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A new species of *Rhaphium* Meigen, 1803 and new records of Dolichopodidae (Diptera) from Oka Nature Reserve, Russia

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ABSTRACT: A new long-legged fly species, *Rhaphium pogonini* sp.n. from the Oka Nature Reserve, Russian Ryazanskaya Oblast, is described and illustrated. The new species appears to be close in habitus to the Holarctic *R. elegantulum* (Meigen, 1824) (with ventral spine on mid coxa) and Far Eastern *R. johnrichardi* Negrobov et Grichanov, 2010 (without ventral spine on mid coxa), differing from them mainly in shape of male hypopygial surstylus, which is curved, very broad and long, nearly reaching apex of cercus. *R. elegantulum* and *R. johnrichardi* male surstylus is straight, thin and relatively short, about half as long as cercus. *R. samarkandiense* Negrobov et Grichanov, 2010, is placed in synonymy with *R. turanicola* (Stackelberg, 1927) (syn.n.). Sixteen species of long-legged flies are reported from the Oka Reserve for the first time. A checklist of 138 Dolichopodidae species known from the Oka Nature Reserve is compiled with corrected nomenclature.
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KEY WORDS: Rhaphiinae, *Rhaphium*, new species, Palaearctic Region, Ryazanskaya Oblast.

Новый вид *Rhaphium* Meigen, 1803 и новые указания Dolichopodidae (Diptera) из Окского заповедника, Россия

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РЕЗЮМЕ: Новый вид мух-зеленушек, *Rhaphium pogonini* sp.n. из Окского заповедника в Рязанской области. По габитусу новый вид, по-видимому, близок голарктическому *R. elegantulum* (Meigen, 1824) (с вентральным шипом на среднем тазике) и дальневосточному *R. johnrichardi* Negrobov et Grichanov, 2010 (без вентрального шипа на среднем тазике), отличаясь от них преимущественно в строении сурстиля гипопигия самца, изогнутом, очень широком и длинном, почти достигающем вершины церки. Сурстили самца *R. elegantulum* и *R. johnrichardi* прямые, тонкие и относительно короткие, примерно вдвое короче церки. *R. samarkandiense* Negrobov et Grichanov, 2010 сведен в синонимы к *R. turanicola* (Stackelberg, 1927) (syn.n.). В Окском заповеднике впервые отмечено шестнадцать видов мух-зеленушек. Составлен справочный список 138 известных видов Dolichopodidae Окского заповедника с уточненной номенклатурой.

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КЛЮЧЕВЫЕ СЛОВА: Rhaphiinae, *Rhaphium*, новый вид, Палеарктика, Рязанская область.

Introduction

The genus *Rhaphium* Meigen, 1803 with about 210 species is mainly Holarctic taxon (Grichanov, 2023). Negrobov (1979) published the last revision and key to the Palaearctic species of this genus. Since then the new species were described almost exclusively from eastern part of the Palaearctic Region, and Negrobov *et al*. (2012) compiled a key to Siberian species, Negrobov *et al*. (2020) published a key to species from Sakhalin and Kuril Islands, and Qilemoge *et al*. (2020) provided the last key to Chinese species. The discovery of new European *Rhaphium* species is a rare event. During the recent half-century one Euro-Siberian species (Kahanpää, 2007) and two Caucasian species (Negrobov, Onishchenko, 1991; Negrobov *et al*., 2013) were described.

A male of one more new *Rhaphium* species was collected by Dr. Sergei V. Pogonin in the Oka Nature Reserve (Ryazanskaya Oblast, Central European Russia), and considered close to the Holarctic *R. elegantulum* (Meigen, 1824) and Far Eastern *R. johnrichardi* Negrobov et Grichanov, 2010. In addition, new records along with a revised checklist of dolichopodid species from the Oka Reserve are provided.

The Oka Nature Reserve is the only place in Ryazanskaya Oblast, where the long-legged flies were collected. Negrobov & Pogonin (1984) published the first list with 73 species found there in 1981. Negrobov & Pogonin (2008) republished this list, adding new material collected in 1985, 2003 and 2004 and expanding the number of dolichopodid species to 81. Pogonin & Negrobov (2008) studied the fauna and seasonal dynamics of species of this family in the Oka Reserve in 2005–2006 and listed 122 species (including one species placed later in synonymy). All three lists used partly outdated nomenclature. In addition, Berezhnova (2017) recorded four species including one new for the Oka Reserve collected in 2016.

The Oka Reserve is located in the Sarmatic mixed forests ecoregion, a band of mixed oak/spruce/pine forests stretching from southern Sweden to the Ural Mountains (see Ecoregions, 2017). Its topography, climate and flora are well described in Russian and English references (see Wikipedia Contributors, 2023 for further reading).

Material and methods

The paper is based on material found in the Oka Nature Reserve that will be deposited in its Nature Museum and the Zoological Institute of the Russian Academy of Sciences (ZIN, St Petersburg, Russia). All specimens were collected by Dr. Sergei V. Pogonin in 2005–2010 and mounted on pins. His name is omitted from the list of material.

Specimens have been studied and photographed with a ZEISS SteREO Discovery.V12 modular stereo microscope and an AxioCam MRc5 camera. The preparation of the male genitalia was photographed with a ZEISS Axiostar stereo microscope and an AxioCam ICc3 camera. The measurement accuracy of these microscopes is 0.01 mm. Morphological terminology and abbreviations follow Cumming & Wood (2017) and Grichanov & Brooks (2017). The lengths of the antennomeres and podomeres are given in millimetres. Body length is measured from the base of the antenna to the tip of abdominal segment 6. Wing length is measured from the base to the wing apex. Antenna length is measured from the base of the scape to tip of the arista-like stylus. The figures showing the hypopygium in lateral view are oriented as it appears on the intact specimen, with the morphologically ventral surface of the genitalia facing upwards, dorsal surface downwards, anterior end facing right and posterior end facing left.

Results

Class Insecta Linnaeus, 1758
Order Diptera Linnaeus, 1758
Superfamily Empidoidea Latreille, 1804
Family Dolichopodidae Latreille, 1809
Subfamily Rhaphiinae Bigot, 1852
Genus ***Rhaphium*** Meigen, 1803

Rhaphium Meigen, 1803: 272, type species *Rhaphium macrocerum* Meigen, 1824, designation by Curtis, 1835: 568.

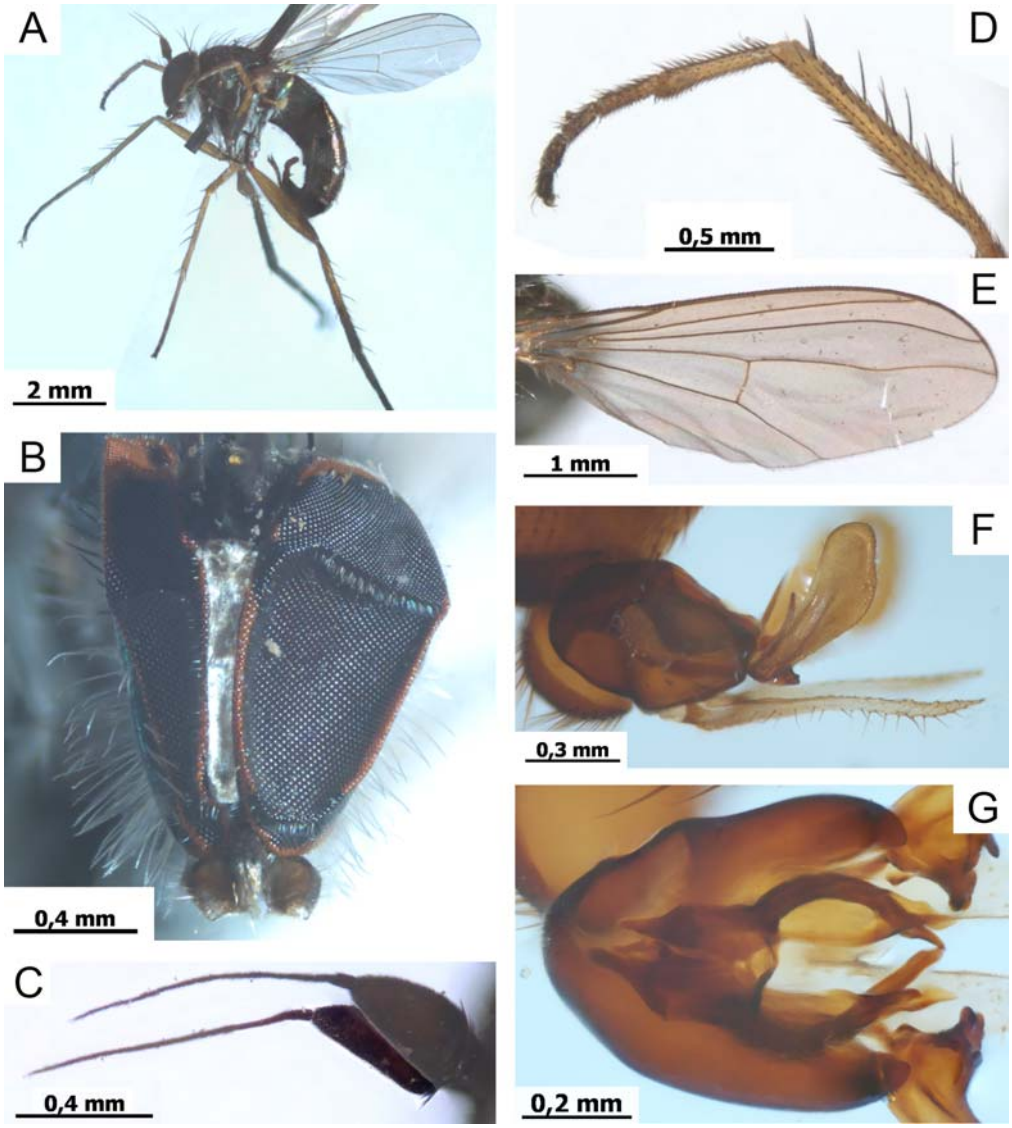

Fig. 1. *Rhaphium pogonini* Grichanov, sp.n., male holotype (A–G): A — habitus; B — head; C — antenna; D — fore tibia and tarsus; E — wing; F — hypopygium after maceration, right lateral view; G — epandrium, ventral view.
Рис. 1. *Rhaphium pogonini* Grichanov, sp.n., самец, голотип (A–G): A — внешний вид; B — голова; C — усик; D — передняя голень и лапка; E — крыло; F — гипопигий после размачивания, вид справа; G — эпандрий, вид снизу.

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Rhaphium pogonini Grichanov, **sp.n.**
Fig. 1A–G.

MATERIAL. Holotype ♂, [Russia, Ryazanskaya Oblast, Spassky District:] OGZ [=Oka Nature Reserve], cordon Lipovaya gora [54°44′00″N, 40°58′10″E], floodplain oak forest, oxbow, trap no. 2, 7–10.vi.2009, S. Pogonin leg. [In Russian] (ZIN; male terminalia dissected and stored in glycerin in microvial pinned with the specimen).

DESCRIPTION. Male (Fig. 1A). Head (Fig. 1B): face silvery white, narrow, almost parallel-

sided, not reaching lower eye margins, under antennae barely less wider than postpedicel height (19/22); proboscis and palps black, with brown hairs; frons metallic blue-green, lower postocular setae white, antenna (Fig. 1C) black; postpedicel elongate-triangular, gradually narrowing apically, 1.7 times as long as width at base; stylus apical. Length (mm) of scape, pedicel, postpedicel, arista-like stylus (aristomeres 1 and 2), 0.13/0.06/0.37/0.07/0.78.

Thorax greenish black; mesonotum shining; pleura greyish-white pollinose; propleuron with fine white hairs; 5 pairs of strong dorsocentral bristles with small setae anteriorly; acrostichals biseriate; scutellum with 2 strong marginal bristles and 2 fine lateral setae.

Legs: with coxae black, white haired; fore and mid coxae with 1–2 black apical bristles anteriorly; mid coxa with ventral brush of short black setae, not forming spine; legs mostly yellow; trochanters, fore femur in basal 2/3, hind femur in distal 1/3 dorsally, hind tibia in distal 1/3, fore and mid tarsi from tip of basitarsus, and hind tarsus black; femora without long hairs; mid femur with short white hairs ventrally at base; fore and mid femora with 1 posteroventral preapical seta; mid and hind femora with 2 anterior preapical bristles; fore tibia (Fig. 1D) with 5–6 short anterodorsal bristles, with 3 posteroventral bristles; fore tarsus with semierect setulae dorsally; fore basitarsus distinctly thickened ventrally at apex; 4–5th segments of fore and mid tarsi slightly widened; mid tibia with 3 anterodorsal, 3 posterodorsal, 1 anteroventral, 1 posteroventral, 5 apical bristles; mid tarsus simple; mid basitarsus with 2–3 short black ventral setae; hind tibia slightly thickened, with 4 anterodorsal, 4 posterodorsal, 3 apical bristles; hind basitarsus slightly thickened, without strong setae. Femur, tibia and tarsomere (from first to fifth) length (mm): fore leg: 1.38/1.28/0.64/0.32/0.19/0.17/0.15, mid leg: 1.74/1.66/0.78/0.41/0.29/0.19/0.19, hind leg: 2.18/2.44/0.74/0.72/0.47/0.31/0.32.

Wing (Fig. 1E) slightly darkened; R_{4+5} and M_{1+2} parallel at apex; M_{1+2} slightly curved in distal part; ratio of part of costa between R_{2+3} and R_{4+5} to this between R_{4+5} and M_{1+2}, 0.69/0.33; ratio of dm-m to distal part of M_4, 0.38/0.91; lower calypter yellow, with yellowish-white cilia; halter yellow.

Abdomen metallic violet-black; weakly pollinose laterally and ventrally; setae and hairs mainly black; segment 1 laterally and ventrally with long white hairs; hypopygium (Fig. 1F–G) black, with brown surstylus and yellow-brown cercus; surstylus large, curved ventrally, widened at apex, with narrow process at base ventrally and small projection at extreme base dorsally; cercus about as long as epandrium, simple, band-like, acute apically, with regular rows of long black and white hairs and setae.

Body length 6.3 mm; antenna length 1.4 mm; wing length 4.7 mm; wing width 1.6 mm.

Female. Unknown.

ETYMOLOGY. The species is named for the collector of the holotype, Dr. Sergei V. Pogonin (Ryazanskaya Oblast, Oka Nature Reserve).

DISTRIBUTION. Russia (Ryazanskaya Oblast).

DIAGNOSIS. *Rhaphium pogonini* Grichanov, sp.n. is close in habitus to the Holarctic *R. elegantulum* (Meigen, 1824) (with ventral spine on mid coxa) and Far Eastern *R. johnrichardi* Negrobov et Grichanov, 2010 (without ventral spine on mid coxa), differing from them mainly in shape of male hypopygial surstylus, which is curved, very broad and long, nearly reaching apex of cercus (Negrobov, 1979; Negrobov, Grichanov, 2010). *R. elegantulum* and *R. johnrichardi* male surstyli are straight, thin and relatively short, about half as long as cercus. *R. johnrichardi* was included into the *R. crassipes* species group (Negrobov, Grichanov, 2010).

New records

Achalcus cinereus (Haliday, 1851)

MATERIAL. Cordon Lipovaya gora: 1♂, 11.04.2009; 1♂, 2♀♀, 4–8.04.2010; 1♂, 1♀, 2–4.08.2010; on meadows and deciduous forest glades near puddles.

Argyra argentina (Meigen, 1824)

MATERIAL. Gorodkovichi vil.: 1♂, 1♀, 13.06.2007, 7.08.2007; Dobryanka vil.: 1♂, 27.06.2007; Lakash Lake: 3♂♂, 27.06.2008; on meadows and deciduous forest edges near rivulets and puddles.

Argyra auricollis (Meigen, 1824)

MATERIAL. Lakash Lake: 1♂, 20.06.2008; on meadow near rivulet.

Argyra hoffmeisteri (Loew, 1850)

MATERIAL. Gorodkovichi vil.: 2♂♂, 6–12.06.2008; 2♂♂, 30.05.2010; deciduous forest edges near rivulet.

Campsicnemus vtorovi Negrobov et Zlobin, 1978

MATERIAL. Lakash Lake: 2♂♂, 25.06.2006, 13.09.2006; Shilishche Lake: 1♂, 18.06.2006; on meadows and deciduous forest edges near puddles.

Chrysotus cupreus Macquart, 1827

MATERIAL. Cordon Lipovaya gora: 1♂, 25.06.2010; inundated forest.

Diaphorus hoffmannseggi Meigen, 1830

MATERIAL. Lakash Lake: 1♂, 28.06.2008, inundated forest, near puddle.

Hercostomus fulvicaudis (Haliday, 1851)

MATERIAL. Dobryanka vil.: 1♂, 29.06.2009; hothouse.

Hercostomus nigrilamellatus (Macquart, 1827)

MATERIAL. Cordon Lipovaya gora: 1♂, 15.07.2010; aspen forest.

Hydrophorus altivagus Aldrich, 1911

MATERIAL. Dobryanka vil.: 2♂♂, 13.09.2007; meadow near rivulet.

Medetera tristis (Zetterstedt, 1838)

MATERIAL. Brykin Bor vil.: 1♂, 4.06.2005, birch trunk; Beryozovyi Rog (natural landmark): 2♂♂, 5.06.2005; Dobryanka vil.: 3♂♂, 30.06.2006, blackthorn trunk.

Rhaphium appendiculatum Zetterstedt, 1849

MATERIAL. Cordon Lipovaya gora: 1♂, 13.06. 2010, inundated forest.

Rhaphium discigerum Stenhammar, 1851

MATERIAL. Lakash Lake: 1♂, 7.07.2006, Dobryanka vil.: 1♂, 15.08.2006; inundated meadow, rivulet.

Rhaphium pectinatum (Loew, 1859)

MATERIAL. Cordon Lipovaya gora: 3♂♂, 1♀, 20.07.2010, river shore, uliginous deposits.

Syntormon bicolorellus (Zetterstedt,1843)

MATERIAL. Cordon Lipovaya gora: 4♂♂, 2♀♀, 2.07–13.08.2010, inundated forest.

Syntormon denticulatus (Zetterstedt, 1843)

MATERIAL. Gorodkovichi vil.: 1♂, 12.05. 2008, deciduous forest edge near rivulet; Papushevo vil.: 1 ♂, 15.05.2007, meadow near puddle.

Conclusion

As a result of this study, the Dolichopodidae species number in the Oka Nature Reserve has increased to 138 belonging to 21 genera of the family. One new species, *Rhaphium pogonini* Grichanov sp.n., is here described and illustrated. Sixteen species are reported from the Oka Reserve for the first time. I suppose that the total number of species can increase here to 200 or 250 species. Therefore, the zoogeographical analysis of known dolichopodid fauna of the Oka Reserve seems to be premature.

Looking for species related to *Rhaphium pogonini* Grichanov sp.n. from the Palaearctic Region, I have found that recently described *R. samarkandiense* Negrobov et Grichanov, 2010 (Negrobov, Grichanov, 2010) is identical to *Rhaphium turanicola* (Stackelberg, 1927) as described and figured by Negrobov (1979). Therefore, I propose a new synonymy:

Rhaphium turanicola (Stackelberg, 1927). Type localities: Uzbekistan: "Turkestan: Tashkent"; Tajikistan: "Woruch, Chanaum Kokand".

=*Rhaphium samarkandiense* Negrobov et Grichanov, 2010, **syn.n.** Type locality: Uzbekistan: Samarkand env., Dargom river.

A checklist of Dolichopodidae species from the Oka Nature Reserve

Only those synonyms and outdated combinations are provided, which were used in old species lists for the Oka Reserve.

Achalcus cinereus (Haliday, 1851)
Argyra argentina (Meigen, 1824)
Argyra auricollis (Meigen, 1824)
Argyra diaphana (Fabricius, 1775)
Argyra hoffmeisteri (Loew, 1850)
Argyra leucocephala (Meigen, 1824)
Argyra magnicornis (Zetterstedt, 1838)
Argyra setimana Loew, 1859
Argyra setulipes Becker, 1918
Argyra vestita (Wiedemann, 1817)
Asyndetus latifrons (Loew, 1857)
Campsicnemus armatus (Zetterstedt, 1849)
Campsicnemus articulatellus (Zetterstedt, 1843)
= *Campsicnemus dasycnemus* Loew, 1857
Campsicnemus curvipes (Fallén, 1823)
Campsicnemus lumbatus Loew, 1857
Campsicnemus marginatus Loew, 1857
Campsicnemus picticornis (Zetterstedt, 1843)
Campsicnemus pumilio (Zetterstedt, 1843)
= *Campsicnemus pectinulatus* Loew, 1864
Campsicnemus pusillus (Meigen, 1824)
Campsicnemus scambus (Fallén, 1823)
Campsicnemus vtorovi Negrobov et Zlobin, 1978
Chrysotimus molliculus (Fallén, 1823)
Chrysotus cilipes Meigen, 1824
Chrysotus cupreus Macquart, 1827
Chrysotus femoratus Zetterstedt, 1843
Chrysotus gramineus (Fallén, 1823)
Chrysotus laesus (Wiedemann, 1817)
Chrysotus monochaetus Kowarz, 1874
Chrysotus neglectus (Wiedemann, 1817)
Chrysotus pulchellus Kowarz, 1874
Chrysotus suavis Loew, 1857
Diaphorus hoffmannseggi Meigen, 1830
Diaphorus oculatus (Fallén, 1823)
Dolichopus acuticornis Wiedemann, 1817
Dolichopus apicalis Zetterstedt, 1849
Dolichopus arbustorum Stannius, 1831
Dolichopus argyrotarsis Wahlberg, 1850
Dolichopus brevipennis Meigen, 1824
Dolichopus campestris Meigen, 1824
Dolichopus cilifemoratus Macquart, 1827
Dolichopus claviger Stannius, 1831
Dolichopus discifer Stannius, 1831
= *Dolichopus nigricornis* Becker, 1917
Dolichopus latilimbatus Macquart, 1827
Dolichopus lepidus Staeger, 1842
Dolichopus linearis Meigen, 1824
Dolichopus lineatocornis Zetterstedt, 1843
Dolichopus longicornis Stannius, 1831

Dolichopus longitarsis Stannius, 1831
Dolichopus migrans Zetterstedt, 1843
Dolichopus nigripes Fallén, 1823
Dolichopus nitidus Fallén, 1823
Dolichopus notatus Staeger, 1842
Dolichopus nubilus Meigen, 1824
Dolichopus pennatus Meigen, 1824
Dolichopus picipes Meigen, 1824
Dolichopus planitarsis Fallén, 1823
Dolichopus plumipes (Scopoli, 1763)
= *Dolichopus pectinitarsis* Stenhammar, 1851
Dolichopus popularis Wiedemann, 1817
Dolichopus remipes Wahlberg, 1839
Dolichopus ringdahli Stackelberg, 1930
Dolichopus simplex Meigen, 1824
Dolichopus ungulatus (Linnaeus, 1758)
Dolichopus wahlbergi Zetterstedt, 1843
Ethiromyia chalybea (Wiedemann, 1817)
= *Hercostomus chalybeus* (Wiedemann, 1817)
Gymnopternus aerosus (Fallén, 1823)
= *Hercostomus aerosus* (Fallén, 1823)
Gymnopternus angustifrons (Staeger, 1842)
= *Hercostomus angustifrons* (Staeger, 1842)
Gymnopternus assimilis (Staeger, 1842)
= *Hercostomus assimilis* (Staeger, 1842)
Gymnopternus brevicornis (Staeger, 1842)
= *Hercostomus brevicornis* (Staeger, 1842)
Gymnopternus celer (Meigen, 1824)
= *Hercostomus celer* (Meigen, 1824)
Gymnopternus metallicus (Stannius, 1831)
= *Hercostomus metallicus* (Stannius, 1831)
Hercostomus fulvicaudis (Haliday, 1851)
Hercostomus nigrilamellatus (Macquart,1827)
Hercostomus nigriplantis (Stannius, 1831)
Hercostomus rothi (Zetterstedt, 1859)
= *Hercostomus praeceps* Loew, 1869
Hydrophorus albiceps Frey, 1915
Hydrophorus altivagus Aldrich, 1911
Hydrophorus balticus (Meigen, 1824)
Hydrophorus bipunctatus (Lehmann, 1822)
Hydrophorus borealis Loew, 1857
Hydrophorus brunnicosus Loew, 1857
Hydrophorus litoreus Fallén, 1823
Hydrophorus praecox (Lehmann, 1822)
Hydrophorus viridis (Meigen, 1824)
Medetera ambigua (Zetterstedt, 1843)
Medetera apicalis (Zetterstedt, 1843)
Medetera betulae Ringdahl, 1949
Medetera diadema (Linnaeus, 1767)
Medetera infumata Loew, 1857
Medetera jacula (Fallén, 1823)
Medetera lorea Negrobov, 1967
Medetera pallipes (Zetterstedt, 1843)
Medetera parenti Stackelberg, 1925
Medetera plumbella Meigen, 1824
Medetera tristis (Zetterstedt, 1838)
Nematoproctus distendens (Meigen, 1824)
Nematoproctus longifilus Loew, 1857
Nematoproctus praesectus Loew, 1869
Neurigona lineata (Oldenberg, 1904)
Neurigona pallida (Fallén, 1823)
Neurigona quadrifasciata (Fabricius,1781)
Poecilobothrus chrysozygos (Wiedemann, 1817)
= *Hercostomus chrysozygos* (Wiedemann, 1817)
Rhaphium antennatum (Carlier, 1835)
Rhaphium appendiculatum Zetterstedt, 1849
Rhaphium caliginosum Meigen, 1824
= *Rhaphium zetterstedti* (Parent, 1925)
Rhaphium commune (Meigen, 1824)
Rhaphium crassipes (Meigen, 1824)
Rhaphium discigerum Stenhammar, 1851
Rhaphium elegantulum (Meigen, 1824)
Rhaphium fascipes (Meigen, 1824)
Rhaphium lanceolatum Loew, 1850
= *Rhaphium caliginosum* Parent, 1925
Rhaphium laticorne (Fallén, 1823)
Rhaphium micans (Meigen, 1824)
Rhaphium monotrichum Loew, 1850
Rhaphium nasutum (Fallén, 1823)
Rhaphium nigribarbatum (Becker, 1900)
Rhaphium patulum (Raddatz, 1873)
Rhaphium pectinatum (Loew, 1859)
Rhaphium penicillatum Loew, 1850
Rhaphium pogonini Grichanov, sp.n.
Rhaphium rivale (Loew, 1869)
Rhaphium suave (Loew, 1859)
Sciapus albifrons (Meigen, 1830)
Sciapus lobipes (Meigen, 1824)
Sciapus longulus (Fallén, 1823)
Sciapus platypterus (Fabricius, 1805)
Sciapus wiedemanni (Fallén, 1823)
Sympycnus pulicarius (Fallén, 1823)
= *Sympycnus annulipes* (Meigen, 1824)
Syntormon bicolorellus (Zetterstedt,1843)
Syntormon denticulatus (Zetterstedt, 1843)
= *Syntormon pumilus* Parent, 1925, nec Meigen, 1824
Syntormon metathesis (Loew, 1850)
Syntormon pumilus (Meigen, 1824)
= *Syntormon rufipes* (Zetterstedt, 1849), nec Meigen, 1824
Syntormon tarsatus (Fallén, 1823)
Thrypticus atomus Frey, 1915
Thrypticus bellus Loew, 1869
Thrypticus laetus Verrall, 1912
Thrypticus pollinosus Verrall, 1912
Thrypticus virescens Negrobov, 1967
Xanthochlorus tenellus (Wiedemann, 1817)

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