 2004; Shamshev et al. 2015).

ETYMOLOGY

The specific name refers to the type locality Daqinggou.

2. *Hybos grossipes* (Linnaeus, 1767)

Musca grossipes Linnaeus, 1767: 988. Type locality: "Europa".

MATERIAL

CHINA. Inner Mongolia: 3 ♂♂, 2 ♀♀, Erdos, Dongsheng (E 109° 45' 7" N 39° 47' 55"), 7.VIII.2006, Maoling Sheng (CAU); 2 ♂♂, 11 ♀♀, Aershan, Wuliqian (E 119° 55' 56" N 47° 11' 46"), 1,035 m, 26.VII.2014, N. Wang & D. Yang (CAU).

DISTRIBUTION

China (Inner Mongolia, Gansu, Ningxia, Shaanxi, Jilin, Shanxi, Hebei, Henan, Sichuan); Palaearctic Region.

REMARKS

For a full list of synonymies, see Yang et al. (2007). Yang & Yang (2004) reported that this species is distributed in Inner Mongolia.

3. *Hybos hubeiensis* Yang & Yang, 1991

Hybos hubeiensis Yang & Yang, 1991: 3. Type locality: China: Hubei, Wudang Mountain.

MATERIAL

CHINA. Inner Mongolia: 2 ♂♂, 1 ♀, Erdos, Dongsheng (E 109° 45' 7" N 39° 47' 55"), 7.VIII.2006, Maoling Sheng (CAU).

DISTRIBUTION

China (Inner Mongolia, Gansu, Ningxia, Henan, Hubei).

REMARKS

This species was described in Hubei by Yang & Yang (1991) and also known to occur in Gansu and Henan (Yang & Yang 2004). Li & Yang (2009) recorded it from Ningxia.

4. *Hybos wudanganus* Yang & Yang, 1991

Hybos wudanganus Yang & Yang, 1991: 5. Type locality: Hubei, Wudang Mountain.

MATERIAL

CHINA. Inner Mongolia: 2 ♂♂, Erdos, Dongsheng (E 109° 45' 7" N 39° 47' 55"), 7.VIII.2006, Maoling Sheng (CAU).

DISTRIBUTION

China (Inner Mongolia, Ningxia, Henan, Hubei).

REMARKS

This species was described by Yang & Yang (1991) from Hubei and also known to occur in Henan (Yang & Yang 2004). Li & Yang (2009) recorded it from Ningxia. It is somewhat similar to *H. grossipes*, but may be separated from the latter by the hind coxa lacking spinose anterior setae and right surstylus long and narrow (Yang & Yang 2004).

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References Cited

- Brunetti E. 1920. Diptera Brachycera. The Fauna of British India, including Ceylon and Burma, Vol. 1. Taylor and Francis, London, 401 pp.
- Chvála M. 1983. The Empidoidea (Diptera) of Fennoscandia and Denmark. II. General Part. The families Hybotidae, Atelestidae and Microphoridae. *Fauna Entomologica Scandinavica* 12: 1-279.
- Cumming JM, Wood DM. 2009. Adult morphology and terminology, pp. 9-50 *In* Brown BV, Borkent A, Cumming JM, Wood DM, Woodley NE, Zumbado MA (eds.). *Manual of Central American Diptera*. Vol. 1. NRC Research Press, Ottawa.
- Frey R. 1938. Hybotinen (Dipt., Empididae) von Formosa und den Philippinen. *Notulae Entomologicae* 18: 52-62.
- Frey R. 1953. Studien über ostasiatische Dipteren. II. Hybotinae, Ocydromiinae, *Hormoepiza* Zett. *Notulae Entomologicae* 33: 57-71.
- Frey R. 1954. 28. Empididae *In* Lindner E.[ed.], *Die Fliegen der Palaearktischen Region* 4(4): 400-639. E. Schweizerbart'sche, Stuttgart.
- Huo S, Grootaert P, Yang D. 2010. Two new yellow-legged species of the genus *Hybos* from Viet Nam (Diptera: Empidoidea: Hybotinae). *Zootaxa* 2512: 47-55.
- Jiang W, Li Z, Yang D. 2011. Two new species of *Hybos* from Taiwan (Diptera: Empidoidea). *Transactions of the American Entomological Society* 137(3-4): 355-358.

- Li WH, Yang D. 2009. Species of *Hybos* Meigen from Ningxia, Palaearctic China (Diptera, Hybotidae). *Revue Suisse de Zoologie* 116(3-4): 353-358.
- Li Z, Wang N, Yang D. 2014. New species of the genus *Hybos* Meigen from Northwest China (Diptera: Empidoidea, Hybotinae). *Zootaxa* 3786(2): 166-180.
- Linnaeus C von. 1767. *Systema naturae per regna tria naturae*. Ed. 12. Holmiae, 533-1327.
- Meigen JW. 1803. Versuch einer neuen Gattungseintheilung der europäischen zweiflügeligen. Insekten. *Magazin für Insektenkunde* 2: 259-281.
- Melander AL. 1928. Diptera, Fam. Empididae. In Wytzman P. [ed.], *Genera Insectorum*, (1927) Fasc. 185. Louis Desmet-Verteneuil, Bruxelles, 434 pp.
- Plant AR. 2013. The genus *Hybos* Meigen (Diptera: Empidoidea: Hybotidae) in Thailand. *Zootaxa* 3690: 1-98.
- Saigusa T. 1963. Systematic studies of the genus *Hybos* in Japan I. New species with yellowish legs (Diptera, Empididae). *Sieboldia* 3(1): 97-104.
- Saigusa T. 1965. Studies on the Formosan Empididae collected by Professor T. Shirôzu (Diptera, Brachycera). *Special Bulletin of the Lepidopterists' Society of Japan* 1: 180-196.
- Shamshev IV, Grootaert P, Kustov S. 2015. New data on the genus *Hybos* Meigen (Diptera: Hybotidae) from the Palaearctic Region. *Zootaxa* (In press).
- Shamshev IV, Grootaert P, Yang D. 2013. New data on the genus *Hybos* (Diptera: Hybotidae) from the Russian Far East, with description of a new species. *Russian Entomological Journal* 22(2): 141-144.
- Shi L, Yang D, Grootaert P. 2009. New *Hybos* species from Oriental China (Diptera: Empididae). *Transactions of the American Entomological Society* 135(1-2): 189-192.
- Smith KGV. 1965. Diptera from Nepal: Empididae. *Bulletin of the British Museum (Natural History), Entomology* 17(2): 61-112.
- Yang D. 2008. Two new yellow-legged species of *Hybos* from Hainan, China (Diptera: Hybotidae). *Revue Suisse de Zoologie* 115(4): 617-622.
- Yang D, Li WH. 2011. Two new species of *Hybos* Meigen from Oriental China (Diptera, Empidoidea, Hybotidae). *Revue Suisse de Zoologie* 118(1): 93-98.
- Yang C, Yang D. 1991. New species of *Hybos* Meigen from Hubei (Diptera: Empididae). *Journal of Hubei University (Natural Science)* 13(1): 1-8.
- Yang D, Yang CK. 2004. Diptera, Empididae, Hemerodromiinae and Hybotinae. *Fauna Sinica Insecta*, Vol. 34. Science Press, Beijing. 329 pp.
- Yang D, Zhang KY, Yao G, Zhang JH. 2007. *World Catalog of Empididae (Insecta: Diptera)*. China Agricultural University Press, Beijing, 599 pp.