

# Forest Long-legged flies (Diptera: Dolichopodidae) from the park of the Forest Research Institute with new records for Bulgaria and notes on habitat affinity

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## Abstract

The paper gives information for 17 dolichopodid species collected from the park of the Forest Research Institute, Sofia. Two species (*Lamprochromus kowarzi* and *Syntormon pseudospicatum*) are recorded as new for the fauna of Bulgaria. Habitat preferences of the identified species are discussed. Two species dominate the study area: *Hercostomus nanus* dominates from early June to mid-July and then *Sybistroma obscurellus* dominates from mid-July to the second half of October.

## Keywords

Diptera, Dolichopodidae, Bulgaria, new records, fauna

## Introduction

The family Dolichopodidae (or long-legged flies) encompasses small- to middle- sized species (1 to 10 mm). Most of the species are predators and feed on other insects or their larvae, mites, worms, etc. The body is most often metallic green but in some species it is yellow or blue. About 8 000 different species are described worldwide. There are no known species from Antarctica. In Bulgaria 195 species are known (Kechev et al., 2020).

The **main purpose** of this work is to give information about species diversity from the investigated wooded area, including new records and notes about habitat preferences of the identified species.

## Material and Methods

The material for the current work was collected from the park of the Forest Research Institute, Bulgarian Academy of Sciences in Sofia (Fig. 1). The insects were collected by means of sweep net. The faunistic list includes the following information: species, data of collecting and number of specimens. For the determination of dolichopodids was used literature by Parent (1938), d'Assis Fonseca (1978), Grichanov (2007) and Negrobov, Stackelberg (1969). For species of *Lamprochromus* were used works by Drake (2017) and Grichanov, Ahmadi (2017). For the distribution was used literature by Negrobov (1991), Grichanov (2007, 2014) and Pollet (2011).

## Vegetation data

The taxonomic nomenclature of plant species follows mainly Delipavlov, Cheshmedzhiev (2003) and, if necessary, references are made to the synonymy of the species in The Plant List (2020). The affiliation of individual species to certain ecological groups of plants is according to Pavlov (1998, 2006) and scientific web sites Plantarium (2020) and Tela Botanica (2020). The abbreviations of the ecological groups according to the soil humidity are: Hg – hygrophytes, Hl – helophytes, Hd – hydrophytes, Mf – mesophytes, Mx – mesoxerophytes, Hm – hygromesophytes, Xe – xerophytes. The abbreviations of the ecological groups by their affiliation to sunlight are: He – heliophytes, Hp – hypoheliophytes, Sc – sciophytes, Sh – hemisciophytes. The cover abundance of the species is presented in a percentage scale (Pavlov, 2006).

## Site 1

Site 1 was located on the border between the forested and the open part of the forest park. This site hosted representatives of the hydro- and hygrophilous vegetation in the water-occupied area of the fountain and mesophilic plant species in its immediate vicinity. The data on the floristic composition and the cover abundance of the species are presented in Table 1.

The composition of the plant community at Site 1 included 16 species from 14 genera and 13 families. Most were members of the family Oleaceae – three species. Trees were represented by six species (37.6% of the species), shrubs – by three species (18.8%) and herbaceous plants – by seven species (43.8%). In terms of soil humidity affiliation, mesophytes had the largest species participation in the communities – eight species (50%), followed by xeromesophytes – four species (25%), hydrophytes – two species (12.5%), hygro- and xerophytes – one type (6.3%). The hydrophytic species *Sagittaria latifolia* had the largest cover abundance, followed by the mesophytic *Hedera helix*. Among the ecological groups of plants distributed by the sunlight factor, the heliophytes of the open

**Table 1.** Floristic composition and projective cover of the species at Site 1

Species	Family	Cover abundance	Ecological group according to the soil humidity	Ecological group according to the sunlight
Total cover abundance of the layer 1- 40%				
<i>Pterocarya stenoptera</i> C. DC.	Juglandaceae	20%	Mf	He
<i>Quercus cerris</i> L.	Fagaceae	20%	Xe	He
Total cover abundance of the layer 2- 55%				
<i>Fallopia X bohémica</i> (Chrték & Chrtková) J. P. Bailey	Polygonaceae	20%	Mf	He
<i>Prunus avium</i> (L.) L.	Rosaceae	5%	Mf	Hp
<i>Prunus cerasifera</i> Ehrh.	Rosaceae	10%	Xm	Hp
<i>Cornus sanguinea</i> L.	Cornaceae	1-5%	Xm	Hp
<i>Clematis vitalba</i> L.	Ranunculaceae	1-5%	Mf	Hp
<i>Fraxinus ornus</i> L.	Oleaceae	10%	Xm	Hp
<i>Ligustrum vulgare</i> L.	Oleaceae	1-5%	Xm	Sh
Total coverage of the layer 3- 75%				
<i>Hedera helix</i> L.	Araliaceae	25%	Mf	Sh
<i>Fraxinus pennsylvanica</i> Marshall	Oleaceae	1-5%	Mf	He
<i>Vinca minor</i> L.	Apocynaceae	10%	Mf	Hp
<i>Sagittaria latifolia</i> Willd.	Alismataceae	30%	Hd	He
<i>Phalaris arundinacea</i> L.	Poaceae	10%	Hd	He
<i>Lythrum salicaria</i> L.	Lythraceae	1%	Mf	He
<i>Carex</i> sp.	Cyperaceae	<1%	Hg	Sh

spaces predominated – seven species (43.8%) and the hypoheliophytes under the canopy of the tree floor – six (37.6%). With the greatest cover abundance was the shade-tolerant species *Hedera helix*.

## Site 2

The site was located inside the forest park on both sides of the channel. It was characterised by a high cover abundance of trees (first layer) – 85.0%. The species composition was poorer than that at Site 1 (Table 2). It consisted of six species belonging to five genera and five families, most of which participated in floors 1 and 2. The herb layer was occupied by a monodominant population of ivy. The distribution of the ecological groups according to the water regime was in favour of the mesophytes – four species (66.7%), followed by the xeromesophytes – two species (33.4%). No hygro- and hydrophytes were observed in this sample area. The distribution of the ecological groups in relation to the affinity of the species for light was dominated by hemisciophytes – three species (50.0%), followed by hypoheliophytes – two species (33.4%) and sciophytes (16.7%).

**Table 2.** Floristic composition and cover abundance of the species at Site 2

Species	Family	Cover abundance	Ecological group according to the soil humidity	Ecological group according to the sunlight
Total coverage of the layer 1- 85%				
<i>Tilia platyphyllos</i> Scop.	Tiliaceae	45%	Mf	Sc
<i>Acer pseudoplatanus</i> L.	Aceraceae	30%	Xm	Sh
<i>Mespilus germanica</i> L.	Rosaceae	10%	Mf	Hp
Total coverage of the layer 2- 55%				
<i>Cornus mas</i> L.	Cornaceae	5%	Xm	Hp
<i>Acer campestre</i> L.	Rosaceae	5%	Mf	Sh
Total coverage of the layer 3- 70%				
<i>Hedera helix</i> L.	Araliaceae	70%	Mf	Sh

## Results

### Subfamily DIAPHORINAE

#### *Argyra leucocephala* (Meigen, 1824)

**Material examined:** 18.09.2020, 2 males; 21.09.2020, 3 males, 4 females; 28.09.2020, 1 male; 02.10.2020, 1 male.

**Distribution:** Europe (Negrobov, 1991; Pollet, 2011), North Africa: Algeria, Tunisia (Grichanov, 2007).

#### *Chrysotus cilipes* Meigen, 1824

**Material examined:** 11.09.2020, 1 male, 1 female.

**Distribution:** Europe (Negrobov, 1991; Pollet, 2011), Abkhazia, Armenia, Azerbaijan, Russia: Kabardino-Balkaria, Krasnodar, Rostov; Transpalearctic species (Grichanov, 2007).

#### *Chrysotus femoratus* Zetterstedt, 1843

**Material examined:** 01.09.2020, 1 male; 11.09.2020, 1 male, 2 females.

**Distribution:** Europe (Negrobov, 1991; Pollet, 2011), North Africa: Algeria, Tunisia (Grichanov, 2007).

#### *Chrysotus gramineus* (Fallén, 1823)

**Material examined:** 18.09.2020, 1 male.

**Distribution:** Europe (Negrobov, 1991; Pollet, 2011), Armenia; Azerbaijan; Georgia; Russia: Kabardino-Balkaria; Transpalearctic species (Grichanov, 2007).

### Subfamily DOLICHOPODINAE

#### *Dolichopus griseipennis* Stannius, 1831

**Material examined:** 08.06.2020, 1 male.

**Distribution:** Europe (Negrobov, 1991; Pollet, 2011); North Africa: Algeria; Middle Asia (Grichanov, 2007).

#### *Dolichopus* sp.

**Material examined:** 17.07.2020, 2 females.

***Hercostomus nanus* (Macquart, 1827)**

Material examined: 08.06.2020, 6 males, 3 females; 15.06.2020, 11 males, 7 females; 22.06.2020, 6 males, 5 females; 29.06.2020, 4 males, 3 females; 02.07.2020, 2 males, 2 females; 06.07.2020, 2 males, 1 female.

Distribution: Europe (Negrobov, 1991; Pollet, 2011).

***Sybistroma nodicornis* Meigen, 1824**

Material examined: 08.06.2020, 1 male, 1 female; 15.06.2020, 1 male, 1 female; 29.06.2020, 1 male, 2 females.

**Distribution:** Europe (Negrobov, 1991; Pollet, 2011), Asia: Iraq; North Africa: Egypt (Grichanov, 2007).

***Sybistroma obscurellus* (Fallén, 1823)**

**Material examined:** 17.07.2020, 3 males; 06.08.2020, 2 males; 01.09.2020, 3 males; 08.09.2020, 1 male, 1 female; 11.09.2020, 4 males, 2 female; 14.09.2020, 3 males, 2 female. 28.09.2020, 2 male; 02.10.2020, 4 males, 2 females; 12.10.2020, 4 males, 1 female.

**Distribution:** Europe (Negrobov, 1991; Pollet, 2011); Russia: Adygea, Krasnodar (Grichanov, 2007).

**Subfamily RHAPHIINAE**

***Rhaphium appendiculatum* Zetterstedt, 1849**

**Material examined:** 08.09.2020, 1 male, 2 females; 21.09.2020, 1 male.

**Distribution:** Europe (Negrobov, 1991; Pollet, 2011), Abkhazia, Georgia, Russia: Alania, Krasnodar, Ural; Middle Asia: Iran, Afghanistan; North Africa: Algeria, Morocco (Grichanov, 2007).

***Rhaphium caliginosum* (Meigen, 1824)**

**Material examined:** 03.06.2020, 1 female; 08.09.2020, 1 male, 1 female; 18.09.2020, 1 male, 1 female.

**Distribution:** All Europe (Negrobov, 1991; Pollet, 2011), Algeria, Armenia, Azerbaijan, Israel, Morocco, Syria, Turkey (Grichanov, 2007); Russia: Krasnodar, Kabardino-Balkaria, Karachai-Cherkessia, Rostov, Stavropol, Ural, Baikal, Primorskii Terr.; Israel, Syria, Turkey; Algeria, Morocco (Grichanov, 2007).

**Subfamily SCIAPODINAE**

***Sciapus* sp.**

**Material examined:** 22.06.2020, 1 female.

**Subfamily SYMPYCNINAE**

***Campsicnemus curvipes* (Fallén, 1823)**

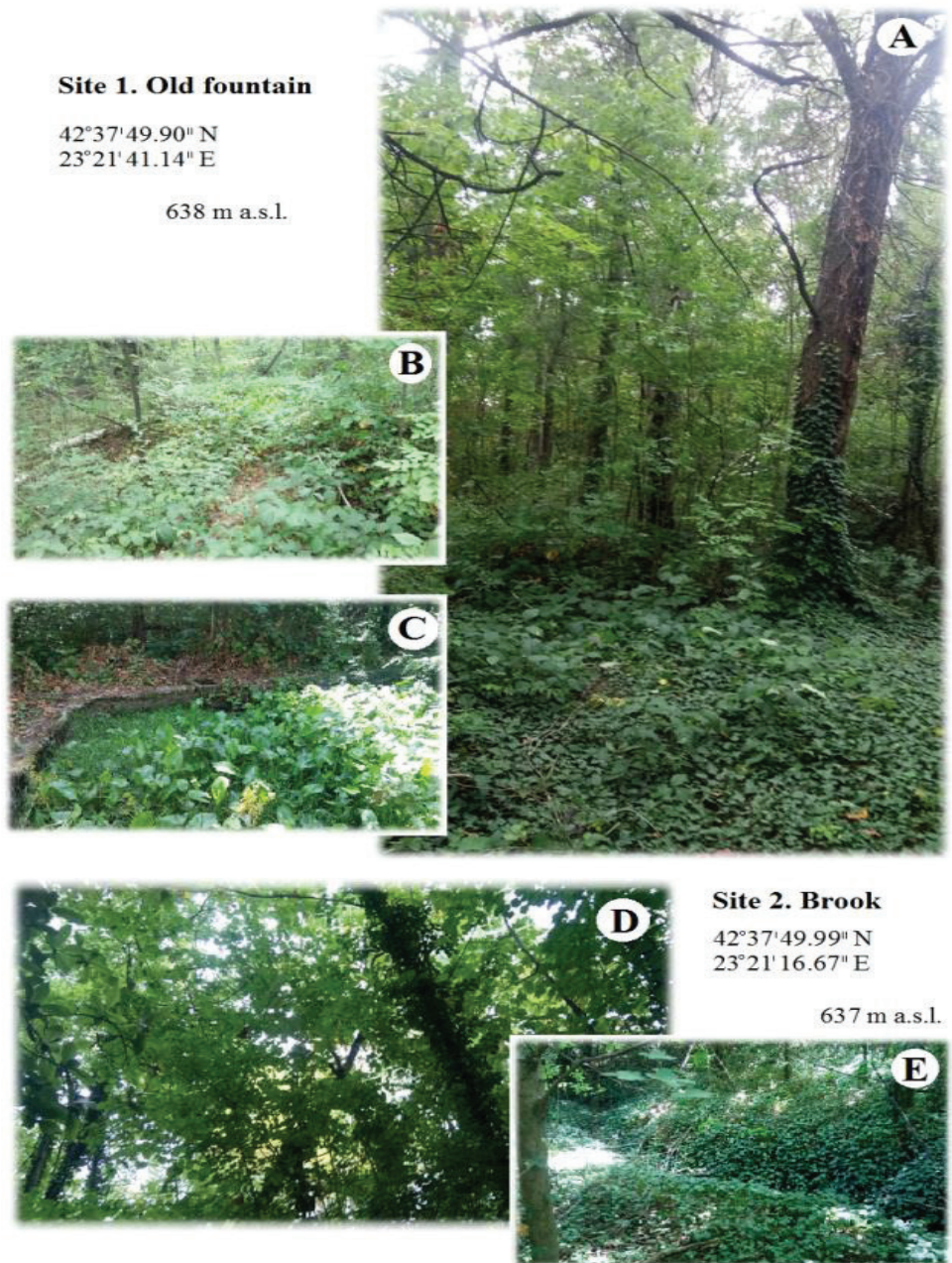
**Material examined:** 02.07.2020, 2 males; 17.07.2020, 3 males, 1 female; 14.08.2020, 1 male, 1 female; 18.08.2020, 1 male; 08.09.2020, 1 female; 02.10.2020, 1 male.

**Distribution:** All Europe (Negrobov, 1991; Pollet, 2011); Canary Islands; Algeria, Madeira, Morocco (Grichanov, 2007).

***Lamprochromus kowarzi* Negrobov et Tshalaja, 1988**

**Material examined:** 17.07.2020, 1 male.





**Figure 1.** Places of collection. A, B – trees and grasses around the old fountain; C – old fountain; D – trees above the brook; E – brook

**Distribution:** Azerbaijan, Israel, Russia (Chechnya), Slovakia (Grichanov, Ahmadi, 2017), Britain (Drake, 2017).

**Note:** First record for Bulgaria.

***Sympycnus pulicarius* (Fallén, 1823)**

**Material examined:** 03.06.2020, 1 male; 14.08.2020, 1 male; 18.08.2020, 1 male.

**Distribution:** All Europe (Negrobov, 1991; Pollet, 2011); Russia: Alania, Kabardino-Blakaria, Karachai-Cherkessia, Stavropol; Nearctic: California (Grichanov, 2007).

***Syntormon pallipes* (Fabricius, 1794)**

**Material examined:** 22.06.2020, 2 males, 1 female; 12.10.2020, 1 male.

**Distribution:** All Europe (Negrobov, 1991; Pollet, 2011); Algeria, Egypt, Iran, Iraq, Israel, Jordan, Morocco, Tunisia, Turkey; Oriental realm: China; Afrotropical: Yemen, Saudi Arabia (Dawah et al., 2020).

***Syntormon pseudospicatum* Strobl, 1899**

**Material examined:** 22.06.2020, 1 male; 11.09.2020, 1 male; 21.09.2020, 1 male, 1 female; 02.10.2020, 1 male.

**Distribution:** Britain, Greece, France and Spain (Drake, 2020).

**Note:** First record for Bulgaria.

## Discussion

*Lamprochromus kowarzi* and *Syntormon pseudospicatum* are recorded as new to the fauna of Bulgaria. *Syntormon pseudospicatum* is morphologically close to the species *S. pallipes*. It is very likely that this species has been caught before and reported as *S. pallipes*. After the comprehensive work done by Drake (2020), distinguishing between the two species becomes easier. *Syntormon pallipes* is a very eurytopic species found from numerous habitats – on riverbanks, marshes, forests, open and shady sites.

Two species could be distinguished as dominant in the studied area. *Hercostomus nanus* dominants from June to the mid of July. After that, *Sybistroma obscurellus* dominated with active period from the mid of July to October (Fig. 2).

Previously, *H. nanus* was reported from a wooded area with a small pond (called “Basha” near Chirpan) in the Upper Thracian Plain (Kechev, Ivanova, 2015). At this site (altitude 149 m a.s.l.) the active flying period of *H. nanus* is in May or one month earlier. It seems that this species dwells in forest and wooded sites with constant availability of water.

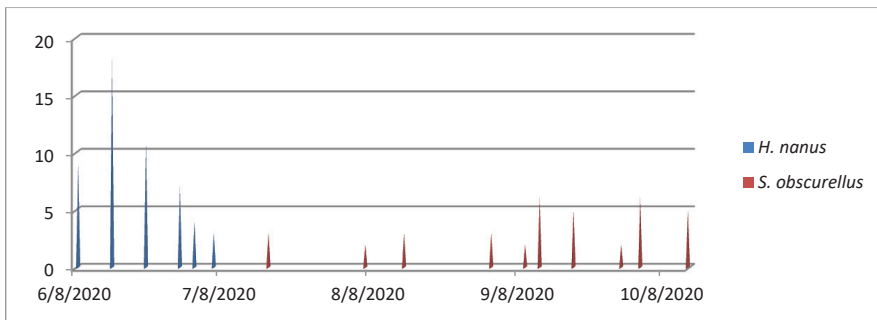
*Sybistroma obscurellus* was reported by Kechev (2007) from the banks of a river in the West Rhodopes, near the Dedovo and Hrabrino Villages, 300 – 900 m above sea level.

*Sybistroma nodicornis* is a more common species than *H. nanus* and *S. obscurellus*. It could be found along the banks of small brooks and wooded areas (Kechev, 2007, 2012, 2014; Kechev, Ivanova, 2015).

*Rhaphium caliginosum*, *Campsicnemus curvipes* and *Sympycnus pulicarius* are eurytopic, very common species in Bulgaria and could be found in a wide range of habitats

**Table 3.** Number of specimens for both collection sites by dates

Species	Date					
	08.09.2020		02.10.2020		12.10.2020	
	Site 1	Site 2	Site 1	Site 2	Site 1	Site 2
<i>Sybistroma obscurellus</i>	1	1	4	2	4	1
<i>Campsicnemus curvipes</i>	1		1			
<i>Syntormon pseudospicatum</i>				1		
<i>Syntormon pallipes</i>					1	
<i>Argyra leucocephala</i>			1			
<i>Rhaphium appendiculatum</i>	2	1				
<i>Rhaphium caliginosum</i>	1	1				



**Figure 2.** Number of specimens of *Hercostomus nanus* and *Sybistroma obscurellus* by months

as marshlands, running waters with sunny banks, wooded areas and deciduous forests. Additionally, *C. curvipes*, *S. pulicarius* and *S. pallipes* are recoded in coniferous forests.

The two habitats (Site 1 and Site 2) in the present work are located close to each other (about 10 m). Insects were collected by a uniform method with an entomological sweep net and in most cases no separation was made between the two places. Separate collections were done only three times and the results are shown on Table 3.

This is a preliminary study of the Dolichopodidae and further surveys of these places with pan traps and malaise traps will give more accurate information about their species diversity and population dynamics by months.

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