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New data on the genus *Hybos* Meigen (Diptera: Hybotidae) from the Palaearctic Region

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Abstract

The taxonomy and distribution of the genus *Hybos* Meigen in the Palaearctic Region is reviewed with a special reference to the European fauna. Twenty-three species have been recorded from the Palaearctic, of which only four species are known from Europe. We describe two new species, *H. andradei* sp. nov. (Portugal) and *H. mediasiaticus* sp. nov. (Middle Asia). The status of two previously considered doubtful species of *Hybos* are validated: *H. striatellus* Villeneuve, 1913 (Algeria) and *H. vagans* Loew, 1874 (the Caucasus). Both species are re-described, and the lectotype of *H. striatellus* is designated. A key to species of *Hybos* from the western Palaearctic is compiled. Numerous new data on distributions of *H. culiciformis* (Fabricius, 1775), *H. femoratus* (Müller, 1776), *H. grossipes* (Linné, 1767) and *H. vagans* are given. *Hybos culiciformis* is recorded for the first time from Algeria, Byelorussia, Croatia, Cyprus, Lebanon, and Portugal; *H. femoratus*—from Estonia, Georgia (including Abkhazia), Kazakhstan, Mongolia and Ukraine; *H. grossipes*—from Byelorussia, Estonia, Kazakhstan, Latvia, Mongolia, Ukraine; *H. vagans*—from Armenia, Azerbaijan, Georgia (including Abkhazia), Russia, Turkey. The variation of some characters in *H. culiciformis* is discussed and is confirmed for Portuguese specimens by COI barcoding. Female postabdominal structures are examined and described for *H. andradei* sp. nov., *H. culiciformis*, *H. femoratus*, *H. grossipes*, *H. mediasiaticus* sp. nov., and *H. striatellus*. Possible relationships of the West-Palaearctic species are discussed. A check-list of *Hybos* from the Palaearctic Realm is provided.

Key words: Hybotidae, *Hybos*, Palaearctic, new species, distribution, female terminalia, phylogeny

Notes on phylogenetic relationships

Phylogenetic relationships within *Hybos* have never been analysed and thus remain unclear. Plant (2013) tentatively proposed seven informal groups for some species of *Hybos* recorded from Southeast Asia, mainly from Thailand.

Among species of the “European-Mediasiatric” complex, *H. andradei* **sp. nov.**, *H. femoratus* and *H. mediasiatricus* **sp. nov.** are probably closely related and form a separate species group. The monophyly of this group is primarily supported by a synapomorphy of the female terminalia, a ring-like tergite 8. Additionally, these species are quite similar in details of the male terminalia (e.g., hypandrium); however, the states of these characters are much more difficult to polarise without a rigorous analysis on a broader scale. *Hybos grossipes* and *H. culiciformis* share tergite 8 partly encircling the abdomen that may support their closer relationships. *Hybos striatellus* has a unique structure of the female terminalia with a ring-like tergite 8 that would indicate affinity to the *H. femoratus* group, but it is probably divided secondarily into two sclerites. On the other hand, the structure of the right surstylus in *H. striatellus* is quite similar to that of *H. culiciformis*. Additionally, sternite 8 in *H. striatellus* (and similarly *H. culiciformis* and *H. grossipes*) bears two strong, closely set median posteromarginal bristles. The relationships of *H. vagans* are even less certain. Among species of the “European-Mediasiatric” complex the female terminalia of *H. vagans* lack some modifications and likely represents a plesiomorphic stage. The shape of the hypandrium of this species (with two subequal posterior processes) somewhat resembles the hypandrium of *H. grossipes*. It is quite possible that the “European-Mediasiatric” fauna of *Hybos* is represented by derivatives of different lineages within the genus. However, a rigorous cladistic analysis involving representatives from other regions would be required to clarify precise relationships and the genesis of the “European-Mediasiatric” species complex of *Hybos*.

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APPENDIX. A check-list of *Hybos* from the Palaearctic Realm

andradei sp. nov.—Portugal.

arctus Yang & Yang, 1988: 283, fig. 2 [male terminalia]—China (Beijing).

aurifer Saigusa, 1963: 97, fig. 1 [male terminalia]—Japan (Hokkaido, Honshu, Kyushu).

bicoloripes Saigusa, 1963: 100—Japan (Honshu).

caesariatus Yang & Yang, 2004: 141 (in Chinese) and 304 (in English), figs 196–201 [head, wing, male terminalia]—Russia (Kuril Islands). ORIENTAL: China (Zhejiang).

culiciformis (Fabricius), 1775: 796 (*Asilus*)—Algeria, Austria, Belgium, Bulgaria, Croatia, Czech Republic, Cyprus, Denmark, Turkey, Finland, France (incl. Corsica), Germany, Great Britain, Greece (incl. Crete), Hungary, Ireland, Italy (incl. Sicily), Lebanon, Lithuania, Montenegro, Poland, Russia (Karelia, Kursk, Leningrad, Moscow, Pskov, Ryazan', Tatarstan, Voronezh), Slovakia, Slovenia, Spain, Sweden, Switzerland, Netherlands, Ukraine (Lvov, Zakarpattia).

emeishanus Yang & Yang, 1989: 157, fig. 3 [male terminalia]—Russia (Kuril Islands). ORIENTAL: China (Sichuan).

femoratus (Müller), 1776: 2135 (*Asilus*)—Austria, Belgium, Bulgaria, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Great Britain, Hungary, Ireland, Italy, Kazakhstan, Lithuania, Mongolia, Netherlands, Norway, Poland, Romania, Russia (Adygea, Arkhangel'sk, Bashkortostan, Chelyabinsk, Kabardino-Balkaria, Karachay-Cherkessia, Karelia, Krasnodar, Krasnoyarsk, Leningrad, Moscow, Ryazan', Samara, Smolensk, Tver', Voronezh, Yaroslavl'), Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine (Cherkassy, Kiev, Zakarpattia), former Yugoslavia.

fulvitarisatus Raffone, 2011: 77, figs 1–5 [male terminalia]—Italy (Romagna).

grossipes (Linné), 1767: 988 (*Musca*)—Austria, Belgium, China (Gansu, Hebei, Henan, Inner Mongolia, Jilin, Ningxia, Shanxi, Shaanxi), Czech Republic, Denmark, Finland, France (incl. Corsica), Germany, Great Britain, Hungary, Italy, Lithuania, Norway, Poland, Romania, Russia (Altay Republic, Amur, Arkhangel'sk, Buryatia, Chelyabinsk, Chita, Irkutsk, Kaluga, Kamchatka, Karelia, Kemerovo, Khabarovsk, Khakassia, Komi, Krasnoyarsk, Kursk, Leningrad, Moscow, Murmansk, Novgorod Velikiy, Novgorod Nizhniy, Perm', Primorskiy Terr., Pskov, Sakhalin (Sakhalin Island), Smolensk, Spain, Sverdlovsk, Tver', Tyumen', Vladimir, Voronezh, Yaroslavl'), Slovakia, Slovenia, Sweden, Switzerland, Netherlands, Ukraine (Kiev, Lvov, Zakarpattia), former Yugoslavia. ORIENTAL: China (Hubei, Sichuan).

hubeiensis Yang & Yang, 1991: 3, fig. 3 [male terminalia]—China (Gansu, Ningxia). ORIENTAL: China (Henan, Hubei).

japonicus Frey, 1953: 63—Japan.

jilinensis Yang & Yang, 1988: 284, fig. 4 [male terminalia]—China (Jilin).

joneensis Yang & Yang, 1988: 285, fig. 5 [male terminalia]—China (Gansu).

liupanshanus Li & Yang, 2009: 354, figs 1–4 [male terminalia]—China (Ningxia).

mediasiaticus sp. nov.—Kyrgyzstan, Tajikistan.

saigusai Chvála, 1985: 391 (new name for *Hybos flavipes* Saigusa, 1963)—Japan (Honshu).

= *flavipes* Saigusa, 1963: 103.

striatellus Villeneuve, 1913: 111—Algeria.

tibialis (Bezzi), 1912: 455—China (Taiwan), Japan, Myanmar.

vagans Loew, 1874: 417—Armenia, Azerbaijan, Georgia, Iran, Russia (Adygea, Chechnya, Krasnodar), Turkey.

wudanganus Yang & Yang, 1991: 5, fig. 7 [male terminalia]—China (Ningxia). ORIENTAL: China (Henan, Hubei).

xanthomelas Saigusa, 1963: 101—Japan (Hokkaido, Honshu).

zlobini Shamshev, Grootaert & Yang, 2013: 143, figs 7, 8 [male terminalia]—Russia (Primorskiy Terr.).