

## A checklist of Syrphidae (Diptera) from Mordovia, Russia

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### Abstract

The fauna of the family Syrphidae in Mordovia is completely unstudied and comprises about forty three species, which are known by just a few records from 2005 to 2016. In this paper, a checklist of Syrphidae in Mordovia is presented, which includes 61 species recorded in the region for the first time.

**Keywords:** *Diptera, Syrphidae, fauna, hoverfly, new record, Mordovia.*

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### Introduction

The family Syrphidae is one of the largest and widespread families of Diptera. Recent estimates indicate that there are over 6000 described species, belonging to about 200 genera. Syrphid flies can be small and large ones, 4–25 mm long and they greatly diverse in morphology and environmental requirements. Dipterous representatives of the family can have black body, but they often have yellow or golden markings, particularly on abdomen, thereby they mimic Hymenoptera species. One of the main diagnostic characters is the structure of wing venation: apex of medial vein bent strongly forward and forming apical cross vein (Vockeroth and Thompson, 1987).

Larvae of Syrphidae prefer a diverse array of habitats. For instance, immature stages of the subfamily Syrphinae are predaceous on soft-bodied arthropods, larvae of Eristalinae subfamily can be coprophagous (Milesiini), mycetophagous (some species of Rhingiini), phytophagous (most species of Merodontini and some species of Brachyopini) or aquatic filter feeders (mainly Eristalini) (Thompson and Vockeroth, 1989).

Most species of the family have economic importance. Adults of the family are significant pollinators of many plants including vegetables, fruit trees and flowering plants (Kevan and Baker, 1983).

Larvae are important predators of many pests so play important part in their biological control. Following Sommaggio (1999) it seems important to note, that syrphid flies are potentially good bioindicators.

The syrphid flies are widespread, there are cosmopolitans among them (for example, *Syrpitta pipiens* (Linnaeus, 1758), *Eristalinus aeneus* (Scopoli, 1763), *Eumerus funeralis* Meigen, 1822); some syrphids are highly migratory (*Eristalis tenax* (Linnaeus, 1758), *Sphaerophoria scripta* (Linnaeus, 1758), *Syrphus ribesii* (Linnaeus, 1758)) and can reach offshore islands. The most complete review of the geographical range, ecological amplitude, flowers visited and flight period of syrphid species was provided by Speight (2014).

There is no comprehensive revision of the family Syrphidae from Russia, but several recent studies were devoted to syrphid fauna of different regions, such as Kirov Region (Pestov *et al.*, 2010), Nizhniy Novgorod Region (Anufriev and Soshnikov, 1984), Moscow Region (Zimina, 1957, 1981, 1986), Leningrad Region (Stackelberg, 1958), Vologda Region (Belova *et al.*, 2008), South Ural (Sorokina and Chashchina, 2003; Sorokina, 2006), Sakhalin and Kuril Islands (Mutin

and Barkalov, 1997) and Komi Republic (Pestov, 2010).

The literature data on the fauna of Syrphidae family in Mordovia are not numerous. The first checklist of the Syrphidae family from this region was a summary of entomological data of Mordovia State Nature Reserve collected from 1938 to 1948, provided by Plavilshchikov (1964) and included 19 species belonging to eight genera. It is clear that they are a small part of species, which are actually presented in the Reserve.

A number of syrphid species have been noted later by Antsiferova and co-authors in 1966–1979 and Ruchin in 2007–2008. Feoktistov (2011) has provided an additional data on the syrphid fauna from the author's collection on the territory of Mordovia Nature Reserve.

This study is devoted to diversity of the syrphid flies in Mordovia, above all, in Mordovia State Nature Reserve. This paper presents new records of 61 syrphid species and provides additional information for the distribution of species, which have been recorded for the territory earlier.

### Study area

The Republic of Mordovia is located in the center of East European Plain between 42°11' and 46°45' east longitude and 53°38' and 55°11' north latitude in southwestern periphery of the Volga basin, between the rivers Moksha and Sura. Maximum length from west to east is 298 kms and from north to south it is 140 kms. The territory is located on the border of the forest and forest-steppe zones of Central Russia. The eastern part of Mordovia is located in the north-west of the Volga Upland, and the western part – in the Oka-Don lowland. In this regard, a variety of habitats is observed in the study area (Fig. 1). Boreal coniferous and mixed forests are common in the west, north-west and north of the republic. In the central and eastern parts of the area, there are broad-deciduous forests. Forest-steppe landscapes predominate in the east and southeast

(Yamashkin, 2014; Ruchin and Egorov, 2017).

Elements of steppe vegetation occur on a small number of sites unsuitable for agricultural use (on slopes of ravines, on hills and on the banks of the river valleys). However, the number of steppe areas may increase due to vegetation overgrowth on sedimentary deposits, especially near steep slopes covered by steppe formations. It is associated with a reduction of grazing impact, reflected in the overgrowth of populations of several steppe grasses. On some slopes, however, this overgrowth corresponds mainly to mesophilic grasses. These areas are usually colonized by shrubs and trees. The forest area is also increasing due to seed renewal of tree species in fallow lands, which are adjacent to forest areas.

### Data collection and analysis

The material for this study was collected from April to October during 2005 to 2016 on the territory of Mordovia State Nature Reserve (MSNR) (Republic of Mordovia, Russia) and adjacent territories by A. B. Ruchin and officers of MSNR. Different types of Diptera habitats were investigated, including secondary deciduous forest, pine forests, old-growth mixed and pine forests, flood plain oak forests, meadows, cuttings and forest borders, steppe plots, wastelands, water-meadows, meadows, dry meadows (Table 1; Fig. 2).

Collections were made by individual hand nets, and then specimens were installed on entomological pins. Specimens were identified to the species level by M. A. Chursina using relevant taxonomic literature: Stackelberg (1933, 1970), Vockeroth and Thompson (1987), Miranda *et al.* (2013).

A checklist of Syrphidae in Mordovia is given below. Some old names (synonyms and homonyms) are replaced by new names according to Fauna Europea (2000–2015). The material of recorded species is deposited in the collection of biological museum of the MSNR.

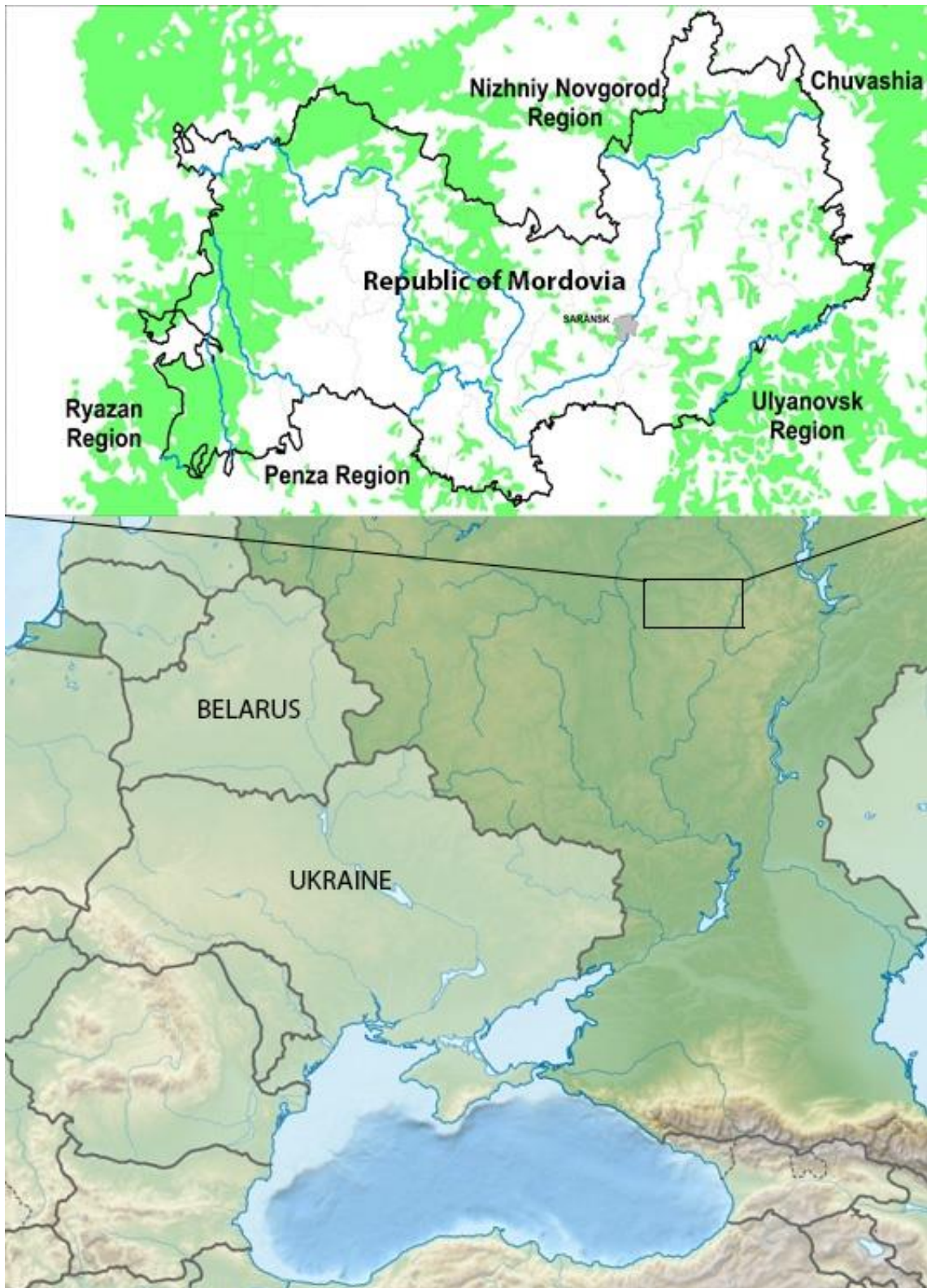


Fig. 1. Location of the Republic of Mordovia in Eastern Europe.

Table 1. List of locality visited.

S. No.	Locality	Latitude	Longitude
1.	Saransk	54° 10' 41.7" N	45° 11' 4.0" E
2.	Ardatov Dist., village KrasnyePoljany	54° 55' 46.1" N	46° 17' 46.4" E
3.	Atyuryevo Dist., village MordovskayaKozlovka	54° 27' 45.6" N	43° 18' 37.5" E
4.	Ardatovo Dist., railway station Svetotehnika	54° 47' 8.7" N	46° 20' 23.6" E
5.	Bolshie Berezniki Dist., village Gart	54° 8' 41.5" N	45° 38' 19.6" E
6.	Bolshie Berezniki Dist., village Permisi	54° 5' 45.3" N	45° 49' 40.5" E
7.	Bolshie Berezniki Dist., village Nerley	54° 4' 41.9" N	45° 42' 14.5" E
8.	Bolshie Berezniki Dist., village Degilevka	54° 9' 26.1" N	45° 40' 47.7" E
9.	Bolshie Berezniki Dist., 9 km S village Simkino	54° 15' 16.5" N	46° 10' 22.0" E
10.	BolshoeIgnatovo Dist., 4 km S village Barahmany	54° 53' 47.6" N	45° 35' 43.2" E
11.	Dubenki Dist., 8 km S village Engalychevo	54° 18' 55.1" N	46° 22' 19.7" E
12.	ElnikiDist, village NovieShali	54° 42' 14.8" N	43° 37' 52.9" E
13.	Elniki Dist., village MalyeMordovskiePoshaty	54° 41' 2.5" N	43° 43' 9.5" E
14.	ZubovoPolyana Dist., village Tenishevo	54° 24' 27.7" N	42° 41' 45.2" E
15.	ZubovoPolyana Dist., village Lesnoy	54° 27' 36.7" N	42° 42' 36.7" E
16.	ZubovoPolyana Dist., settlem. Yavas	54° 25' 1.9" N	42° 50' 41.0" E
17.	Ichalki Dist., 2 km NW village Hanineevka	54° 21' 29.9" N	45° 8' 49.2" E
18.	Ichalki Dist., Kemljanskoe forestry, settlem. Smolny	54° 50' 4.4" N	45° 22' 42.5" E
19.	Ichalki Dist., Barakhmanovskoe forestry	54° 44' 28.7" N	45° 34' 57.2" E
22.	Kochkurovo Dist., village Sabaevo	53° 59' 35.5" N	45° 43' 23.8" E
21.	Kochkurovo Dist., village StaryeTurdaki	53° 54' 49.9" N	45° 28' 30.5" E
22.	KrasnoslobodskDist, Krasnoslobodsk	54° 25' 44.8" N	43° 47' 35.1" E
23.	KrasnoslobodskDist, village Sinjakovo	54° 25' 40.8" N	43° 40' 57.1" E
24.	Lyambir Dist., village Atemar	54° 11' 3.1" N	45° 23' 51.0" E
25.	Lyambir Dist., village Ekaterinovka	54° 9' 1.9" N	45° 33' 1.5" E
26.	Ruzaevka Dist., 3 km N village StreleckajaSloboda	54° 11' 54.6" N	44° 42' 16.4" E
27.	StaroeShaygovoDist, village StaroeAkshino	54° 17' 27.2" N	44° 42' 55.8" E
28.	StaroeShaygovo Dist., village Govorovo	54° 27' 36" N	44° 50' 17" E
29.	StaroeShaygovo Dist., village Lesnichestvo	54° 18' 22.9" N	44° 28' 16.6" E
30.	StaroeShaygovo Dist., village Konopat	54° 21' 09" N	44° 53' 49" E
31.	Temnikov Dist., village Veseliy	54° 32' 52.5" N	43° 0' 58.2" E
32.	Temnikov Dist., village Lavrentevo	54° 29' 27.0" N	43° 2' 54.9" E
33.	Temnikov Dist., MSNR, village Pushta	54°43'07.1" N	43°13'32.2" E
34.	Temnikov Dist., MSNR, 6 km NW village Pushta	54°44'15.3" N	43°08'53.2" E
35.	Temnikov Dist., MSNR, 5 km N village Pushta	54°44'52.0" N	43°12'04.2" E
36.	Temnikov Dist., MSNR, cordon Polyanski	54°46'36.5" N	43°28'47.1" E
37.	Temnikov Dist., MSNR, cordon Podrubnyj	54°47'51.5" N	43°08'48.4" E
38.	Temnikov Dist., MSNR, cordon Plotomoyka	54° 49' 53.2" N	43° 8' 17.0" E
39.	Temnikov Dist., Temnikov	54° 37' 53.9" N	43° 13' 0.5" E
40.	Temnikov Dist., MSNR, cordon Noven'kovskij	54°55'50.2" N	43°25'18.1" E
41.	Temnikov Dist., MSNR, cordon Taratinski	54°44'50.6" N	43°05'09.1" E
42.	Temnikov Dist., MSNR, cordon SrednjaMel'nica	54°54'09.4" N	43°13'53.5" E
43.	Temnikov Dist., MSNR, cordon Steklyanny, zone 86	54°53'38.1" N	43°35'59.4" E
44.	Temnikov Dist., village Tarhany	54° 32' 20.0" N	43° 24' 34.3" E
45.	Temnikov Dist., village Tretjakovo	54° 31' 59.4" N	43° 12' 54.1" E
46.	Temnikov Dist., MSNR, zone 35	54°53'27.3" N	43°11'20.5" E
47.	Temnikov Dist., MSNR, zone 79	54°53'38.1" N	43°34'57.7" E
48.	Temnikov Dist., MSNR, zone 274	54°47'45.4" N	43°10'28.5" E
49.	Temnikov Dist., MSNR, zone 278	54°47'51.4" N	43°12'27.1" E
50.	Temnikov Dist., MSNR, zone 342	54°47'06.3" N	43°19'40.0" E
51.	Temnikov Dist., MSNR, zone 345	54°47'07.1" N	43°19'41.3" E
52.	Temnikov Dist., MSNR, zone 360	54°46'11.2" N	43°13'43.4" E
53.	Temnikov Dist., MSNR, zone 364	54°46'24.2" N	43°17'45.8" E
54.	Temnikov Dist., MSNR, zone 368	54°46'37.5" N	43°21'45.1" E
55.	Temnikov Dist., MSNR, zone 381	54°45'24.0" N	43°09'50.5" E
56.	Temnikov Dist., MSNR, zone 384	54°45'33.1" N	43°12'44.5" E
57.	Temnikov Dist., MSNR, zone 385	54°45'36.4" N	43°13'48.7" E
58.	Temnikov Dist., MSNR, zone 389	54°45'50.0" N	43°17'50.5" E
59.	Temnikov Dist., MSNR, zone 397	54°46'21.3" N	43°23'47.6" E
60.	Temnikov Dist., MSNR, zone 398	54°46'22.1" N	43°25'48.3" E

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61.	Temnikov Dist., MSNR, zone 404	54°44'43.3" N	43°07'56.8" E
62.	Temnikov Dist., MSNR, zone 417	54°45'23.5" N	43°20'56.3" E
63.	Temnikov Dist., MSNR, zone 420	54°45'10.7" N	43°24'05.5" E
64.	Temnikov Dist., MSNR, zone 427	54°42'25.3" N	43°24'11.5" E
65.	Temnikov Dist., MSNR, zone 430	54°44'34.1" N	43°16'00.3" E
66.	Temnikov Dist., MSNR, zone 434	54°51'46.3" N	43°09'02.2" E
67.	Temnikov Dist., MSNR, zone 435	54°43'26.4" N	43°08'09.7" E
68.	Temnikov Dist., MSNR, zone 440	54°43'50.3" N	43°13'05.0" E
69.	Temnikov Dist., MSNR, zone 442	54°43'56.5" N	43°15'02.1" E
70.	Temnikov Dist., MSNR, zone 446	54°43'32.1" N	43°08'32.8" E
71.	Temnikov Dist., MSNR, zone 447	54°41'42.3" N	43°22'12.4" E
72.	Temnikov Dist., MSNR, zone 448	54°42'42.3" N	43°12'12.1" E
73.	Tengushevo Dist., village Hlebino	54° 37' 54.9" N	42° 49' 29.6" E
74.	Tengushevo Dist., 6 km NW village Barashevo	54° 32' 7.4" N	42° 52' 34.7" E
75.	Tengushevo Dist., village Klemeshhej	54° 35' 10.7" N	42° 51' 39.0" E
76.	Tengushevo Dist., village Dachniy	54° 33' 21.2" N	42° 38' 2.1" E
77.	Torbeevo Dist., village Surgod	54° 02' 42" N	43° 05' 59" E
78.	Torbeevo Dist., village Drakino	54° 03' 05" N	43° 15' 58" E
79.	Torbeevo Dist., village Varzhelja	54° 11' 12.3" N	43° 7' 15.8" E
80.	Torbeevo Dist., village Vindrey	54° 15' 25.9" N	42° 59' 12.8" E
81.	Ruzaevka Dist., village Levzhensky	54° 6' 32.7" N	45° 4' 22.8" E
82.	Ruzaevka Dist., station Paygarm	54° 4' 36.4" N	44° 50' 22.4" E
83.	Chamzinka Dist., village Komsomolskij	54° 26' 28.1" N	45° 50' 2.3" E
84.	Chamzinka Dist., village Gorbunovka	54° 24' 22" N	45° 46' 34" E
85.	Atjashevo Dist., village Atjashevo	54° 35' 23" N	45° 06' 04" E
86.	Ichalki Dist., village Selishhi	54° 44' 23" N	45° 38' 36" E





**Fig. 2.** The biotopes of Republic of Mordovia: **A** – Ardatovo District, environs of railway station Svetotehnika, the border of deciduous forest; **B** – Bolshie Berezniki District, environs of vill. Gart, steppefied slope with outcrop of carbonates; **C** – Ruzaevka District, environs of vill. Levzhensky, steppe land with a feather-grass; **D** – Ichalki District, Smolny, Barakhmanovskoe forestry water-meadow; **E** – Temnikov District, MSNR, 5 km toward the north from vill. Pushta, zone 408, pine forest; **F** – ZubovoPolyana District, toward southwest from vill. Pusha, swamp with cotton-grass.

### Material examined

This paper presents records for 103 syrphid species in Mordovia belonging to 44 genera. Sixty-one species are recorded for the first time from the region and are marked with “\*”.

**\*Anasimyia lineata (Fabricius, 1787)**

*Material.* 1♀: **6** (12.vi.2012).

*Distribution.* From central and southern Norway through central Europe to the Pacific coast.

**\*Blera fallax (Linnaeus, 1953)**

*Material.* 1♂: **33** (30.v.2008); 1♀: **57** (27.v.2016). (Fig. 3).

*Distribution.* From central and southern Norway through central Europe to the Pacific coast.

**\*Brachypalpoides lentus (Meigen, 1822)**

*Material.* 2♀♀: **21** (12.vi.2008); 1♂: **24** (29.v.2008); 1♂: **82** (11.iv.2006).

*Distribution.* From Ireland through central Europe into European parts of Russia; from southern Europe eastwards to the former Yugoslavia and Greece and further into Syria.

**\*Callicera aenea (Fabricius, 1781)**

*Material.* 2♂♂: **25** (29.v.2008); 1♂: **35** (19.v.2013).

*Distribution.* Norway, Sweden, Poland, Czech Republic, France, Germany, European part of Russia: to the south to the Crimea and to the east till Siberia and Sakhalin.

**Ceriana conopsoides (Linnaeus, 1758)**

*Material.* 1♂: **36** (24.vii.2015); 1♀: **63** (25.v.2015).

*Distribution.* From Finland to the Mediterranean and North Africa, Central Europe, Asian part of Russia to the Pacific Ocean, China.

**Chalcosyrphus nemorum (Fabricius, 1805)**

*Material.* 1♂: **61** (26.v.2016).

*Distribution.* From Fennoscandia to the Pyrenees; from Ireland through much of Europe to Russia and on to the Pacific coast; from Alaska to Nova Scotia and south to California.

**\*Chalcosyrphus nitidus (Portschinsky, 1879)**

*Material.* 1♂: **54** (7.vi.2015).

*Distribution.* Russia, Ukraine, Northern China.

**Chalcosyrphus piger (Fabricius, 1794)**

*Material.* 1♂: **50** (25.v.2015); 1♂, 1♀: **65** (9.v.2013, 23.vi.2013); 1♂: **71** (26.v.2015).

*Distribution.* From Northern France through Central Europe to Asian part of Russia.

**Chalcosyrphus valgus (Gmelin, 1790)**

*Material.* 1♂: **7** (5.vi.2016); 1♂: **25** (29.v.2008); 1♀, 1♂: **33** (30.v.2008); 1♂: **34** (21.v.2016); 1♂: **36** (18.v.2014); 1♂: **37** (15.v.2016); 1♀: **39** (1.vi.2008); 2♂♂: **50** (25.v.2015, 31.v.2015); 1♀: **51** (31.v.2015); 1♀: **65** (12.vi.2008).

*Distribution.* Scandinavia, central and southern Europe, Asian part of Russia, China.

**\*Cheilosia albipila (Meigen, 1838)**

*Material.* 2♀♀: **34** (27.iv.2014); 1♂: **38** (20.v.2005).

*Distribution.* From Ireland to central Siberia.

**Cheilosia albitarsis (Meigen, 1822)**

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*Material.* 1♂, 1♀: **18** (21.v.2008); 1♂: **25** (2.vi.2009); 1♀: **61** (26.v.2016).

*Distribution.* Whole Palearctic except the Far North.

**\*Cheilosia brunnipennis (Becker, 1894)**

*Material.* 1♂, 1♀: **24** (7.v.2016).

*Distribution.* From France to the south of Russia, Israel, North Africa.

**\*Cheilosia chrysocoma (Meigen, 1822)**

*Material.* 1♂: **34** (10.v.2013); 1♀: **36** (18.v.2014).

*Distribution.* Scandinavia, the north of Spain, Italy, Bulgaria, East Ireland, Central Europe, European part of Russia and Siberia.

**\*Cheilosia flavipes (Panzer, 1798)**

*Material.* 1♀: **18** (21.v.2008); 1♀: **31** (25.v.2013); 1♀: **35** (16.v.2015); 1♀: **83** (14.vii.2008).

*Distribution.* From Sweden and Finland to Western Siberia.

**\*Cheilosia grossa (Fallen, 1817)**

*Material.* 1♂: **1** (7.iv.2008); 1♂: **19** (09.iv.2008).

*Distribution.* Fennoscandia, central and southern Europe, Asian part of Russia (Siberia), this species was recorded in the eastern region (India) and Africa (Morocco).

**\*Cheilosia illustrata (Harris, 1780)**

*Material.* 1♀, 1♂: **19** (20.vii.2007); 1♀: **29** (17.vii.2009); 1♀: **34** (25.vii.2009); 1♀: **65** (13.vi.2016).

*Distribution.* From Fennoscandia, Spain and Italy to Western Siberia.

**\*Cheilosia impressa (Loew, 1840)**

*Material.* 2♂♂, 2♀♀: **63** (13.vi.2016); 1♀: **65** (12.vi.2016).

*Distribution.* From Ireland to the east through central Europe to European parts of Russia and across Siberia to the Pacific.

**\*Cheilosia lasiopa (Kowarz, 1885)**

*Material.* 1♂: **19** (26.iv.2008).

*Distribution.* From the Great Britain through Central Europe to European part of Russia.

**\*Cheilosia laticornis Rondani, 1857**

*Material.* 1♀: **49** (14.v.2016).

*Distribution.* Southern Sweden, Netherlands, Poland, Czech Republic, southern Germany, France, Switzerland, Austria, Italy, Balkans, Romania, southern Russia and Ukraine on to the

Transcaucasus and Kirghizistan; Afghanistan; Turkey, Israel and North Africa.

**\*Cheilosia latifrons (Zetterstedt, 1843)**

*Material.* 1♀: **67** (21.iv.2016).

*Distribution.* From Ireland through Central and Southern Europe to Western Siberia.

**\*Cheilosia morio (Zetterstedt, 1838)**

*Material.* 1♀: **22** (5.vi.2009); 1♀: **35** (19.v.2013).

*Distribution.* From northern Scandinavia to northern Germany and Poland, to the east through central Europe to western Siberia and Mongolia.

**Cheilosia mutabilis (Fallen, 1817)**

*Material.* 1♀: **58** (11.vi.2016).

*Distribution.* From the Great Britain, in most of Europe to western Siberia.

**\*Cheilosia pagana (Meigen, 1822)**

*Material.* 1♂: **12** (26.v.2013); 1♂, 1♀: **27** (11.v.2008); 1♂: **29** (26.iv.2008); 1♀: **31** (25.v.2013); 1♂: **34** (11.v.2016).

*Distribution.* From Fennoscandia, Spain and Italy to western Siberia.

**\*Cheilosia scutellata (Fallen, 1817)**

*Material.* 1♀: **47** (23.viii.2016); 1♀: **65** (12.vi.2016).

*Distribution.* From Fennoscandia to Iberia and round the Mediterranean to Greece, Turkey and north Africa; from Ireland eastwards through Eurasia to the Pacific coast.

**\*Cheilosia velutina Loew, 1840**

*Material.* 1♂: **34** (9.v.2009).

*Distribution.* From Ireland through much of Europe into Russia and on through Siberia to the Pacific coast.

**\*Chrysogaster simplex Loew, 1843**

*Material.* 1♀: **1** (21.iv.2008); 1♀: **3** (29.vi.2013); 1♀: **18** (24.vi.2008).

*Distribution.* Greece, Romania, Turkey.

**\*Chrysogaster solstitialis (Fallen, 1817)**

*Material.* 1♀: **61** (23.iv.2016); 1♂: **65** (12.iv.2016); 1♂: **77** (21.vi.2016).

*Distribution.* From Fennoscandia south to the Mediterranean; north Africa; from Ireland eastwards through much of Europe into European parts of Russia; Ukraine; the Caucasus.

**Chrysotoxum bicinctum (Linnaeus, 1758)**

*Material.* 1♀: **5** (19.viii.2008); 1♂: **18** (30.vi.2008); 1♂: **21** (8.vii.2008); 1♀: **34** (17.viii.2013).

*Distribution.* From Fennoscandia to the Mediterranean and Africa, through the central and southern Europe (Italy, Bulgaria), Turkey and European part of Russia to central Siberia.

***Chrysotoxum festivum* (Linnaeus, 1758)**

*Material.* 3♀♀: **1** (9.viii.2008); 1♀: **3** (8.vi.2013); 2♂♂: **6** (5-12.vi.2015); 1♂: **7** (5.vi.2016); 1♂, 1♀: **9** (30.vi.2009); 1♂: **12** (26.v.2013); 1♀, 1♂: **13** (31.v.2014); 1♂: **17** (12.vi.2009); 5♂♂, 1♀: **18** (5-28.vi.2008); 1♀: **19** (6.ix.2009); 1♂, 2♀♀: **21** (12.vi.2008); 1♂, 1♀: **25** (29.v.2008); 1♂: **31** (6.vi.2015); 1♀: **32** (6.vii.2013); 4♂♂: **33** (30.v.2008); 4♂♂: **34** (12.vii.2008, 8-12.vi.2014); 1♀: **39** (1.vi.2008); 1♂, 1♀: **51** (31.v.2015); 1♂, 2♀♀: **54** (7.vi.2015, 24.viii.2014); 1♂: **57** (27.v.2016); 1♂, 2♀♀: **60** (7.vi.2015); 1♂: **62** (03.vi.2016); 2♀♀, 1♂: **63** (7.vi.2015); 1♀: **64** (16.vi.2014); 2♂♂: **65** (23.vi.2013, 2.vi.2016); 2♂♂, 2♀♀: **66** (5.vi.2015); 1♂, 1♀: **68** (10.vi.2016); 1♀: **70** (26.v.2016); 1♀: **77** (26.vii.2016); 1♀: **78** (18.viii.2016); 2♀♀, 1♂: **81** (13-28.vi.2015); 1♂: **83** (15.vi.2008).

*Distribution.* From Fennoscandia to the south to Mediterranean and Africa, from Ireland to east Europe and Turkey and European part of Russia, through Siberia to the shores of the Pacific, Japan, North India.

**\**Chrysotoxum octomaculatum* Curtis, 1831**

*Material.* 1♀: **14** (2.viii.2015); 1♂: **40** (29.vi.2016).

*Distribution.* From England and Netherlands to the south to the Mediterranean Sea, to the east through central and southern Europe and southern Russia, to Armenia and Kazakhstan.

**\**Chrysotoxum verralii* Collin, 1940**

*Material.* 1♂: **66** (31.v.2015).

*Distribution.* From England to the east through most of Europe and Asia, almost to the Pacific Ocean; Iran.

***Criorhina asilica* (Fallen, 1816)**

*Material.* 1♀: **4** (18.v.2008); 1♀: **31** (25.v.2013); 1♂: **33** (30.v.2008); 1♂: **53** (11.vi.2016); 1♂, 1♀: **60** (31.v.2015); 2♂♂, 2♀♀: **67** (21.v.2016, 13.vi.2016); 1♂: **72** (19.v.2016).

*Distribution.* Central and southern Norway, Sweden, Spain, Great Britain, to the east through Central Europe, European part of Russia, Ukraine, Bulgaria, Romania.

***Criorhina ranunculi* (Panzer, 1804)**

*Material.* 1♂: **26** (19.v.2009); 1♂: **33** (3.v.2008); 1♂: **39** (11.iv.2008); 1♂: **65** (6.v.2015).

*Distribution.* From southern Norway and southern Sweden to the south, through central Europe in European part of Russia.

**\**Dasysyrphus tricinctus* (Fallen, 1817)**

*Material.* 1♂: **27** (16.viii.2008); 2♂♂: **33** (11.iv.2008, 27.vii.2015); 1♂, 1♀: **55** (24-26.v.2016); 1♀: **59** (17.viii.2014).

*Distribution.* From Iceland to the Pyrenees, from Ireland and Fennoscandia towards the east to central and northern Europe and Russia, to the shores of the Pacific and Japan.

***Dasysyrphus venustus* (Meigen, 1822)**

*Material.* 1♂: **2** (20.v.2008); 2♀♀: **7** (12.vi.2008); 1♂: **13** (23.vii.2016); 1♂, 1♀: **25** (2.vi.2009); 1♀: **26** (19.v.2009); 1♀: **27** (11.v.2008); 1♀: **31** (6.vi.2015); 1♀: **33** (30.v.2008); 1♀: **39** (1.vi.2008); 1♀: **42** (18.vi.2016); 1♂: **46** (29.v.2016); 2♀♀: **55** (26.v.2016); 1♀: **63** (25.v.2010); 1♀: **69** (2.vi.2016); 2♂♂, 1♀: **71** (26.v.2015); 1♀: **79** (7.vi.2008).

*Distribution.* From Fennoscandia to the south to the Pyrenees, from Ireland to the east through northern, central and mountain regions of southern Europe, European part of Russia, Siberia and the Urals to the Pacific coast (the Kuril Islands); North America from Alaska to Quebec and south to Oregon.

**\**Didea intermedia* (Loew, 1854)**

*Material.* 1♂: **18** (21.vi.2008); 1♀: **31** (6.vi.2015); 1♀: **34** (12.vii.2008); 1♂: **35** (10.vi.2012); 1♀: **40** (13.vii.2014); 1♀: **50** (22.viii.2015); 1♀: **60** (07.vi.2015); 1♀: **71** (26.v.2015); 1♀: **81** (9.vi.2009).

*Distribution.* From Fennoscandia towards south through the central and southern Europe, in Russia to the Pacific coast (Kamchatka).

**\**Epistrophe diaphana* (Gravenhorst, 1807)**

*Material.* 1♀: **7** (27.viii.2016); 1♀: **8** (12.vi.2015); 1♀: **54** (4.vii.2015).

*Distribution.* From Britain through central and southern Europe into Russia and on through Asia to the Pacific coast.

***Epistrophe grossulariae* (Meigen, 1822)**

*Material.* 2♀♀: **23** (19.vii.2014); 1♀: **33** (19.v.2016); 1♂, 1♀: **34** (19.v.2013, 12.vii.2008); 1♀: **38** (3.viii.2014); 1♀: **45** (17.v.2014); 1♂: **46** (18.vi.2016); 1♂: **54** (7.vi.2015); 1♀: **63** (13.vi.2016); 1♀: **71**



(26.v.2015); 2♀♀: **74** (30.vi.2013); 1♀: **77** (21.vi.2016).

*Distribution.* From Ireland eastwards through Eurasia to Kamchatka; Italy; North America from Alaska to Quebec and south to California.

***Episyrphus balteatus* (De Geer, 1776)**

*Material.* 1♂: **17** (23.vii.2008); 1♂: **28** (24.vi.2008).

*Distribution.* From Fennoscandia to the Mediterranean; Canary Islands, the Azores and North Africa; Ireland across Eurasia to the Pacific coast, south to Sri Lanka; Australia.

***Eristalinus aeneus* (Scopoli, 1763).**

*Material.* 1♀: **9** (30.vi.2015); 1♀: **14** (2.viii.2015); 1♀: **34** (1.viii.2015); 1♀: **72** (19.v.2016).

*Distribution.* Cosmopolitan.

***Eristalis abusiva* Collin, 1931**

*Material.* 1♀: **16** (5.viii.2013); 1♀: **28** (10.vii.2016).

*Distribution.* Fennoscandia, toward the south to north France; from east Ireland through northern and central Europe to Russia and then through Siberia to the Pacific coast.

**\**Eristalis alpine* Strobl, 1893**

*Material.* 1♀: **18** (17.vi.2008).

*Distribution.* From Denmark, the Netherlands and Belgium to the east through mountainous part of Central and Southern Europe to European part of Russia and Turkey, through Siberia to the Pacific coast; Mongolia.

**\**Eristalis anthophorina* (Fallen, 1817)**

*Material.* 1♂: **24** (7.v.2016); 1♂: **61** (1.vii.2016).

*Distribution.* From Denmark and the Netherlands eastwards through central Europe to the Pacific coast and Japan, Mongolia.

***Eristalis arbustorum* (Linnaeus, 1758)**

*Material.* 1♂: **12** (23.vii.2016); 1♂: **18** (24.vi.2008); 1♂: **28** (10.vii.2016); 1♂, 1♀: **30** (09.vii.2016); 1♀: **34** (25.vii.2009); 1♀: **77** (26.vii.2016); 2♂♂: **81** (9-13.vi.2015); 2♀♀: **82** (24.vi.2016); 1♂, 1♀: **84** (24.vi.2016); 1♂: **85** (30.vii.2016); 1♂: **86** (24.vi.2016).

*Distribution.* Whole Palearctic, including north Africa; North America; to north of India.

**\**Eristalis cryptarum* (Fabricius, 1794)**

*Material.* 1♀: **34** (21.v.2016). (Fig. 4)

*Distribution.* From Ireland through central Europe to central Siberia.

***Eristalis horticola* (De Geer, 1776)**

*Material.* 1♂: **11** (1.vii.2009); 1♂: **18** (21.vi.2008); 1♂: **34** (11.v.2015); 1♀: **37** (15.v.2016).

*Distribution.* From Fennoscandia toward south to North Africa; from Ireland toward east in most of Europe and Russia to the Pacific coast.

***Eristalis interrupta* (Poda, 1761)**

*Material.* 2♀♀: **1** (9.viii.2008, 26.ix.2009); 1♀: **3** (29.vi.2013); 1♀: **5** (19.vii.2008); 2♂♂: **12** (26.v.2013); 1♀: **14** (2.viii.2015); 1♂, 1♀: **22** (3.ix.2009); 1♀: **23** (19.vii.2014); 1♂: **24** (7.v.2016); 1♂: **26** (19.v.2009); 1♂: (10.viii.2014); 1♀: **30** (09.vii.2016); 2♂♂, 3♀: **34** (25.vii.2009, 17.viii.2013); 1♂: **40** (13.vii.2014); 1♂: **41** (16.viii.2015); 1♂: **46** (29.v.2016); 1♀: **76** (7.vi.2014); 1♀: **78** (18.viii.2016); 1♂, 2♀♀: **81** (9.vi.2009, 22.viii.2008).

*Distribution.* From northern Fennoscandia to the south, from Ireland to east through Central Europe to Turkey and Asia, to Siberia; Japan and North America.

**\**Eristalis intricaria* (Linnaeus, 1758)**

*Material.* 1♂: **35** (10.v.2016); 1♀: **78** (18.viii.2016); 1♀: **81** (1.v.2001).

*Distribution.* From Ireland through northern and central Europe to eastern Siberia.

***Eristalis rupium* Fabricius, 1805**

*Material.* 1♀: **3** (29.vi.2013); 2♀♀: **15** (2.viii.2015); 1♀: **18** (24.vi.2008); 5♀♀: **34** (9.v.2009, 12.vi.2012, 25.vii.2009); 2♂♂, 2♀♀: **35** (10.v.2014); 1♀: **37** (15.v.2016); 1♀: **54** (28.viii.2014); 1♀, 2♂♂: **63** (11-25.v.2015); 1♀: **65** (21.vii.2012).

*Distribution.* From Fennoscandia towards south to the Pyrenees and northern Spain; from Great Britain to the east through central Europe and Turkey, through Siberia; North America.

***Eristalis tenax* (Linnaeus, 1758)**

*Material.* 1♀, 2♂♂: **1** (21-27.viii.2009); 1♀: **3** (29.vi.2013); 2♀: **6** (27.viii.2016); 1♂: **7** (27.viii.201); 2♂♂: **12** (23.vii.2016); 1♂: **15** (2.viii.2015); 1♂: **18** (22.ix.2008); 1♀: **25** (27.viii.2016); 1♂: **28** (10.vii.2016); 1♂, 1♀: **30** (09.vii.2016); 1♀: **33** (6.ix.2014); 1♂, 2♀♀: **44** (22.vi.2013); 1♂: **50** (18.vii.2015); 1♂: **64** (10.viii.2015); 1♂: **86** (11.viii.2013); 1♂: **75** (18.vii.2015); 1♂, 3♀♀: **81** (28.vii.2016); 1♀: **84** (24.vi.2016).

*Distribution.* Cosmopolitan, distributed in all regions except the Far North.

***Eupeodes corolla* (Fabricius, 1794)**

*Material.* 1♀: **23** (19.vii.2014).

*Distribution.* From Iceland toward south to Iberia, the Mediterranean; North Africa; from Ireland eastwards through most of Europe into European parts of Russia; through Siberia from the Urals to the Pacific coast; Japan; China.

**\**Eupeodes lapponicus* (Zetterstedt, 1838)**

*Material.* 1♀: **18** (20.vi.2008); 1♀: **33** (3.v.2008); 2♀♀: **50** (25.v.2015); 2♀♀: **51** (31.v.2015); 1♂: **63** (13.vi.2016).

*Distribution.* From Ireland east through most of Eurasia (including Turkey) to the Pacific coast; Iceland; Greenland; North America.

**\**Eupeodes luniger* (Meigen, 1822)**

*Material.* 1♂: **10** (22.v.2008); 1♂: **18** (15.v.2008); 1♀: **34** (9.v.2009); 1♀: **36** (18.v.2014).

*Distribution.* From Ireland through Europe to the Pacific coast (Kuril Isles) and Japan.

**\**Ferdinanda cuprea* (Scopoli, 1763)**

*Material.* 1♂, 1♀: **34** (12.vii.2008); 1♂: **36** (18.v.2014).

*Distribution.* From Ireland through Europe to the Pacific coast (Kuril Isles) and Japan.

**\**Hammerschmidtia ferruginea* (Fallen, 1817)**

*Material.* 1♀: **65** (23.vi.2013). (Fig. 5).

*Distribution.* From Fennoscandia towards south to north France; from Great Britain toward east through northern and central Europe, through Siberia to the Pacific coast.

***Helophilus affinis* Wahlberg, 1844**

*Material.* 1♂: **59** (17.viii.2014); 1♀: **64** (30.vi.2014).

*Distribution.* From Scandinavia towards south to the Netherlands; through northern Europe, Siberia and Asia.

**\**Helophilus hybridus* Loew, 1846**

*Material.* 1♂: **34** (11.vii.2012); 1♀: **25** (29.v.2008); 1♀: **1** (10.v.2008); 3♀♀: **60** (24.viii.2016); 1♀: **81** (28.vii.2016).

*Distribution.* From Fennoscandia to north France; from Ireland toward east through central and northern Europe to Russia, then to Siberia and the Pacific coast; Serbia, Mongolia; North America from Alaska to Utah.

***Helophilus pendulus* (Linnaeus, 1758)**

*Material.* 1♀: **1** (21.viii.2008); 1♀: **6** (27.viii.2016); 1♀: **13** (23.vii.2016); 1♀: **21** (8.ix.2009); 1♀: **25** (29.v.2008); 1♀: **29** (7.viii.2013); 1♂: **33** (30.v.2008); 1♂, 1♀: **34** (17.viii.2013, 19.v.2013); 1♂: **43** (12.vii.2014); 1♀: **56** (24.vii.2016); 1♂, 1♀: **60** (24.vii.2016); 1♀: **80** (6.vi.2008).

*Distribution.* From Iceland south to Iberia; from Ireland to the east through central and southern Eurasia to the Pacific coast.

**\**Helophilus trivittatus* (Fabricius, 1805)**

*Material.* 1♀: **18** (24.vi.2008); 1♀: **6** (12.vi.2015); 1♀: **34** (21.v.2016); 1♀: **57** (27.v.2016); 1♀: **68** (10.viii.2016); 1♂: **73** (18.vii.2015); 1♀: **77** (26.vii.2016).

*Distribution.* From Fennoscandia toward south to the Mediterranean Sea; Ireland through Eurasia to the Pacific coast; Iran, Afghanistan.

**\**Leucozona glaucia* (Linnaeus, 1758)**

*Material.* 1♂: **63** (13.vi.2016); 1♂: **67** (14.vi.2016).

*Distribution.* From Ireland through mountainous parts of central Europe into Turkey and European parts of Russia; from Siberia to the Pacific coast.

**\**Leucozona inopinata* Doczkal, 2000**

*Material.* 1♀: **10** (22.v.2008).

*Distribution.* Norway, Sweden, Finland, Denmark, Germany, France, Switzerland, Austria, Hungary, Japan.

**\**Leucozona laternaria* (Müller, 1776)**

*Material.* 1♀: **18** (24.vi.2008).

*Distribution.* From Ireland through Europe to the Pacific coast and Japan.

**\**Mallota megilliformis* (Fallen, 1817)**

*Material.* 1♀: **2** (20.v.2008); 1♀: **25** (02.vi.2009); 1♀: **31** (25.v.2013); 1♀: **33** (19.v.2016); 1♂: **67** (21.v.2016); 1♂: **68** (10.vi.2016).

*Distribution.* From south of Fennoscandia to Germany; from Poland towards the east to European part of Russia to Siberia and Khabarovsk.

**\**Mallota rossica* Portschninsky, 1877**

*Material.* 1♂: **63** (8.vi.2014). (Fig. 6).

*Distribution.* The central part of European Russia, Iran, Kyrgyzstan; from Asiatic part of Russia to Sakhalin; Mongolia, China.

***Mallota tricolor* Loew, 1871**

*Material.* 1♀: **34** (21.v.2016); 1♂: **54** (11.vi.2016). (Fig. 7).

*Distribution.* Lithuania, Poland, Germany, Belarus, European parts of Russia and Asia; Siberia to Kamchatka.

***Melanostoma mellinum* (Linnaeus, 1758)**

*Material.* 1♀: **26** (19.v.2013); 1♂: **33** (5.v.2013).

## Syrphidae (Diptera) from Mordovia, Russia

*Distribution.* Norway, Finland, Luxembourg, France, European part of Russia.

### ***Microdon analis* (Macquart, 1842)**

*Material.* 2♀: **31** (6.vi.2015); 1♀: **35** (10.vi.2012); 1♂: **51** (31.v.2015); 1♀: **53** (11.vi.2016); 1♀: **56** (14.vi.2016); 1♀: **57** (27.v.2016); 1♂, 2♀: **60** (31.v.2015); 1♀: **62** (3.v.2016); 2♀: **63** (29.v.2015).

*Distribution.* From Ireland through most of Europe to the Pacific coast; Mongolia.

### **\**Microdon mutabilis* (Linnaeus 1758)**

*Material.* 1♂: **25** (29.v.2008); 1♀: **44** (5.vi.2009); 1♀: **60** (7.vi.2015); 1♂: **63** (8.vi.2014).

*Distribution.* From Ireland through most of Europe to the Pacific coast.

### ***Myathropa florea* (Linnaeus, 1758)**

*Material.* 1♀: **40** (13.vii.2014); 1♂: **60** (7.vi.2015); 1♀: **63** (13.vi.2016).

*Distribution.* From Fennoscandia towards the south to Iberia and Mediterranean, the Canary Islands and in North Africa; from Ireland toward east through Eurasia to the Pacific coast.

### **\**Myolepta vara* (Panzer, 1798)**

*Material.* 1♂: **22** (5.vi.2009).

*Distribution.* From the Netherlands through Belgium toward south, to the Mediterranean Sea; through central and southern Europe to Switzerland; Austria, Romania, the Balkans and the Caucasus, to the Pacific coast.

### **\**Paragus bicolor* (Fabricius, 1794)**

*Material.* 1♀: **3** (8.vi.2013).

*Distribution.* From southern Sweden and Denmark toward south to the Mediterranean and northern Africa; from France toward east through central and southern Europe to Mongolia; Iran and Afghanistan; North America.

### ***Parhelophilus frutetorum* (Fabricius, 1775)**

*Material.* 1♂: **52** (27.v.2016). (Fig. 8).

*Distribution.* From Southern Sweden through central Europe into Russia, the Caucasus and eastern Siberia.

### **\**Pipiza lugubris* (Fabricius, 1775)**

*Material.* 1♀: **13** (19.vii.2015); 1♀: **46** (18.vi.2016); 1♀: **58** (9.viii.2014).

*Distribution.* Fennoscandia, Poland, from England through France and across central Europe to Austria.

### **\**Pipiza nocticula* (Linnaeus, 1758)**

*Material.* 1♀: **34** (21.v.2016); 1♀: **50** (31.v.2016).

*Distribution.* Europe.

### ***Platycheirus albimanus* (Fabricius, 1781)**

*Material.* 1♀: **35** (16.v.2015); 1♀: **58** (9.viii.2014).

*Distribution.* Greenland, Iceland, from Fennoscandia toward south to Iberia and the Mediterranean; from Ireland through most of Europe into Turkey and European part of Russia; from the Urals to the Pacific coast; Philippines; western parts of the USA.

### **\**Platycheirus podagratus* (Zetterstedt, 1838)**

*Material.* 1♂: **31** (25.v.2013); 1♂: **33** (5.v.2013).

*Distribution.* From Fennoscandia to the Pyrenees; from Ireland through northern Europe and mountainous parts of central Europe into Russia to Siberia; North America.

### **\**Platycheirus rosarum* (Fabricius, 1787)**

*Material.* 1♀: **48** (13.viii.2015).

*Distribution.* From Fennoscandia to Iberia and the Mediterranean; from Ireland through most of Europe to European parts of Russia; from the Urals to the Altai; in North America from Alaska to Nova Scotia and south to New Jersey.

### **\**Psarus abdominalis* (Fabricius, 1794)**

*Material.* 1♀: **44** (5.vi.2009).

*Distribution.* From Sweden through the Netherlands to central France; from Brittany through central Europe to European part of Russia.

### **\**Rhingia campestris* Meigen, 1822**

*Material.* 1♀: **18** (21.vi.2008); 1♀: **25** (02.vi.2009).

*Distribution.* From Fennoscandia to the Pyrenees, northern Spain and the Mediterranean; from Ireland through most of Europe to European parts of Russia and the Caucasus; throughout Siberia to the Pacific coast; Mongolia.

### ***Sericomyia silentis* (Harris, 1776)**

*Material.* 1♀: **34** (12.viii.2008); 1♂: **43** (4.viii.2015); 1♂: **51** (22.viii.2015); 1♀: **63** (22.viii.2015); 1♂: **65** (7.vii.2014).

*Distribution.* From Fennoscandia through mountainous regions to the Pyrenees; from Ireland through northern Europe and mountainous parts of central Europe to Russia and the Pacific coast and Japan.

### ***Sphaerophoria scripta* (Linnaeus, 1758)**

*Material.* 1♂: **15** (2.viii.2015); 2♂♂, 1♀: **18** (24-25.vi.2008); 1♀: **21** (8.ix.2009); 1♂: **27**

(11.v.2008); 1♂: **31** (25.v.2013); **32** (6.viii.2013); 1♂: **34** (1.viii.2012); 1♂: **37** (20.v.2015); 1♂: **51** (31.v.2015).

*Distribution.* From Iceland and Fennoscandia to the Mediterranean and north Africa; from Ireland through much of the Palearctic to the Pacific coast (United Kingdom, Ireland, Italy, Spain, Austria, Denmark, Czech Republic, Finland, France, Germany, Greece, Greenland, Iceland, Norway, Sweden, Switzerland, Belarus).

***Sphecomyia vespiformis* (Gorski, 1852)**

*Material.* 1♂: **25** (29.v.2008); 1♂: **81** (9.vi.2009).

*Distribution.* From Norway to northern Sweden, Finland and Karelia, Poland and Siberia.

***Spilomyia diophthalma* (Linnaeus, 1758)**

*Material.* 3♀♀: **34** (11.v.2015, 8.vii.2012, 17.viii.2013); 1♂: **41** (15.viii.2014); 1♀: **60** (24.vii.2016); 1♂: **66** (18.viii.2013); 1♂: **75** (2.viii.2014); 1♂: **81** (21.vi.2009).

*Distribution.* Southern Norway, Sweden, Finland, Germany, Czech Republic, France, Switzerland, northern Italy, European parts of Russia, Turkey and the Caucasus and on through Siberia to Sakhalin.

**\**Syrirta pipiens* (Linnaeus, 1758)**

*Material.* 1♂: **1** (26.v.2009); 1♀: **42** (17.vi.2015); 2♂♂, 1♀: **44** (22.vi.2013).

*Distribution.* Most of the Palearctic, including north Africa (Austria, Belarus, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Mexico, Norway, Spain, Sweden, Switzerland, United Kingdom); most of North America, South America and the Oriental region.

***Syrphus ribesii* (Linnaeus, 1758)**

*Material.* 2♀♀: **1** (9.viii.2008); 1♂: **26** (19.v.2009); 1♀: **31** (25.v.2013); 1♂: **33** (19.v.2016); **34** (21.v.2016); 1♀: **37** (15.v.2016); 1♂, 1♀: **49** (14.v.2016); 1♂, 1♀: **57** (27.v.2016); 1♀: **60** (18.v.2014); 1♀: **70** (13.viii.2016); 1♀: **82** (26.vi.2016).

*Distribution.* From Iceland to Iberia and the Mediterranean; from Ireland through most of Europe to Turkey, European parts of Russia and Afghanistan; from the Urals to the Pacific coast; Japan; from Alaska south to central parts of the USA.

***Syrphus vitripennis* Meigen, 1822**

*Material.* 2♀♀: **1** (9.viii.2008, 29.ix.2009); 1♂: **4** (18.v.2008); 1♀: **18** (18.vi.2015); 1♂: **21** (8.ix.2009); 1♂: **25** (29.v.2008); 2♀♀, 1♂: **33**

(3-19.v.2013); 1♂, 2♀♀: **34** (11-21.v.2015); 1♀, 1♂: **37** (15.v.2016); 1♂: **49** (14.v.2016); 2♀♀, 2♂♂: **72** (11.v.2016); 1♀: **74** (18.vii.2015); 1♂: **80** (6.vi.2008).

*Distribution.* Most of the Palearctic region, including north Africa (Austria, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom); United States, Canada, Japan.

***Temnostoma apiforme* (Fabricius, 1794)**

*Material.* 1♂: **34** (1.vii.2012); 1♂: **42** (18.vi.2015); 1♂: **50** (25.v.2015); 1♂: **51** (31.v.2015); 1♂: **52** (27.v.2016); 1♂: **56** (28.v.2016); 2♂♂: **60** (31.v.2015, 11.vi.2016); 1♂: **63** (25.v.2015); 1♂: **65** (12.vi.2016); 1♀: **71** (26.v.2015).

*Distribution.* From Lapland to northern France; from eastern Belgium through northern and central Europe to European parts of Russia and through Siberia to the Pacific coast and Japan.

***Temnostoma bombylans* (Fabricius, 1805)**

*Material.* 1♀: **7** (5.vi.2016); 1♂: **19** (12.vi.2008); 1♀: **33** (30.v.2008); 1♂, 1♀: **37** (29.v.2016); 1♀: **60** (7.vi.2015); 1♂: **63** (8.vi.2014); 1♂: **66** (5.vi.2015); 1♀: **80** (06.vi.2008).

*Distribution.* From Sweden and Denmark south to the Pyrenees and North Africa; from northern France through northern and central Europe to Asiatic parts of Russia, the Pacific coast and Japan; Korea.

***Temnostoma vespiforme* (Linnaeus, 1758)**

*Material.* 1♀: **1** (28.vii.2011); 1♂: **18** (27.vi.2008); 1♀: **46** (29.v.2016); 1♀: **52** (21.vi.2015); 1♂: **54** (21.vii.2013); 1♀, 1♂: **60** (7.vi.2015, 13.viii.2015); 1♂, 1♀: **63** (7.vi.2015); 1♂: **67** (13.viii.2016); 1♂: **72** (5.vi.2015); 1♀: **74** (18.vii.2015); 1♂: **80** (6.vi.2008).

*Distribution.* From Sweden to Spain; from France through most of Europe and on through Asiatic parts of Russia to the Pacific coast and Japan; the Caucasus; from Alaska to New Mexico.

**\**Trichopsomyia flavitarsis* (Meigen, 1822)**

*Material.* 1♂: **31** (25.v.2013).

*Distribution.* From Fennoscandia to the Pyrenees; from Ireland through northern Europe and mountainous parts of central Europe into European parts of Russia and on to the Pacific coast.

***Volucella bombylans* (Linnaeus, 1758)**

## Syrphidae (Diptera) from Mordovia, Russia

*Material.* 1♂: **6** (5.vi.2016); 2♀♀: **7** (5.vi.2016); 1♂: **9** (9.vii.2009); 1♀: **16** (30.v.2008); 7♂♂: **18** (5-24.vi.2008); 1♂: **27** (16.viii.2008); 1♂: **28** (10.vii.2016); 1♀: **31** (6.vi.2015); 2♂♂: **33** (22.vi.2014); 4♂♂: **34** (8-13.vi.2014, 25.vii.2009); 1♂: **37** (25.v.2014); 1♂: **42** (18.vi.2016); 1♂, 2♀♀: **51** (31.v.2015, 06.vi.2012); 1♂: **52** (27.v.2016); 1♀: **56** (14.vi.2016); 1♂: **57** (27.v.2016); 1♀: **60** (7.vi.2015); 1♂: **62** (3.vi.2016); 3♂♂: **63** (13.vi.2016); 1♀: **64** (16.vi.2014); 1♂♂, 2♀♀: **66** (31.v.2015); 1♂, 1♀: **68** (10.vi.2016); 2♀♀: **69** (2.vi.2016); 1♂: **70** (26.v.2016); 1♀: **74** (7.vi.2014); 1♀: **76** (7.vi.2014); 1♂, 1♀: **77** (21.vi.2016); 2♂♂: **84** (24.vi.2016); 1♂, 1♀: **85** (24.vi.2016).

*Distribution.* From Fennoscandia to Iberia; from Ireland through central and southern Europe into Russia to the Pacific coast and Japan; from Alaska to Newfoundland and south to California and Georgia.

### \**Volucella inanis* (Linnaeus, 1758)

*Material.* 2♀♀: **1** (20.vii.2008, 9.viii.2008); 1♀: **27** (16.viii.2008); 1♂: **29** (7.viii.2013); 1♂: **40** (13.vii.2014).

*Distribution.* From Fennoscandia to Spain and the Mediterranean; north Africa and Asia Minor (Syria); from Britain through central and southern Europe to Turkey and European parts of Russia and the Pacific; Afghanistan, Mongolia, China.

### \**Volucella infata* (Fabricius, 1794)

*Material.* 1♀: **37** (15.v.2016).

*Distribution.* From Sweden to the Pyrenees; from Britain through central Europe to European parts of Russia and the Caucasus.

### *Volucella pellucens* (Linnaeus, 1758)

*Material.* 1♀: **1** (9.viii.2008); 1♀: **3** (10.viii.2014); 1♀: **9** (18.vii.2009); 1♀: **14** (2.viii.2015); 1♀: **15** (2.viii.2015); 1♀: **18** (27.vi.2008); 1♀: **21** (8.vii.2008); 1♀: **27** (16.viii.2008); 1♀: **34** (1.viii.2015); 1♀: **45** (10.viii.2014); 1♀: **50** (22.viii.2015); 1♂: **53** (11.vi.2016); 1♂: **65** (12.vi.2016); 1♀: **70** (13.vi.2015); 1♂: **74** (18.vii.2015).

*Distribution:* From Fennoscandia to Iberia; from Ireland through Eurasia to Japan; India.

### \**Xanthandrus comtus* (Harris, 1780)

*Material.* 1♀: **22** (3.ix.2009).

*Distribution.* From Ireland through central and southern Europe to Russia and the Caucasus and on to the Pacific coast; Japan.

### \**Xanthogramma citrofasciatum* (De Geer, 1776)

*Material.* 1♂: **8** (31.v.2015); 1♀: **51** (31.v.2015).

*Distribution.* From Norway to Iberia; from Ireland through central and southern Europe to European Russia; the Caucasus; western Siberia.

### \**Xanthogramma pedissequum* (Harris, 1776)

*Material.* 1♂: **23** (19.vii.2014); 1♀: **25** (2.vi.2009); 1♂: **27** (11.v.2008); 1♂: **31** (6.vi.2015); 1♂: **44** (22.vi.2013); 1♂: **46** (29.v.2016).

*Distribution.* From Britain to southern France and into central Europe.

### \**Xylota abiens* Meigen, 1822

*Material.* 1♀: **18** (5.vii.2008); 1♀: **33** (1.vii.2014); 1♀: **47** (28.vii.2015); 1♂: **57** (27.v.2016).

*Distribution.* From Denmark to the Pyrenees; from Ireland through central Europe to Russia, the Caucasus and the Pacific coast.

### \**Xylota florum* (Fabricius, 1805)

*Material.* 1♂: **57** (27.v.2016).

*Distribution.* From Ireland through much of Europe into European parts of Russia and the Caucasus and on as far as eastern Siberia.

### *Xylota segnis* (Linnaeus, 1758)

*Material.* 1♂: **35** (10.vi.2012); 1♀: **44** (5.vi.2009); 1♂: **63** (13.vi.2016).

*Distribution.* Europe except for the extreme north.

### *Xylota sylvarum* (Linnaeus, 1758)

*Material.* 1♂: **35** (10.vi.2012); 1♀: **61** (01.vii.2016).

*Distribution.* From Fennoscandia to Iberia; from Ireland through much of northern and central Eurasia to the Pacific coast; Greece and Turkey.

### \**Xylota tarda* Meigen, 1822

*Material.* 1♀: **56** (17.vi.2014).

*Distribution.* From Fennoscandia to Spain; from Ireland through central Europe into European parts of Russia; the Caucasus; through Asia to the Pacific coast.

### \**Xylota triangularis* Zetterstedt, 1838

*Material.* 1♀: **18** (17.vi.2008).

*Distribution.* From Lapland to Norway and Sweden; European parts of Russia and Siberia; Mongolia.



Fig. 3. *Blera fallax* L., lateral view.



Fig. 4. *Eristalis cryptarum* F., lateral view.



Fig. 5. *Hammerschmidtia ferruginea* F., lateral view.



Fig. 6a. *Mallota rossica* P., lateral view.



Fig. 6b. *Mallota rossica* P., fore leg.



Fig. 7. *Mallota tricolor* L., lateral view.



Fig. 8. *Parhelophilus frutetorum* F., lateral view.

## Discussion

To discuss the data presented here, it is necessary to note the following. Of the 103 provided species, 43 species were recorded for the Republic of Mordovia earlier. Namely, *C. conopoides*, *Ch. piger*, *Ch. albitarsis*, *Cr. asilica*, *Cr. ranunculi*, *D. venustus*, *E. balteatus*, *E. aeneus*, *E. abusive*, *E. horticola*, *H. affinis*, *M. tricolor*, *M. mellinum*, *M. analis*, *M. florea*, *P. frutetorum*, *Pl. albimanus*, *S. silentis*, *Sph. vespiformis*, *Sp. diophthalma*, *T. vespiforme*, *T. apiforme*, *T. bombylans*, *V. bombylans*, *X. sylvarum* were recorded for the region by Feoktistov (2011), *Ch. nemorum*, *Ch. mutabilis*, *Ch. bicinctum*, *E. grossulariae*, *E. arbustorum*, *E. tenax*, *E. rupium*, *S. vitripennis*, *X. segnis* were recorded for the region by Plavilshchikov (1964), *Ch. festivum*, *E. interraptia*, *H. pendulus* were recorded by Plavilshchikov (1964), Antsiferova and Dobromyslov (1966). *E. corolla* was recorded for the region by Plavilshchikov (1964), Antsiferova (1966) and in The Red Data Book (Astradamov, 2005). *Sph. scripta* was recorded for the region by Plavilshchikov (1964), Antsiferova *et al.* (1966) and Antsiferova (1979). *S. ribessi* was recorded for the region by Plavilshchikov (1964) and Antsiferova (1979). *V. pellucens* was recorded for the region by Plavilshchikov (1964), Ruchin *et al.* (2007), Ruchin (2008) and Feoktistov (2011).

The most widespread species in the studied region are species from the genera *Volucella*, *Chrysotoxum*, *Syrphus* and *Eristalis*. These species were recorded for the region in previous studies and are represented in most of the studied habitats. Some recorded species, including *Ch. festivum*, *V. bombylans*, *E. aeneus*, *E. tenax* are widespread or cosmopolitan, but their new distributional record from Mordovia are of importance. These data reflect an important role of this species for forest ecosystems functioning. Thus, a wide range of ecological tolerance allows them to be widely distributed in a variety of habitats.

A number of species, such as *E. lapponicus*, *M. rossica*, *E. diaphana*, *X. comtus*, species of the genus *Cheilosia* and some others, are rare and were recorded for

the territory of Mordovia State Nature Reserve for the first time.

Speaking of rare species, it is important to note such species as *Criorhina ranunculi*. It is a Central European nemoral species, which is distributed from South Ukraine to Leningrad Region. It is known as a relict species and has been recorded in the areas, which were defined as Quaternary refuges. Adults can be found in April and May, visiting blooming willow. Larvae develop in rotting wood and hollows of old decaying trees, mainly deciduous trees. Thus, reduction of the areas of natural deciduous forests is a limiting factor, restricting a distribution of this species. *E. cryptarum* is a very rare boreal species, which prefers wetland, spring-fed streamlets in tundra, floodplain marshes and wet flushes in moorland. Larvae are detritus feeders, developing in water (Speight, 2002).

Typical inhabitants of light sparse forests, forest with overmature trees and forest borders are species belonging to genera *Brachypalpus*, *Chalcosyrphus* and *Xylota*. These species are associated with trees and shrubs, and their larvae have been found in xylem. It is noticeable that among recorded species there were extremely anthropophilic species occurring in farmlands, gardens and parks, along fire-breaks and tracks, such as *P. albimanus*, *S. scripta*, *S. pipiens*, *X. segnis*, *S. ribessi* and *S. vitripennis*.

We have presented a comprehensive revision of the syrphid fauna, based on long-term collection. This source of information can be considered by future ecological and faunistic researches. Such study may provide a wider review of the dynamics of diptera fauna populations, which associated with ecosystem changes.

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