


A new species *Chrysotus hubenovi* and new data on the family Dolichopodidae (Diptera) of Bulgaria


Новый вид *Chrysotus hubenovi* и новые данные по семейству Dolichopodidae (Diptera) Болгарии

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Abstract. *Chrysotus hubenovi* sp. nov. is described from the West Rhodope Mountains, Bulgaria. In addition, the records of 37 dolichopodid species are given for seven mountains or mountain massifs in Bulgaria. Sixteen species are recorded as new to the Pirin Mountains, four are new to the Lozenska Mountain, four are new to the Milevska Mountain, two are new to the Konyavska Planina Mountain, five are new to the Vitosha Mountain, five are new to the West Rhodope Mountains, and one species is new to the Belasitsa Mountain. The distribution of 210 dolichopodid species by the altitudinal zones and vegetation belts of Bulgaria is reviewed and briefly discussed.

Резюме. *Chrysotus hubenovi* sp. nov. описан из Западных Родопских гор (Болгария). В дополнение к этому, в статье приводятся находки 37 видов Dolichopodidae с семи гор и горных массивов Болгарии. Шестнадцать видов впервые отмечены для горного массива Пирин, четыре вида – для горы Лозенска, четыре – для горы Милевска, два – для горы Конявска Планина, пять – для горы Витоша, пять – для Западных Родопских гор и один вид – для горы Беласица. Выполнен обзор и краткий анализ распределения 210 видов Dolichopodidae по высотным зонам и поясам растительности Болгарии.

Key words: long-legged flies, vegetation belts, vertical distribution, fauna, Bulgaria, Dolichopodidae, *Chrysotus*, new records, new species

Ключевые слова: мухи-зеленушки, пояса растительности, вертикальное распределение, фауна, Болгария, Dolichopodidae, *Chrysotus*, новые находки, новый вид

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Introduction

The family Dolichopodidae encompasses 210 species known in Bulgaria, belonging to 11 subfamilies (Kechev et al., 2020). Many authors re-

ported dolichopodids from different plain and mountain regions of Bulgaria. Nedelkov (1909, 1912) listed 12 species. Beschovski studied the Dolichopodidae mainly on the Bulgarian Black

Sea coasts (Beschovski, 1964, 1966, 1971, 1972a, 1972b, 1973, 1975, 1976). Kechev investigated the Dolichopodidae of the West Rhodope Mountains (Kechev, 2006, 2007a), the Upper Thracian Plain (Kechev, 2012a, 2012b, 2014) and the Sarnena Sredna Gora Mountains (Kechev, 2016). The studies on the vertical distribution of Dolichopodidae in Bulgaria are insufficient and only Kechev (2007b) in his PhD thesis gave information on 45 species collected in different vegetation belts of the West Rhodopes.

Many papers deal with taxonomy of the genus *Chrysotus* Meigen, 1824 in the Palaearctic. Negrobov with coauthors revised the genus *Chrysotus* (Negrobov, 1980; Negrobov & Maslova, 1995; Negrobov et al., 2000; Negrobov et al., 2003). Later on, many new Palaearctic species were described. In particular, Naglis (2010) described a new species of *Chrysotus* from Switzerland. Negrobov & Maslova (2015) described a new species from the Sakhalin Province of Russia. Negrobov et al. (2016) described two new species from Japan and provided a key to the males of the Japanese *Chrysotus*. Grichanov et al. (2020) described a new species of *Chrysotus* from Morocco and gave a key to the males of the Mediterranean species of *Ch. gramineus*-group.

The aims of this article are to describe a new species of *Chrysotus*, to give new records of Dolichopodidae for several mountain massifs of Bulgaria and to review the species composition and the vertical distribution of the Dolichopodidae in different vegetation belts of Bulgaria.

Material and methods

The material was collected by sweep-netting from seven Bulgarian mountains and mountain massifs (Fig. 1) in 2002–2020. Photos of some sampled habitats are given as Electronic supplementary material 1. A part of the material was collected by the first author and Anelia Stojanova (Plovdiv University “Paisii Hilendarski”) and identified by the first author. Another part of the material was collected by Miroslav Barták and Stěpán Kubíc (Czech Republic) and identified by the second author.

The dolichopodids were identified mostly according to Parent (1938), Negrobov & Stackelberg (1969), d’Assis Fonseca (1978) and Grichanov (2007).

For clearing the male genitalia, they were placed in 10% KOH solution for three days.

The specimens listed below as new records for the Bulgarian mountains are stored as follows: The specimens determined by the first author are housed at the Department of Forest Entomology, Phytopathology and Game Fauna of the Forest Research Institute, Bulgarian Academy of Sciences (Sofia, Bulgaria). The specimens collected by Barták and Kubíc and determined by the second author are stored at the Czech University of Life Sciences (Prague, Czech Republic). The type specimens of *Chrysotus hubenovi* sp. nov. are deposited at the National Museum of Natural History (Sofia, Bulgaria).

The new records of Dolichopodidae for mountains of Bulgaria are given as Electronic supplementary material 2.

Table 1 summarises the data on the vertical distribution of all species recorded from Bulgaria, based on own data (Electronic supplementary material 2) and the available publications. We used the published data mostly summarised in Hubenov (2021). The original data were taken from the following papers: Nedelkov (1909, 1912), Beschovski (1964, 1966, 1967, 1971, 1972a, 1972b, 1973, 1975, 1976, 2012, 2013), Beschovski & Dzhabazov (2002), Kechev (2005, 2006, 2007a, 2007b, 2010, 2011a, 2011b, 2012a, 2012b, 2014, 2016, 2017), Pollet & Kechev (2007), Negrobov & Kechev (2010, 2012), Kechev et al. (2014), Kechev & Ivanova (2015), Kechev & Negrobov (2015) and Kechev et al. (2020). In Table 1, the species are given by the hypsometric belts (each of 200 m altitude) and by the vegetation belts. *Dolichopus plumitarsis* Fallén, 1823 was reported for Bulgaria (Negrobov, 1991) without faunistic data (collecting locality, altitude, etc.), hence it was excluded from Table 1.

According to the vertical segmentation of relief (Galabov, 1966, 1982; Simeonov & Totzev, 1997; Stefanov, 2002), the territory of Bulgaria includes five zones: (1) lowlands, up to 200 m, (2) hills, from 200 to 600 m, (3) low mountains, from 600 to 1000 m, (4) middle mountains, from 1000 to 1600 m, and (5) high mountains, above 1600 m.

The vegetation of Bulgaria is differentiated in a system of six vegetation belts (Stoyanov, 1966; Velchev et al., 1982, 1989; Velchev & Tonkov, 1986): (1) xerothermic oak forests, up to 600–700 m,

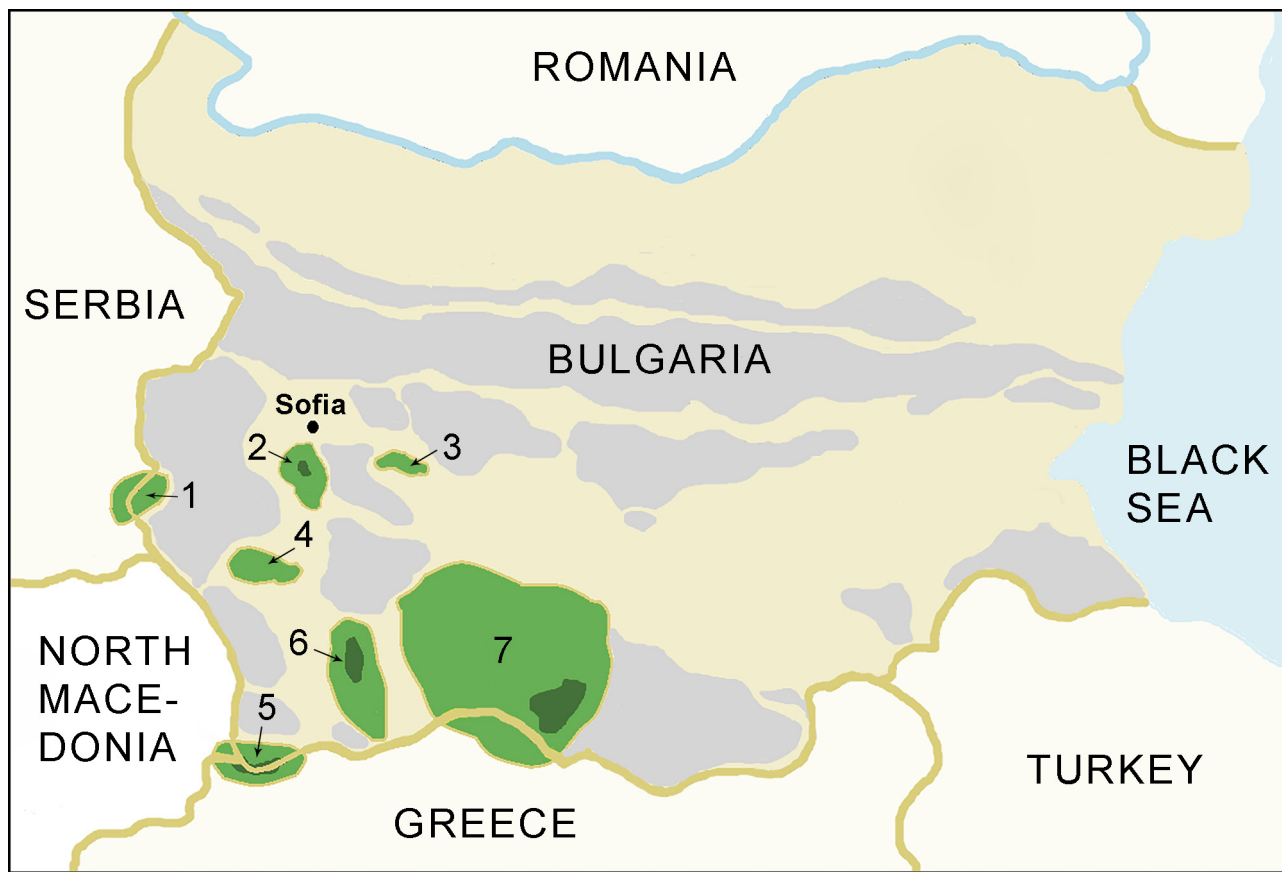


Fig. 1. Collecting areas of Dolichopodidae in Bulgaria. Numbers indicate collecting areas; mountains under study are in green. 1 – Milevska Mountain, 2 – Vitosha Mountain, 3 – Lozenska Mountain, 4 – Konyavska Planina Mountain, 5 – Belasitsa Mountain, 6 – Pirin Mountains, 7 – West Rhodope Mountains.

(2) mesophilic and xeromesophilic oak-hornbeam forests, from 600–700 to 900–1000 m, (3) beech forests, from 900–1000 to 1500–1600 m, (4) coniferous forests, from 1300–1600 to 2000–2200 m, (5) subalpine vegetation, from 2000–2200 to 2500 m, and (6) alpine vegetation, above 2500 m.

Sørensen's coefficient (Sørensen, 1948) was used to calculate similarity of faunal lists.

Taxonomic account

Order **Diptera**

Family **Dolichopodidae**

Subfamily **Diaphorinae**

Genus ***Chrysotus*** Meigen, 1824

***Chrysotus hubenovi* sp. nov.**

(Figs 2, 3)

Holotype. Male, **Bulgaria**, *West Rhodope Mts.*, Yagodina Vill., Buinovska Reka River, 1100 m, sweep netting, 10.IX.2020, M. Kechev leg.

Paratypes. 1 male, 1 female, with same data as for holotype.

Description. Male. Body length 2.0 mm; wing length 2.3 mm.

Head (Fig. 2A, B). Frons shining, dark metallic-green. Occiput black. Face below antennae dark, narrow, one-third as wide as diameter of eye. Lower parts of eyes touching anteriorly. Clypeus black with grey pruinosity. Palp dark, small. Proboscis brownish. Antennae (Fig. 2A) positioned above middle of head; scape small, conical, yellow; pedicel twice as long as scape, yellow, with crown of black setulae at apex; postpedicel ovate-triangular, higher than long, black, covered with white hairs (Fig. 2B); arista black.

Thorax. Mesonotum metallic-green, dorsal part shining with blue reflection. Two pronotal setae, one posthumeral, one supraalar and one postalar setae; five pairs of strong dorsocentral setae; acrostichals biseriate; scutellum with one pair of

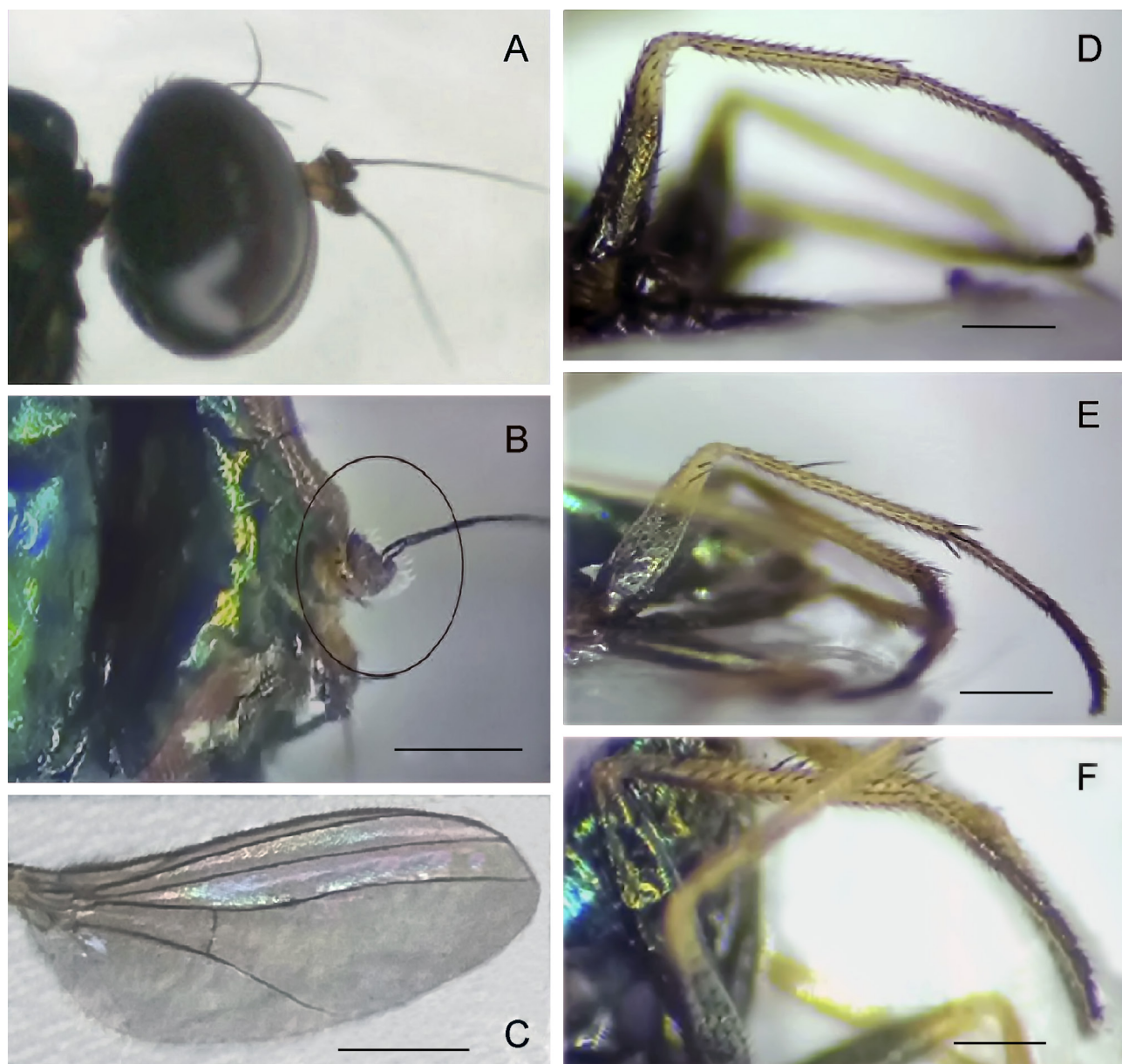


Fig. 2. *Chrysotus hubenovi* sp. nov., male. **A**, head; **B**, antenna; **C**, wing; **D**, fore leg; **E**, mid leg; **F**, hind leg. Scale bars: 0.3 mm (B, D–F), 0.5 mm (C). Photos by M. Kechev.

strong marginal scutellar setae and one pair of smaller lateral ones.

Wing (Fig. 2C) transparent. *C* ending at wing apex; *R*₁ ending in basal third. *R*₂₊₃ straight. *R*₃₊₄ and *M* parallel, slightly bent anteriorly. Anal lobe small. Lower calypter yellow, with white setae. Halter white.

Legs. Fore leg (Fig. 2D): coxa and trochanter black; coxa with black hairs and setae; femur from base to apical two-thirds dark metallic-green, shining, apical third yellow, with black hairs;

tibia entirely yellow; first tarsal segment yellow, tarsal segments 2–5 black; length ratio (from tarsomere 5 to femur): 1.0 : 1.5 : 1.5 : 2.0 : 4.5 : 8.7 : 9.0.

Mid leg (Fig. 2E): coxa and trochanter black; femur in basal two-thirds dark metallic-green with black setae, apical third yellow, with three anterior setae at apex; tibia yellow with black setae, one strong black anterodorsal seta at base and four apical setae; first tarsal segment mainly yellow, dark at apex; tarsal segments 2–5 black;

Table 1. Vertical distribution of the Bulgarian Dolichopodidae.

Taxa	Distribution															
	Vegetation belts															
	1		2		3			4		5		6				
	Xerothermic oak forests (up to 600–700 m)		Oak-hornbeam forests (up to 900–1000 m)		Beech forests (up to 1500–1600 m)			Coniferous forests (from 1300–1600 m to 2000–2200 m)		Subalpine vegetation (up to 2500 m)		Alpine vegetation (above 2500 m)				
	Altitudinal belts															
	Lowlands		Hills		Low mountains		Middle mountains			High mountains						
0–200 m		200–400 m	400–600 m	600–800 m	800–1000 m	1000–1200 m	1200–1400 m	1400–1600 m	1600–1800 m	1800–2000 m	2000–2200 m	2200–2400 m	2400–2600 m	2600–2800 m	2800–2925 m	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Subfamily ACHALCINAE																
<i>Achalcus flavicollis</i> (Meigen, 1824)	•															
Subfamily DIAPHORINAE																
<i>Argyra argyria</i> (Meigen, 1824)	•															
<i>Argyra auricollis</i> (Meigen, 1824)								•								
<i>Argyra diaphana</i> (Fabricius, 1775)		•	○	○	•											
<i>Argyra ilonae</i> Gosseries, 1988					•											
<i>Argyra leucocephala</i> (Meigen, 1824)	•	•	•													
<i>Argyra vestita</i> (Wiedemann, 1817)	•															
<i>Asyndetus latifrons</i> (Loew, 1857)	•	•														
<i>Chrysotus angulicornis</i> Kowarz, 1874					•	○	○	○	•							
<i>Chrysotus cilipes</i> Meigen, 1824	•	•														
<i>Chrysotus femoratus</i> Zetterstedt, 1843	•	•														
<i>Chrysotus gramineus</i> (Fallén, 1823)									•	•						
<i>Chrysotus hubenovi</i> sp. nov.						•										
<i>Chrysotus laesus</i> (Wiedemann, 1817)									•	•						
<i>Chrysotus monochaetus</i> Kowarz, 1874		•	•	•	•	○	○	•	•							
<i>Chrysotus neglectus</i> (Wiedemann, 1817)					•	○	○	○	•							
<i>Chrysotus obscuripes</i> Zetterstedt, 1838											•					
<i>Chrysotus palustris</i> Verrall, 1876	•															
<i>Chrysotus pennatus</i> Lichtwardt, 1902	•	•	•	•												
<i>Chrysotus polleti</i> Olejníček, 1999	•															
<i>Chrysotus pulchellus</i> Kowarz, 1874	•	○	○	○	•											
<i>Chrysotus suavis</i> Loew, 1857	•	•														
<i>Diaphorus hoffmannseggii</i> Meigen, 1830		•														
<i>Melanostolus nigricilius</i> (Loew, 1871)	•															
Subfamily DOLICHOPODINAE																
<i>Dolichopus arbustorum</i> Stannius, 1831					•											
<i>Dolichopus argyrotarsis</i> Wahlberg, 1850					•											
<i>Dolichopus beschovski</i> Negrobov et Kechev, 2010											•	•				

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Dolichopus campestris</i> Meigen, 1824					•										
<i>Dolichopus cilifemoratus</i> Macquart, 1827	•	•	•												
<i>Dolichopus claviger</i> Stannius, 1831		•													
<i>Dolichopus diadema</i> Haliday, 1832	•														
<i>Dolichopus discifer</i> Stannius, 1831		•	•	○	○	○	•	○	○	•					
<i>Dolichopus excisus</i> Loew, 1859	•	•	•												
<i>Dolichopus griseipennis</i> Stannius, 1831	•	•	•												
<i>Dolichopus latilimbatus</i> Macquart, 1827	•														
<i>Dolichopus lepidus</i> Staeger, 1842								•	•	•	•				
<i>Dolichopus linearis</i> Meigen, 1824	•														
<i>Dolichopus litorellus</i> Zetterstedt, 1852					•										
<i>Dolichopus longicornis</i> Stannius, 1831				•											
<i>Dolichopus longisetosus</i> Negrobov, 1973								•							
<i>Dolichopus longitarsis</i> Staeger, 1831							•	•							
<i>Dolichopus nitidus</i> Fallén, 1823			•	•											
<i>Dolichopus nubilus</i> Meigen, 1824	•														
<i>Dolichopus pennatus</i> Meigen, 1824							•	•	•						
<i>Dolichopus phaeopus</i> Haliday, 1851											•				
<i>Dolichopus picipes</i> Meigen, 1824								•	•						
<i>Dolichopus plumipes</i> (Scopoli, 1763)								•	•						
<i>Dolichopus popularis</i> Wiedemann, 1817								•	•						
<i>Dolichopus pyrenaicus</i> Parent, 1920											•				
<i>Dolichopus sabinus</i> Haliday, 1838	•	•													
<i>Dolichopus salictorum</i> Loew, 1871	•	•													
<i>Dolichopus siculus</i> Loew, 1859		•													
<i>Dolichopus signifer</i> Haliday, 1838	•	•													
<i>Dolichopus simplex</i> Meigen, 1824								•	•						
<i>Dolichopus strigipes</i> Verrall, 1875	•														
<i>Dolichopus trivialis</i> Haliday, 1832								•							
<i>Dolichopus ungulatus</i> (Linnaeus, 1758)					•	•	•	•	•	•	•				
<i>Ethiromyia chalybeus</i> (Wiedemann, 1817)					•										
<i>Gymnopternus aerosus</i> (Fallén, 1823)					•	•									
<i>Gymnopternus angustifrons</i> (Staeger, 1842)							•								
<i>Gymnopternus brevicornis</i> (Staeger, 1842)								•							
<i>Gymnopternus celer</i> (Meigen, 1824)		•	○	○	•										
<i>Gymnopternus metallicus</i> (Stannius, 1831)						•									
<i>Hercostomus chetifer</i> (Walker, 1849)				•											
<i>Hercostomus convergens</i> Loew, 1857	•	•													
<i>Hercostomus fugax</i> (Loew, 1857)							•	•	○	○	•	•			
<i>Hercostomus fulvicaudis</i> (Walker, 1849)	•														
<i>Hercostomus gavarniae</i> Parent, 1928				•	•	•									
<i>Hercostomus germanus</i> (Wiedemann, 1817)						•	•	•	•	•	•				
<i>Hercostomus gracilis</i> (Stannius, 1831)		•	•												
<i>Hercostomus labiatus</i> (Loew, 1871)											•				
<i>Hercostomus longioventris</i> (Loew, 1857)						•	•	•	•						
<i>Hercostomus nanus</i> (Macquart, 1827)	•														
<i>Hercostomus nigrilamellatus</i> (Macquart, 1827)	•	•	•												
<i>Hercostomus nigriplantis</i> (Stannius, 1831)	•	•	•												
<i>Hercostomus parvilamellatus</i> (Macquart, 1827)		•													
<i>Hercostomus plagiatus</i> (Loew, 1857)	•														

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Hercostomus rusticus</i> (Meigen, 1824)				•	•	•	•								
<i>Hercostomus sahlbergi</i> (Zetterstedt, 1838)				•	•	•	•								
<i>Hercostomus stroblianus</i> Becker, 1917		•													
<i>Hercostomus thraciensis</i> Kechev et Negrobov, 2015	•														
<i>Hercostomus vivax</i> (Loew, 1857)							•	•	•	•	•	•			
<i>Orthochile nigrocoerulea</i> Latreille, 1809	•														
<i>Poecilobothrus chrysozygos</i> (Wiedemann, 1817)	•	•	•	•	○	○	○	•							
<i>Poecilobothrus comitalis</i> (Kowarz, 1867)	•														
<i>Poecilobothrus ducalis</i> (Loew, 1857)		•	○	•											
<i>Poecilobothrus nobilitatus</i> (Linnaeus, 1767)	•	○	○	•	•										
<i>Poecilobothrus principalis</i> (Loew, 1861)	•														
<i>Poecilobothrus regalis</i> (Meigen, 1824)	•	•													
<i>Sybistroma crinipes</i> Staeger, 1842		•													
<i>Sybistroma discipes</i> (Germar, 1817)					•	•	•	•	•						
<i>Sybistroma impar</i> (Rondani, 1843)	•														
<i>Sybistroma nodicornis</i> Meigen, 1824	•														
<i>Sybistroma obscurellus</i> (Fallén, 1823)				•	•	•	•	•	•						
<i>Sybistroma setosa</i> (Schiner, 1862)	•														
<i>Tachytrechus consobrinus</i> (Haliday, 1851)	•	•													
<i>Tachytrechus genualis</i> Loew, 1857				•											
<i>Tachytrechus insignis</i> (Stannius, 1831)	•														
<i>Tachytrechus notatus</i> (Stannius, 1831)		•	•												
<i>Tachytrechus ripicola</i> Loew, 1857	•														
Subfamily HYDROPHORINAE															
<i>Aphrosylus fuscipennis</i> Strobl, 1909	•														
<i>Aphrosylus piscator</i> Lichtwardt, 1902	•														
<i>Aphrosylus venator</i> Loew, 1857	•														
<i>Hydrophorus balticus</i> (Meigen, 1824)	•	•	•	•	•	•	•	•	•	•	•	•	•		
<i>Hydrophorus bipunctatus</i> (Lehmann, 1822)												•			
<i>Hydrophorus praecox</i> (Lehmann, 1822)	•														
<i>Hydrophorus viridis</i> (Meigen, 1824)		•	○	•											
<i>Liancalus virens</i> (Scopoli, 1763)	•	○	•	•											
<i>Orthoceratium lacustre</i> (Scopoli, 1763)	•														
<i>Schoenophilus versutus</i> (Haliday, 1851)	•														
<i>Scellus notatus</i> (Fabricius, 1781)	•	•	•	•	•	•	•	•	•	•	•	•			
<i>Thinophilus flavipalpis</i> (Zetterstedt, 1843)	•														
<i>Thinophilus ruficornis</i> (Haliday, 1838)	•														
Subfamily MEDETERINAE															
<i>Medetera diadema</i> (Linnaeus, 1767)				•	•										
<i>Medetera flavipes</i> Meigen, 1824	•														
<i>Medetera glauca</i> Loew, 1869	•														
<i>Medetera helvetica</i> Naglis et Negrobov, 2014									•	○	•				
<i>Medetera impigra</i> Collin, 1941									•	○	•				
<i>Medetera jacula</i> (Fallén, 1823)	•	•													
<i>Medetera micacea</i> Loew, 1857	•	•													
<i>Medetera muralis</i> Meigen, 1824			•												
<i>Medetera murina</i> Becker, 1917	•														
<i>Medetera pallipes</i> (Zetterstedt, 1843)		•													
<i>Medetera petrophila</i> Kowarz, 1877	•														
<i>Medetera petrophiloides</i> Parent, 1925	•														

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Medetera perfida</i> Parent, 1932									•						
<i>Medetera pinicola</i> Kowarz, 1877								•							
<i>Medetera truncorum</i> Meigen, 1824	•														
<i>Systemus scholtzi</i> (Loew, 1850)		•													
<i>Thrypticus bellus</i> Loew, 1869				•	•	•	•								
Subfamily NEURIGONINAE															
<i>Neurigona biflexa</i> Strobl in Czerny & Strobl, 1909	•														
<i>Neurigona erichsoni</i> (Zetterstedt, 1843)		•	•	•	•	○	○	•	•						
<i>Neurigona quadrifasciata</i> (Fabricius, 1781)		•													
<i>Neurigona nubifera</i> (Loew 1869)		•													
<i>Neurigona pallida</i> (Fallén, 1823)			•												
<i>Neurigona suturalis</i> (Fallén, 1823)		•	•	•	•	•	•	•	•	•					
<i>Oncopygius distans</i> (Loew, 1857)			•	•	•	○	○	•	•						
Subfamily RHAPHIINAE															
<i>Rhaphium albifrons</i> Zetterstedt, 1843		•													
<i>Rhaphium antennatum</i> (Carlier, 1835)		•													
<i>Rhaphium appendiculatum</i> Zetterstedt, 1849	•	•	•	•											
<i>Rhaphium auctum</i> Loew, 1857		•	○	○	○	○	○	○	•						
<i>Rhaphium brevicorne</i> Curtis, 1835	•	•	•	•	•	•	•	•							
<i>Rhaphium caliginosum</i> (Meigen, 1824)	•	•	•	•	•	•	•	•							
<i>Rhaphium crassipes</i> (Meigen, 1824)							•								
<i>Rhaphium discigerum</i> Stenhammar, 1851	•														
<i>Rhaphium fascipes</i> (Meigen, 1824)		•													
<i>Rhaphium fissum</i> Loew, 1850		•													
<i>Rhaphium laticorne</i> (Fallén, 1823)		•	•												
<i>Rhaphium micans</i> (Meigen, 1824)			•												
<i>Rhaphium monotrichum</i> Loew, 1850					•	•									
<i>Rhaphium penicillatum</i> Loew, 1850		•	•												
<i>Rhaphium riparium</i> (Meigen, 1824)	•	•													
Subfamily PELOROPEODINAE															
<i>Chrysotimus flaviventris</i> (Roser, 1840)					•										
<i>Chrysotimus molliculus</i> (Fallén, 1823)	•	•	•	•	•	•									
<i>Epithalassius caucasicus</i> Becker, 1918	•														
<i>Epithalassius stackelbergi</i> Beschovski, 1966	•														
<i>Micromorphus albipes</i> (Zetterstedt, 1843)	•	•	•												
<i>Peloropeedes acuticornis</i> (Oldenberg, 1916)		•													
<i>Peloropeedes meridionalis</i> Parent, 1928	•														
<i>Vetimicrotes mediterraneus</i> (Becker, 1918)	•														
Subfamily SCIAPODINAE															
<i>Sciapus bellus</i> Loew, 1873		•													
<i>Sciapus contristans</i> (Wiedemann, 1817)	•														
<i>Sciapus costae</i> Mik, 1890			•												
<i>Sciapus flavicinctus</i> (Loew, 1857)	•														
<i>Sciapus frater</i> (Parent, 1927)	•														
<i>Sciapus glauciscens</i> (Loew, 1856)	•														
<i>Sciapus heteropygus</i> Parent, 1926		•													
<i>Sciapus longulus</i> (Fallén, 1823)	•														
<i>Sciapus maritimus</i> Becker, 1918			•												
<i>Sciapus opacus</i> (Loew, 1866)	•														
<i>Sciapus pallens</i> (Wiedemann, 1830)	•														

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Sciapus palmipes</i> Collin, 1966	•														
<i>Sciapus platypterus</i> (Fabricius, 1805)	•	•	•												
<i>Sciapus wiedemanni</i> (Fallén, 1823)	•														
Subfamily SYMPYCNINAE															
<i>Campsicnemus curvipes</i> (Fallén, 1823)	•	•	•	•	•	•	•	•	•						
<i>Campsicnemus filipes</i> Loew, 1859	•														
<i>Campsicnemus magius</i> (Loew, 1845)	•														
<i>Campsicnemus pusillus</i> (Meigen, 1824)		•													
<i>Campsicnemus scambus</i> (Fallén, 1823)	•														
<i>Campsicnemus simplicissimus</i> Strobl, 1906	•														
<i>Campsicnemus umbripennis</i> Loew, 1856	•	•	•	•	•	•	•	•	•	•	•				
<i>Campsicnemus varipes</i> Loew, 1859			•												
<i>Lamprochromus bifasciatus</i> (Macquart, 1827)		•	•												
<i>Lamprochromus kowarzi</i> Negrobov et Chalaya, 1988				•											
<i>Lamprochromus speciosus</i> (Loew, 1871)	•														
<i>Lamprochromus semiflavus</i> (Strobl, 1880)					•										
<i>Sympycnus cirripes</i> (Haliday, 1851)					•	•	•	•	•	•	•				
<i>Sympycnus pulicarius</i> (Fallén, 1823)	•	•	•	•	•	•	•	•	•	•	•				
<i>Sympycnus simplicipes</i> Becker, 1908	•	•	•												
<i>Syntormon aulicus</i> (Meigen, 1824)				•	•										
<i>Syntormon bulgariensis</i> Negrobov et Kechev, 2012										•					
<i>Syntormon denticulatum</i> (Zetterstedt, 1843)		•	•	•	•	○	○	○	•						
<i>Syntormon filiger</i> Verrall, 1912	•														
<i>Syntormon metathesis</i> (Loew, 1850)	•														
<i>Syntormon mikii</i> Strobl, 1899	•														
<i>Syntormon monile</i> (Haliday, 1851)						•	•	•							
<i>Syntormon pallipes</i> (Fabricius, 1794)	•	•	•	•	•	•	•	•							
<i>Syntormon pseudospicatum</i> Strobl, 1899				•											
<i>Syntormon pumilum</i> (Meigen, 1824)		•	•	•											
<i>Syntormon triangulipes</i> Becker, 1902	•														
<i>Telmaturgus tumidulus</i> (Raddatz, 1873)					•										
<i>Teuchophorus chaetifemoratus</i> Pollet et Kechev, 2007		•													
<i>Teuchophorus cristulatus</i> Meuffels et Grootaert, 1990	•	•													
<i>Teuchophorus medovoensis</i> Kechev, Negrobov et Grichanov, 2014		•													
<i>Teuchophorus monacanthus</i> Loew, 1859	•	•	•												
<i>Teuchophorus simplex</i> Mik, 1880		•	•	•	•										
<i>Teuchophorus spinigerellus</i> (Zetterstedt, 1843)	•	•	•												
<i>Vetimicrotes mediterraneus</i> (Becker, 1918)	•														
Subfamily XANTHOCHLORINAE															
<i>Xanthochlorus luridus</i> Negrobov, 1978		•													
<i>Xanthochlorus tenellus</i> (Wiedemann, 1817)		•	•	•	•	•	•	•	•	•	•				
↑ Total number: 210 species	Vegetation belts														
	1	2	3	4	5	6									
→ Numbers of species for each vegetation belt	148	56	49	40	3	0									

Legend. • – species presence confirmed, ○ – species presence possible but not confirmed.

Blank circles (○) are used for the following cases: a species was recorded, for example, at 200 and 800 m above the sea level (•), but was not recorded, for example, at 500–600 m (○). Blank circles (○) were not included in the calculations in Table 2 and in the text of the discussion.

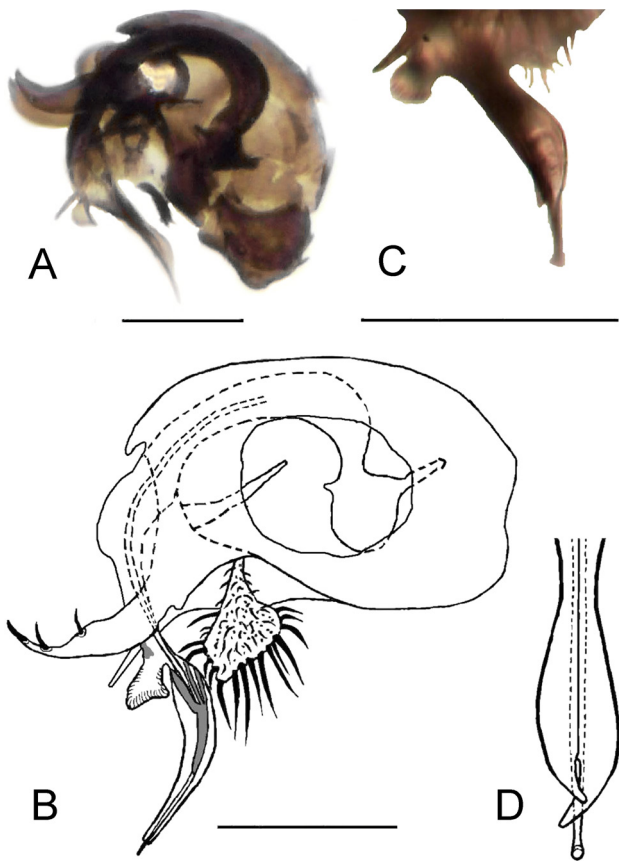


Fig. 3. *Chrysotus hubenovi* sp. nov., male. **A, B**, hypopygium, lateral view; **C**, apex of phallus, lateral view; **D**, apex of phallus, ventral view. Scale bars: 0.1 mm. Photos and drawings by M. Kechev.

Table 2. Similarity of dolichopodid species lists in different vegetation belts (Sørensen’s coefficient).

Oak-hornbeam forests	21.5%			
Beech forests	13.2%	30.4%		
Coniferous forests	10.4%	22.5%	36.8%	
Subalpine vegetation	1.3%	3.2%	7.0%	12.0%
Vegetation belts	Xerothermic oak forests	Oak-hornbeam forests	Beech forests	Coniferous forests
0–10%	10–20%	20–30%	30–40%	

length ratio (from tarsomere 5 to femur): 0.8 : 1.0 : 1.4 : 1.8 : 4.7 : 8.2 : 8.5.

Hind leg: coxa with one long black lateral seta; femur (Fig. 2F) entirely dark metallic-green with black setae; tibia yellow with one dorsal seta at base and one dorsal seta at middle; first tarsal segment yellow from base to middle, black from middle to apex; tarsal segments 2–5 black; length ratio (from tarsomere 5 to femur): 1.2 : 1.0 : 1.8 : 2.8 : 4.2 : 13.0 : 13.7.

Abdomen. Dark green, shining, covered with black setae.

Hypopygium (Fig. 3A–D): epandrium black, semiglobular; lateral epandrial lobe slightly projected, bearing three setae; surstylus with fused lobes, bearing one thick apical spine and two sub-apical ventral setae; hypandrium short, simple; phallus thick, long, with one broad lateral subapical lobe; cercus elongate-triangular, yellow, covered with long black setae.

Female. Body length 2.5 mm; wing length 2.8 mm.

Similar to male. Scape and pedicel yellow; postpedicel black, covered with white hairs; arista black. Mesonotum dark green, with slight blue reflection at apex. Coxa and trochanter black; femur dark green; tibia yellow; first tarsal segment of all legs yellow at base, black at apex; other tarsal segments black.

Comparison. Up to now, two species of *Chrysotus* with yellow antennae were known in the Palearctic, *Ch. corniger* Negrobov et Maslova, 1995 described from the Primorskiy Territory in the Russian Far East (Negrobov & Maslova, 1995) and *Ch. polleti* Olejníček, 1999 described from Bulgaria (Olejníček, 1999). *Chrysotus hubenovi* sp. nov. is similar to these species in yellow coloration of antenna and can be distinguished from them using the following key:

1. Antenna (scape, pedicel and postpedicel) entirely yellow. Dorsal surface of apical third of mid tibia covered with silvery microtrichia *Ch. polleti* – Antennal scape and pedicel yellow, postpedicel black. Dorsal surface of mid tibia without silvery microtrichia 2
2. Fore and mid femora from base to apical two-thirds dark metallic-green, with apical third yellow; phallus with one broad lateral subapical lobe (Fig. 3A, B) *Ch. hubenovi* sp. nov.

– Femora entirely yellow; phallus without lateral sub-apical lobe (Fig. 4) **Ch. corniger**

Etymology. The new species is named after the Bulgarian dipterist Zdravko Hubenov (National Museum of Natural History, Sofia, Bulgaria).

Habitat. The specimens of *Ch. hubenovi* sp. nov. were collected along the banks of a small mountain river between the beech and coniferous vegetation belts (Electronic supplementary material 1: A). Dominant trees near the river are hornbeam (*Carpinus betulus*), beech (*Fagus sylvatica*), willow (*Salix caprea*), spruce (*Picea abies*) and white pine (*Pinus sylvestris*). Dominant hygrophilous plant on the banks is butterbur (*Petasites hybridus*).

Discussion

The vertical distribution of the dolichopodid species in Bulgaria (Table 1) has the following features. Most of species (148, or 70.4% of the total number of species) have been found in the first vegetation belt, which can be explained by the larger territory of this vegetation belt (72.4%). In the second vegetation belt, oak-hornbeam forests, 56 species (26.6%) were collected; 49 species (23.3%) were found in the beech forests, 40 species (19.0%), in the belt of coniferous forests, and only three species (1.4%), in the subalpine vegetation belt. No dolichopodids were collected above 2400 m, i.e. within three highest altitudinal belts (2400–2925 m).

According to the vertical distribution in Bulgaria, the dolichopodid species can be divided into five groups distributed in different number of vegetation belts: one vegetation belt (152 species, 72.3%), two belts (33 species, 15.7%), three belts (14 species, 6.6%), four belts (eight species, 3.8%) and five vegetation belts (one species, *Hydrophorus balticus* (Meigen, 1824), 0.4%).

Table 2 presents the similarity of dolichopodid species lists in the vegetation belts according to Sørensen's similarity coefficient (Sørensen, 1948). Beech and coniferous forests show the greatest similarity (36.8%), followed by oak-hornbeam and beech forests (30.4%).

The species *Aphrosylus fuscipennis* Strobl, 1909, *A. venator* Loew, 1857, *Epithalassius caucasicus* Becker, 1918 and *E. stackelbergi* Beschovski, 1966 prefer saline habitats and so far have been

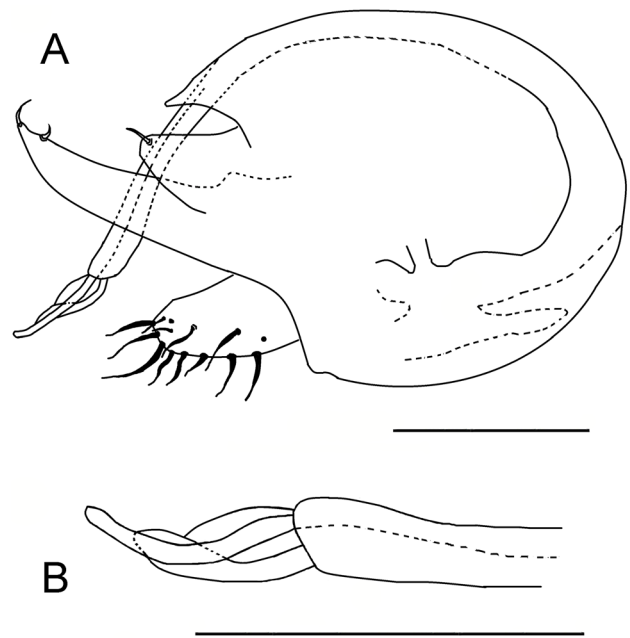


Fig. 4. *Chrysotus corniger* Negrobov et Maslova, 1995, male. **A**, hypopygium, lateral view; **B**, phallus, lateral view (modified from Negrobov & Maslova, 1995). Scale bars: 0.1 mm.

found only at the Bulgarian Black Sea coast (Beschovski, 1964, 1966, 1973, 1975), inhabiting low altitude. Other species such as *Dolichopus beschovskii* Negrobov et Kechev, 2010, *D. phaeopus* Haliday, 1851, *D. picipes* Meigen, 1824, *D. plumipes* (Scopoli, 1763), *D. popularis* Wiedemann, 1817, *D. simplex* Meigen, 1824, *D. unguilatus* (Linnaeus, 1758), *Hercostomus fugax* (Loew, 1857), and *H. vivax* (Loew, 1857) inhabit higher altitudes and are abundant in moist alpine and subalpine meadows. These are probably species of northern European and Siberian origin adapted to cooler climate, and they are therefore unlikely to be found at lower altitudes. On the other hand, *Hercostomus thraciensis* Kechev et Negrobov, 2015 described from floodplain forests near the Maritsa River at an altitude up to 200 m apparently has a Mediterranean origin and distribution. The active flying period of this species is from early April to mid-May (Kechev & Ivanova, 2015; Kechev & Negrobov, 2015). Soon after the description of the species, it was found in Turkey (Küçükberber et al., 2017) and Israel (Grichanov & Freidberg, 2018). *Hydrophorus balticus*, *Scellus notatus* (Fabricius, 1781), *Rhaphium caliginosum* (Meigen, 1824), *Campsicnemus curvipes* (Fallén, 1823), *C. umbripennis*

Loew, 1856, *Sympycnus pulicarius* (Fallén, 1823), *Syntormon pallipes* (Fabricius, 1794), and *Xanthochlorus tenellus* (Wiedemann, 1817) are eurytopic, very common species in Bulgaria and inhabit a wide range of habitats at different altitudes.

Some species, for example, *Chrysotus angulicornis* Kowarz, 1874 and *Ch. neglectus* (Wiedemann, 1817), were reported from oak-hornbeam and coniferous forests but still were not found in beech forests. In future, their occurrence can be confirmed in this vegetation belt as well.

Addenda

Electronic supplementary material 1. Collecting sites of Dolichopodidae in Bulgaria. **A**, old Roman bridge and vegetation at the bank of the Buynovska River, the West Rhodope Mountains; **B, C**, Cheirski Lakes, the West Rhodope Mountains; **D**, the Sandanska Bistritsa River in Popina Luka, the Pirin Mountains; **E**, waterfall in the Sandanska Bistritsa River in Popina Luka, the Pirin Mountains; **F**, alpine meadow in the Vitosha Mountain (A, photo by Sevdalin Belilov; B–F, photos by Mihail Kechev). File format: JPEG.

Electronic supplementary material 2. New records of Dolichopodidae from Bulgarian mountains. Pp. s42–s46. File format: PDF.

These materials are available from: <https://doi.org/10.31610/zsr/2022.31.1.27>

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