

**DISTRIBUTION AND ZOOGEOGRAPHICAL ANALYSIS OF
THE HORSE FLIES (Diptera: Tabanidae)
FROM GENERA *Dasyrhamphis*, *Philipomyia*, *Atylotus*
AND *Theriopectes* IN CROATIA**

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Systematic research into the distribution of horse flies (Tabanidae) in Croatia was carried out in the period from 1992 to 2008. Horse flies were collected using different entomological methods, and in addition to field research, all relevant literature data were reviewed. In total, 5872 specimens, representing 12 species of four genera: *Philipomyia*, *Dasyrhamphis*, *Atylotus* and *Theriopectes* were collected from 271 localities covering 181 UTM grids. The zoogeographical analysis indicates that the Mediterranean species *Dasyrhamphis anthracinus*, *Dasyrhamphis ater*, *Dasyrhamphis umbrinus* and *Theriopectes tunicatus* were distributed in Croatia only in localities along the Adriatic Sea coast, while *Theriopectes gigas* and *Philipomyia graeca*, although also Mediterranean species, were found in the Alpine, Pannonian and continental regions of Croatia. *Philipomyia aprica* was collected in the Alpine region, as well as on the mountains of the Mediterranean region. The boreo-montane Eurasian species *Atylotus fulvus* and *Atylotus rusticus*, as well as the South European *Atylotus loewianus*, were sampled in the Mediterranean, continental, Pannonian and Alpine regions of Croatia, while the Afro-Eurasian arid species *Atylotus flavoguttatus* was found in the Mediterranean, Pannonian and continental regions of Croatia.

Horse flies, Tabanidae, distribution, Croatia

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Sustavna istraživanja zoogeografske rasprostranjenosti obada (Tabanidae) u Hrvatskoj obavljena su u razdoblju od 1992. do 2008. godine. Obadi su

uzorkovani različitim entomološkim metodama i uz terenska uzorkovanja korišteni su i svi literaturni podatci. Uzorkovane su 5872 jedinke svrstane u 12 vrsta te u 4 roda *Philipomyia*, *Dasyrhamphis*, *Atylotus* i *Theriopectes*. Obadi su uzorkovani na 271 postaji koje pokrivaju 181 polje na UTM mreži Hrvatske. Zoogeografska analiza pokazuje da se mediteranske vrste *Dasyrhamphis anthracinus*, *Dasyrhamphis ater*, *Dasyrhamphis umbrinus*, *Theriopectes tunicatus* u Hrvatskoj pojavljuju jedino na postajama u mediteranskom području uz obalu Jadranskog mora, dok su također mediteranske vrste *Theriopectes gigas* i *Philipomyia graeca* uzorkovane i u gorskom, panonskom i kontinentalnom području Hrvatske. Vrsta *Philipomyia aprica* uzorkovana je na području gorske Hrvatske i u mediteranskom području na planinama duž obale Jadranskog mora. Borealno-euroazijske vrste *Atylotus fulvus*, *Atylotus rusticus*, južnoeuropska *Atylotus loewianus* uzorkovane su u mediteranskom, gorskom, kontinentalnom i panonskom području Hrvatske, dok je afro-euroazijska aridna vrsta *Atylotus flavoguttatus* uzorkovana u mediteranskom, kontinentalnom i panonskom području Hrvatske.

Obadi, Tabanidae, rasprostranjenost, Hrvatska

Introduction

The family Tabanidae includes some 4000 species worldwide (Gibson & Torr, 1999), 78 of which are known to occur in Croatia (Krčmar et al., 1996; Krčmar et al., 2003; Krčmar & Merdić, 2007). Horse flies (Tabanidae) are known worldwide as important mechanical vectors of viruses, bacteria, protozoans and helminths, which cause diseases in wild and domestic animals and humans (Chvála et al., 1972; Krinsky, 1976; Foil, 1989; Le Goff et al., 1991; Chippaux et al., 2000; Desquesnes & Dia, 2004). Studies on vector ecology are essential to understand, predict and control insect-borne diseases (Barros, 2001). Tabanidae were intensively studied in Croatia in the nineties of the past century and early in the 21st century and there are several comprehensive papers dealing with the tabanid fauna of Croatia.

The purpose of this study was to present a list of the species of horse flies from the genera *Philipomyia* and *Dasyrhamphis* (tribe Diachlorini) and genera *Atylotus* and *Theriopectes* (tribe *Tabanini*) in Croatia with information on the abundance and distribution of these genera.

Materials and methods

Systematic field research into the distribution and *zoogeography* of horse flies of the genera *Atylotus* and *Therioplectes* (tribus Tabanini) and the genera *Philipomyia* and *Dasyrhamphis* (tribus Diachlorini) in the area of Croatia was conducted in the period from 1992 until 2008. Horse flies were collected using various methods: entomological nets, by hand picking from domestic animals, inside automobiles, Malaise traps and modified Manitoba traps with different natural and synthetic attractants. In addition to field research the following literature references were reviewed: Brauer (1880), Strobl (1893, 1898, 1900, 1902), Surcouf (1924), Coe (1958, 1960), Moucha (1959, 1965), Leclercq (1960, 1965, 1968, 1976), Majer (1985) and Rucner (1994), and all the data from these references were included in the zoogeographical analysis. The collected specimens were determined according to the keys Chvála et al. (1972) and Majer (1987). The names of species are written according to the Palaearctic catalogue (Chvála, 1988). The zoogeographical analysis was made according to biogeographical division of Croatia into Alpine, continental, Mediterranean and Pannonian regions (Radović et al., 2009). Distribution of registered horse flies species is represented on a UTM net with 100 x 100 km grid and basic fields 10 x 10 km (Figure 1, 2, 3, 4, 5, 6, 7). The maps were created using the ArcView 9.0 software.

Results

A total of 5872 horse flies were collected in 271 localities within 181 UTM fields in Croatia. All collected specimens were classified into 12 horsefly species and genera: *Atylotus*, *Therioplectes*, *Philipomyia* and *Dasyrhamphis*. The most numerous genus is *Atylotus* with 5 species, followed by *Dasyrhamphis* with 3 species and *Therioplectes* and *Philipomyia* with 2 species each (Table 1). The most abundant species in the sample is *Atylotus loewianus* with 46.73%, and then follow *Philipomyia graeca* with 22.39%, *Philipomyia aprica* with 16.59%, *Atylotus rusticus* with 6.52%, *Dasyrhamphis umbrinus* with 2.54%, *Therioplectes tunicatus* with 2.13%, *Therioplectes gigas* with 0.90%, *Dasyrhamphis ater* with 0.83%, *Dasyrhamphis anthracinus* with 0.78%, *Atylotus fulvus* with 0.41% and *Atylotus flavoguttatus* with 0.17% (Table 1).

Table 1. List of the species from genera *Atylotus*, *Theriopectes*, *Dasyrhamphis* and *Philipomyia* collected in Croatia.Tablica 1. Popis vrsta rodova *Atylotus*, *Theriopectes*, *Dasyrhamphis* i *Philipomyia* uzorkovanih u Hrvatskoj

Genus	Species	Specimens	%
<i>Atylotus</i>	<i>Atylotus flavoguttatus</i> (Szilády, 1915)	10	0.17
	<i>Atylotus fulvus</i> (Meigen, 1804)	24	0.41
	<i>Atylotus latistriatus</i> (Brauer, 1880)	-	0.0
	<i>Atylotus loewianus</i> (Villeneuve, 1920)	2744	46.73
	<i>Atylotus rusticus</i> (Linne, 1767)	383	6.52
<i>Theriopectes</i>	<i>Theriopectes gigas</i> (Herbst, 1787)	53	0.90
	<i>Theriopectes tunicatus</i> (Szilády, 1927)	125	2.13
<i>Dasyrhamphis</i>	<i>Dasyrhamphis ater</i> (Rossi, 1790)	49	0.83
	<i>Dasyrhamphis anthracinus</i> (Meigen, 1820)	46	0.78
	<i>Dasyrhamphis umbrinus</i> (Meigen, 1820)	149	2.54
<i>Philipomyia</i>	<i>Philipomyia aprica</i> (Meigen, 1820)	974	16.59
	<i>Philipomyia graeca</i> (Fabricius, 1794)	1315	22.39
Σ 4	12	5872	1.00

The zoogeographical analysis of these genera and species has shown that they are most abundant in the Mediterranean region, with twelve species: *Dasyrhamphis anthracinus*, *Dasyrhamphis ater*, *Dasyrhamphis umbrinus* (Figure 1), *Theriopectes gigas*, *Theriopectes tunicatus* (Figure 2), *Philipomyia aprica*, *Philipomyia graeca* (Figure 3), *Atylotus flavoguttatus*, *Atylotus fulvus*, *Atylotus latistriatus* (Figure 4), *Atylotus loewianus* (Figure 5), *Atylotus rusticus* (Figure 6),

Distribution and zoogeographical analysis of the Horse flies (Diptera: Tabanidae) from genera *Dasyrhamphis*, *Philipomyia*, *Atylotus* and *Therioplectes* in Croatia

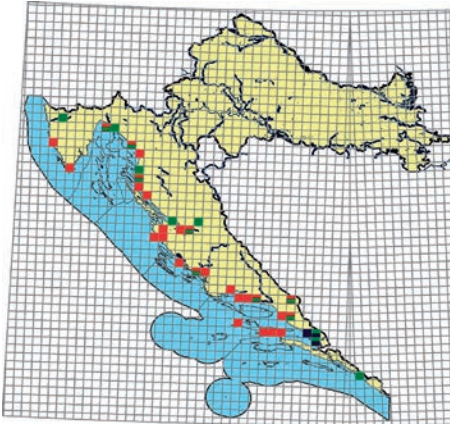


Figure 1. Distribution of the horse flies from the genus *Dasyrhamphis* (Diptera: Tabanidae) in Croatia. *Dasyrhamphis ater* (green), *Dasyrhamphis anthracinus* (blue) and *Dasyrhamphis umbrinus* (red).

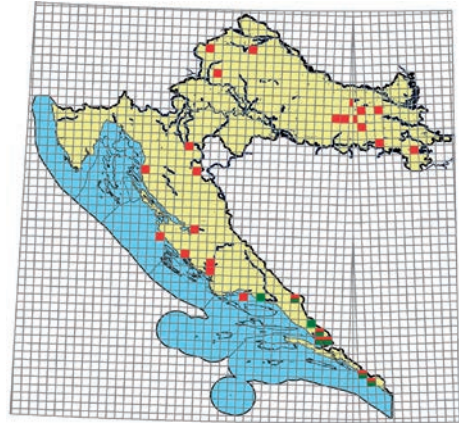


Figure 2. Distribution of the horse flies from the genus *Therioplectes* (Diptera: Tabanidae) in Croatia. *Therioplectes tunicatus* (green) and *Therioplectes gigas* (red).

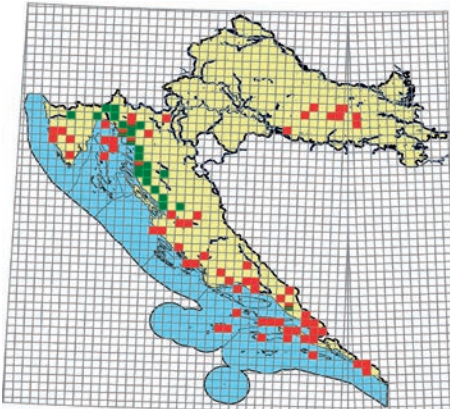


Figure 3. Distribution of the horse flies from the genus *Philipomyia* (Diptera: Tabanidae) in Croatia. *Philipomyia graeca* (red) and *Philipomyia aprica* (green).

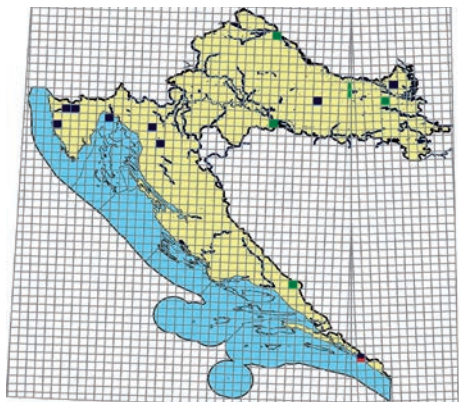


Figure 4. Distribution of the horse flies from the genus *Atylotus* (Diptera: Tabanidae) in Croatia. *Atylotus latistriatus* (red), *Atylotus flavoguttatus* (green) and *Atylotus fulvus* (blue).

Slike 1. do 4. Rasprostranjenost obada iz rodova *Dasyrhamphis*, *Therioplectes* *Philipomyia* i *Atylotus* u Hrvatskoj.

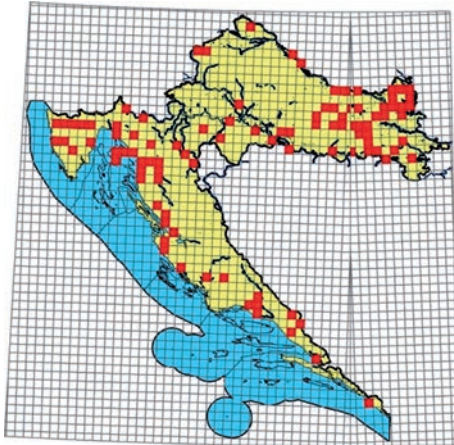


Figure 5. Distribution of the species *Atylotus loewianus* (Diptera: Tabanidae) in Croatia.

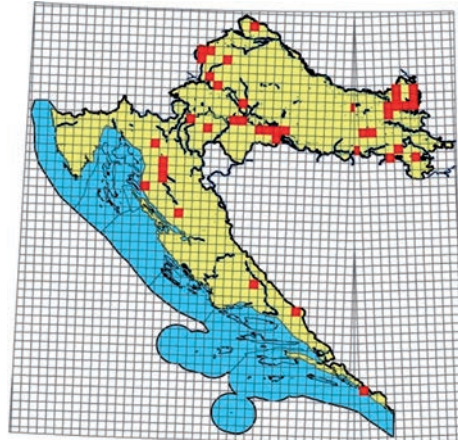


Figure 6. Distribution of the species *Atylotus rusticus* (Diptera: Tabanidae) in Croatia.

Slike 5. i 6. Rasprostranjenost vrsta *Atylotus loewianus* (Diptera: Tabanidae) i *Atylotus rusticus* (Diptera: Tabanidae) u Hrvatskoj.

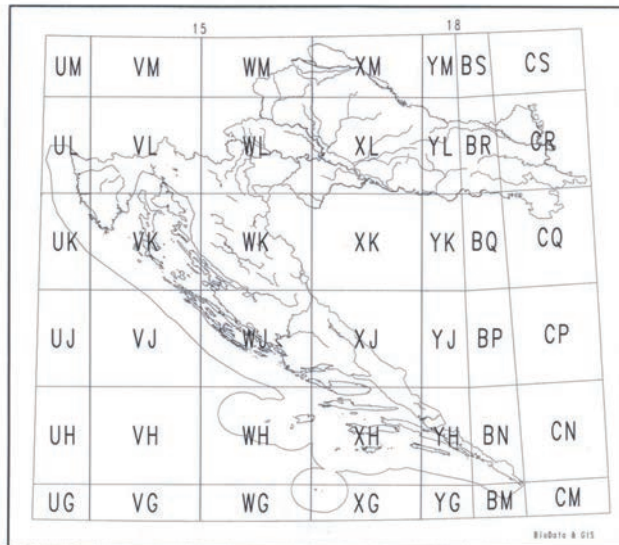


Figure 7. Map of Croatia with UTM net (100 x 100 km fields).
Slika 7. Karta Hrvatske s UTM mrežom (100x100 km. poljima)

followed by the continental region with six horsefly species: *Theriopectes gigas*, *Philipomyia graeca*, *Atylotus flavoguttatus*, *Atylotus fulvus*, *Atylotus loewianus* and *Atylotus rusticus* (Figure 2, 3, 4, 5, 6), also the Alpine region with six horsefly species found, *Theriopectes gigas*, *Philipomyia graeca*, *Philipomyia aprica*, *Atylotus fulvus*, *Atylotus loewianus* and *Atylotus rusticus* (Figure 2, 3, 4, 5, 6) and finally, the Pannonian region with five horsefly species: *Theriopectes gigas*, *Atylotus flavoguttatus*, *Atylotus fulvus*, *Atylotus loewianus* and *Atylotus rusticus* (Figure 2, 4, 5, 6).

The list of the determined species of horse flies from the genera *Dasyrhamphis*, *Philipomyia*, *Theriopectes* and *Atylotus*, including localities, UTM grids, dates and numbers of collected specimens are presented in appendix 1.

1. *Dasyrhamphis anthracinus* (Meigen, 1820)

Ušće Neretve (YH 06), 1.VI.1950 (1♀, 1♂), (Majer, 1985); Bačina (XH 97), 30.V.1995 (6♀, 7♂), 4.VI.1996 (4♂), Opuzen (YH 06), 30.V.1995 (1♂), 4.VI.1996 (2♀); Gradac (XH 97), 3.VI.1996 (1♀); Modro Oko (YH 06), 4.VI.1996 (20♀), (Krčmar, 1999). Baćinska jezera (XH 97), 22.V.2002 (1♂), (Krčmar & Merdić, 2007); Vriještica (YH 07), 16.V.2003 (2♀).

2. *Dasyrhamphis ater* (Rossi, 1790)

Dubrovnik (BN 62), (Brauer, 1880; Strobl, 1898, 1900); Bakar (VL 61), 4.VI.1887 (1♀), 15.VI.1887 (1♀); Draga Sušak (VL 51), 13.VI.1888 (1♂); Lucija (VL 02), 10.VI.1964 (1♀); Orehovica (VL 51), 12.VI.1886 (1♀, 1♂) (Moucha, 1965); Živi Bunari (VK 95), 29.V.1995 (1♀); Paklenica (WK 30), 29.V.1995 (2♀); Glavina Donja (XJ 71), 21.VI.1995 (1♂); Obrovac (WJ 59), 2.VI.1996 (9♀, 1♂); Vodice (WJ 64), 3.VI.1996 (1♀); Omiš (XJ 31), 3.VI.1996 (2♀); Plužine - Biokovo (XH 79), 4.VI.1996 (1♀); Gračac (WK 60), 5.VI.1996 (1♀), (Krčmar, 1999); Zavižan (VK 96), 9.VI.2001 (2♀) (Krčmar, 2003); Ušće Neretve (YH 06), 22.V.2002 (8♀), Vriještica (YH 07), 14.V.2003 (1♂), 16.V.2003 (4♂), 6.VI.2003 (1♂) (Krčmar & Merdić, 2007); Vriještica (YH 07), 16.V.2003 (2♀), 6.VI.2003 (1♂) (J. Mikuska collection); Ledenice (VK 89), 8.VI.2007 (1♀), 10.VI.2007 (2♀); Novi Vinodolski (VK 89), 24.VI.2007 (1♀); Bater (VK 89), 25.VI.2007 (1♀) (S. Krčmar collection).

3. *Dasyrhamphis umbrinus* (Meigen, 1820)

Rijeka (VL 51), Split (XJ 11) (Brauer, 1880; Strobl, 1898, 1900; Surcouf, 1924; Moucha, 1959); Novigrad (WJ 49), 27.V.1958 (3♂, 3♀), 31.V.1958 (4♀, 6♂) (Coe, 1960); Kaštela (XJ

02), 9.VII.1960 (1♀); Stobreč (XJ 21), 11.VI.1960 (1♀, 1♂) (Leclercq, 1960); Pula (VK 16), 10.VI.1954 (2♂); Stobreč (XJ 21), 11.VII.1960 (2♂), 30.V.1962 (1♂) (Majer, 1985); Hvar (XH 18), (Strobl, 1893, 1898, 1900; Moucha, 1959); Makarska (XH 69), 21.V.1934 (1♂); Murter (WJ 45), 14.VI.1931 (1♂); Split (XJ 11), 28.V.1927 (1♀), 4.VI.1943 (1♀); Sućurac (XJ 11), 15.V.1924 (1♀, 6♂) (Moucha, 1959); Draga Sušak (VL 51), 8.VI.1887 (1♀); Dušikrava (VK 94), 1.VI.1914 (1♀, 1♂); Jablanac (VK 95), 2.VI.1914 (1♀, 1♂); Orehovica (VL 51), 12.VI.1886 (1♀, 1♂); Rovinj (UK 99), 12.VI.1964 (2♀); Senj (VK 98), 6.VI.1889 (1♀, 1♂), 30.V.1890 (1♀); Split (XJ 11), 7.VI.1909 (2♀) (Moucha, 1965); Zadar (WJ 18), (Strobl, 1893, 1898, 1900, Moucha, 1959); Karlobag (WK 03), 29.V.1995 (1♂); Rudelić Draga (WK 03), 29.V.1995 (1♀); Bokanjac (WJ 28), 29.V.1995 (1♀); Imotski (XJ 71), 20.VI.1995 (2♀); Glavina Donja (XJ 71), 21.VI.1995 (6♀); Obrovac (WJ 59), 2.VI.1996 (36♀); Poličnik (WJ 29), 2.VI.1996 (11♀); Vodice (WJ 64), 3.VI.1996 (2♀); Donje Polje (WJ 74), 3.VI.1996 (2♀); Makarska (XH 69), 3.VI.1996 (1♀); Plužine - Biokovo (XH 79), 5.VI.1996 (1♀); Omiš (XJ 31), 5.VI.1996 (1♀) (Krčmar, 1999); Bogomolje (XH 67), 16.VI.2004 (1♀), Gdinj (XH 57), 16.VI.2004 (1♀), Zastrižišće (XH 47), 16.VI.2004 (19♀) (J. Mikuska collection). Novi Vinodolski (VK 89), 9.VI.2007 (1♀); Ledenice (VK 89), 8.VI. 2007 (4♀), 9.VI.2007 (6♀), 10.VI.2007 (2♀), Bater (VK 89), 10.VI.2007 (1♀) (S. Krčmar collection).

4. *Philipomyia aprica* (Meigen, 1820)

Fužine (VL 71), 8.VIII.1895 (1♀), Risnjak (VL 53), 30.VII.1902 (1♀), Jablanac (VK 95), 3.VI.1914 (1♀) (Moucha, 1965); Velebit (WK 41), 8.VIII.1955 (2♀), 15.VIII.1955 (1♀) (Leclercq, 1965); Opatija (VL 42), 21.VII.1966 (1♀) (Leclercq, 1968); Filipov kuk (WK 13), 29.VII.1971 (1♀) (Rucner, 1994); Biokovo (XH 79) (Brauer, 1880; Moucha, 1959; Strobl, 1898, 1900); Buzet (VL 12), 8.VII.1992 (2♀); Vratnik (VK 98), 24.VII.1995 (1♀); Dragaljin (VL 70), 18.VII.1996 (14♀), 19.VII.1996 (15♀), 20.VII.1996 (31♀); Bribir (VL 80), 18.VII.1996 (3♀); Jurjevo (VK 97), 26.VII.1997 (3♀) (Krčmar, 1999); Oltari (VK 97), 28.VII.1995 (46♀), 26.VII.1997 (15♀), 12.VIII.2000 (1♀); Krasno Polje (WK 06), 2.VII.1999 (2♀); Lomska Duliba (WK 05), 13.VII.1996 (6♀); Zavižan (VK 96), 22.VII.1995 (2♀), 28.VII.1995 (16♀), 26.VII.1997 (25♀), 1.VII.1999 (96♀), 2.VII.1999 (124♀), 12.VIII.2000 (27♀); Štirovača (WK 04), 2.VII.1999 (30♀) (Krčmar, 2003); Gornje Jelenje (VL 62), 4.VII.1992 (1♀), Sunger (VL 81), 31.VII. 1987 (1♀), 5.VIII.1992 (1♀), 17.VII.1993 (8♂, 3♀), 18.VII.1993 (7♀), Sungerski lug (VL 81), 17.VII.1993 (8♀), Risnjak (VL 53), 19.VII.1995 (1♀), Bjelolasica (VL 91), 21.VII.1995 (3♀), Donji Bukovac (VL 81), 27.VII.1997 (1♀); Begovo Razdolje (VL 91), 27.VII.1997 (3♀); Platak (VL 63), 12.VII.2002 (14♀), Lič (VL 71), 13.VII.2002 (4♀), Klek (WL 11), 16.VII.2002 (1♀) (Krčmar et al., 2008); Brušane (WK 22), 28.VII.1995 (28♀); Baške Oštarije (WK 13), 28.VII.1995 (56♀); Breze (VL 80), 19.VII.1996 (19♀, 2♂), 23.VI.2007 (1♀), 24.VI.2007 (3♀), 25.VI.2007 (2♀), 19.VII.2007 (1♀), 20.VII.2007 (2♀), 21.VII.2007 (1♀); Lukovo (VL 80), 19.VII.1996 (19♀); Barić Draga (WK 21), 27.VII.1997 (2♀); Ličko Liješće (WK 25), 22.VI.2000 (1♀); Soldana (VL 81), 13.VII.2002 (5♀); Bater (VK 89), 23.VI.2007 (27♀), 24.VI.2007 (56♀), 25.VI.2007 (98♀), 19.VII.2007 (19♀), 20.VII.2007 (5♀),

21.VII.2007 (10♀); Velika Kapela (WL 00), 23.VI.2007 (12♀), 24.VI.2007 (18♀), 25.VI.2007 (13♀), 19.VII.2007 (34♀), 20.VII.2007 (9♀), 21.VII.2007 (7♀); Jasenak (WL 00), 9.VIII.2007 (1♀) (S. Krčmar collection).

5. *Philipomyia graeca* (Fabricius, 1794)

Dubrovnik (BN 62); Rijeka (VL 51); Split (XJ 11) (Brauer, 1880; Strobl, 1898, 1900; Surcouf, 1924; Moucha, 1959); Korčula (XH 75), 22.V.1955 (7♀, 1♂) (Coe, 1958); Novigrad (WJ 49), 28.V.1958 (1♀), 30.V.1958 (1♂) (Coe, 1960); Kaštela (XJ 02), 9.VII.1960 (1♀); Mlini (BN 72), 13.VII.1960 (3♀, 1♂) (Leclercq, 1960); Kanfanar (VK 19), 16.VII.1966 (23♀); Valture (VK 17), 14.VII.1966 (1♂), (Leclercq, 1968); Flengi (UL 90), 9.VIII.1975 (1♀); Kloštar Istarski (UL 90), 11.VIII.1975 (3♀), (Leclercq, 1976); Hvar (XH 18), 10.VI.1924 (2♀), 23.V.1926 (1♀); Janjina (XH 95), 20.VI.1931 (4♀); Kapija island (WJ 54), 23.VI.1929 (1♀); Krk (VK 68); Lumbarda (XH 75), 15.VI.1926 (3♀, 2♂); Split (XJ 11), 16.VI.1942 (1♀); Sućurac (XJ 11), 25.VII.1924 (2♀, 2♂); Vela Luka (XH 45), 18.VI.1931 (1♀); Vrana (WJ 46), 18.VI.1924 (1♀) (Moucha, 1959); Draga Sušak (VL 51), 11.VI.1887 (1♀); Hvar (XH 18), 11.VI.1962 (1♀, 1♂), 18.VI.1962 (1♀, 7♂); Rovinj (UK 99), 12.VI.1964 (4♀) (Moucha, 1965); Hvar (XH 18) -, (6♀); Zadar (WJ 18) -, (1♀) (Strobl, 1902); Krk (VK 68) (Moucha, 1959); Bačina (XH 97), 29.VI.1990 (8♀, 3♂), 30.V.1995 (2♀), 4.VI.1996 (3♀); Biokovo (XJ 60), 17.VI.1990 (1♀); Ušće Neretve (YH 06), 29.VI.1990 (1♀); Rovinj (UK 99), 30.V.1991 (2♀), 10.VI.1993 (2♀); Cres (VK 57), 26.VI.1991 (1♀); Bokanjac (WJ 28), 29.V.1995 (3♀); Imotski (XJ 71), 20.VI.1995 (4♀); Glavina Donja (XJ 71), 21.VI.1995 (11♀); Prološko blato (XJ 71), 22.VI.1995 (1♀); Limski kanal (UK 99), 3.VI.1996 (1♂), 7.VI.1996 (2♀); Knapići (VL 00), 19.VII.1995 (18♀); Kanfanar (VK 19), 20.VII.1995 (11♀); Funtana (UL 90), 21.VII.1995 (1♀); Starigrad (WK 30), 25.VII.1995 (1♀); Plužine - Biokovo (XH 79), 26.VII.1995 (1♀), 4.VI.1996 (1♀), 5.VI.1996 (11♀), 25.VI.1996 (1♀); Omiš (XJ 31), 26.VII.1995 (5♀), 3.VI.1996 (2♀), 5.VI.1996 (3♀), 10.VII.1996 (7♀), 7.VIII.1996 (2♀); Dugopolje (XJ 22), 27.VII.1995 (14♀); Kotlenice (XJ 32), 27.VII.1995 (2♀); Donji Dolac (XJ 31), 27.VII.1995 (1♀); Bisko (XJ 32), 27.VII.1995 (3♀); Obod (BN 71), 18.V.1996 (1♀), 11.VII.1996 (1♀), 12.VII.1996 (5♀); Opuzen (YH 06), 19.V.1996 (1♀), 11.VII.1996 (2♀), 7.VIII.1996 (1♀); Zaton (WJ 59), 2.VI.1996 (2♀); Obrovac (WJ 59), 2.VI.1996 (5♀); Vodice (WJ 64), 3.VI.1996 (4♀); Lozovac (WJ 75), 3.VI.1996 (1♀), 23.VII.1996 (1♀); Ljubitovica (WJ 93), 3.VI.1996 (2♀); Gradac (XH 97), 3.VI.1996 (1♀); Modro Oko (YH 06), 4.VI.1996 (16♀); Metković (YH 16), 4.VI.1996 (1♀); Badžula (YH 16), 4.VI.1996 (5♀); Potravlje (XJ 24), 5.VI.1996 (1♀); Gračac (WK 60), 5.VI.1996 (1♀); Dragaljin (VL 70), 18.VII.1996 (1♀), 19.VII.1996 (1♀); Orebić (XH 76), 10.VIII.1996 (1♀); Korčula (XH 75), 12.VIII.1996 (1♀), 16.VIII.1996 (1♀); Beli (VK 59), 26.VI.1997 (1♀); Dobrinj (VK 69), 29.VI.1997 (21♀) (Krčmar, 1999); Borovik (BR 72), 8.VI.1995 (2♀); Kršinci (BR 73), 2.VII.1995 (1♀), 23.V.1996 (1♀); Kutjevo (YL 23), 21.V.1996 (1♀); Feričanci (YL 34), 7.VI.1997 (1♀); Novo Zvečevo (XL 94), 5.VII.1997 (1♀), Orahovica (YL 24), 16.V.1990 (1♀) (Krčmar & Mikuska, 2001); Zavižan (VK 96), 1.VII.1999 (2♀), 9.VI.2001 (7♀) (Krčmar, 2003); Komiža

(XH 86), 11.VI.2002 (1♀, 2♂); Žena Glava (WH 96), 11.VI.2002 (29♀, 1♂), 13.VI.2002 (50♀, 2♂); Stončica (XH 06), 10.VII.2001 (3♀), 12.VI.2002 (73♀, 5♂); Vis (XH 06), 12.VI.2002 (6♀, 3♂); Bargujac (XH 06), 5.VI.2002 (12♀), 12.VI.2002 (3♀), Zlo Polje (XH 06), 12.VI.2002 (7♀); Milna (XH 06), 14.VI.2002 (17♀); Kostirna (WH 96), 11.VI.2002 (132♀), 13.VI.2002 (27♀); Podstražje (XH 06), 11.VI.2002 (53♀) (Krčmar et al., 2003); Bargujac (XH 06), 12.VI.2002 (2♂), (Krčmar & Mikuska, 2002); Modro Oko (YH 06), 22.V.2002 (1♀), 15.VI.2002 (1♀); Baćinska jezera (XH 97), 22.V.2002 (2♀); Ušće Neretve (YH 06), 22.V.2002 (2♀), 15.VI.2002 (2♀); Desne (YH 07), 5.VI.2003 (1♀), 6.VI.2003 (3♀); Vriještica (YH 07), 6.VI.2003 (1♀, 1♂), 7.VI.2003 (1♂), 5.VII.2003 (1♀), 16.V.2003 (2♀) (Krčmar & Merdić, 2007); Sunger (VL 81), 18.VII.1993 (1♀); Lokve (VL 82), 29.VI.1996 (3♀); Jasenak (WL 00), 28.VI.1997 (1♀), 22.VI.2000 (1♀); Matić poljana (VL 81), 21.VI.2000 (1♀); (Krčmar et al., 2008); Orah (XH 98), 7.VI.2003 (48♀); Anđelići (XH 98), 7.VI.2003 (1♀); Blato na Cetini (XJ 41), 8.VI.2003 (3♀); Prološko jezero (XJ 71), 8.VI.2003 (14♀); Bargujac (XH 06), 9.VI.2003 (6♂); Vis (XH 06), 9.VI.2003 (8♀); Komiža (XH 86), 9.VI.2003 (10♀); Kostirna (WH 96), 9.VI.2003 (15♀); Žena Glava (WH 96), 9.VI.2003 (35♀); Kodžomanove staje (XJ 24), 10.VI.2003 (1♀); Papuk (YL 13), 21.VI.2003 (2♀); Bater (VK 89), 20.V.2007 (1♀), 21.V.2007 (1♀), 8.VI.2007 (1♀), 10.VI.2007 (1♀), 23.VI.2007 (10♀), 24.VI.2007 (2♀), 25.VI.2007 (6♀); Bjelsko (WL 00), 21.V.2007 (4♀), 22.V.2007 (5♀), 10.VI.2007 (1♀), 24.VI.2007 (1♀); Jasenak (WL 00), 22.V.2007 (4♀), 9.VI.2007 (4♀), 10.VI.2007 (2♀), 23.VI.2007 (1♀); Kneja (WL 11), 25.VI.2007 (1♀); Novi Vinodolski (VK 89), 9.VI.2007 (2♀), 10.VI.2007 (1♀), 23.VI.2007 (3♀), 24.VI.2007 (3♀), 25.VI.2007 (1♀), 19.VII.2007 (2♀); Velika Kapela (WL 00), 21.V.2007 (2♀), 22.V.2007 (1♀), 10.VI.2007 (1♀), 24.VI.2007 (1♀); Ledenice (VK 89), 8.VI.2007 (2♀), 10.VI.2007 (1♀) (S. Krčmar collection); Vriještica (YH 07), 6.VI.2003 (3♀), 7.VI.2003 (5♂), 15.VI.2004 (3♀), 19.VI.2004 (1♀, 1♂); Vrgorac (XH 98), 7.VI.2003 (3♀); Orah (XH 98), 7.VI.2003 (56♀); Prološko jezero (XJ 71), 8.VI.2003 (22♀); Bosiljevo (WL 22), 23.VI.2003 (1♀); Borovac (XL 61), 9.VI.2004 (1♀); Bučje (XL 83), 9.VI.2004 (2♀); Zastrižišće (XH 47), 16.VI.2004 (45♀, 1♂); Gdinj (XH 57), 16.VI.2004 (11♀); Bogomolje (XH 67), 16.VI.2004 (27♀); Baćina (XH 97), 17.VI.2004 (1♀); Dubrava (YH 05), 17.VI.2004 (5♀); Kula Norinska (XH 97), 18.VI.2004 (4♀); Desne (YH 07), 18.VI.2004 (6♀); Žena Glava (WH 96), 18.VI.2004 (30♀); Vis (XH 06), 9.VI.2003 (15♀), 18.VI.2004 (15♀); Ston (YH 05), 17.VI.2004 (1♀); Kostirna-Vis (WH 96), 18.VI.2004 (77♀) (J. Mikuska collection); Mljet (Dulibe) (YH 03), 30.V.2008 (8♀, 1♂) (T. Bogdanović collection).

6. *Therioptectes gigas* (Herbst, 1787)

Dubrovnik (BN 62) (Brauer, 1880; Strobl, 1898, 1900); Zadar (WJ 18) (Strobl, 1893); Split (XJ 11) (Strobl, 1902); Sljeme (WL 78), 1.VI.1899 (1♀); Kalnik (XM 11), 20.V.1918 (1♀); Krapina (WM 61), 20.V.1916 (1♀) (Moucha, 1965); Trnovec (WM 61), 15.VIII.1928 (1♀), 15.VIII.1932 (1♀), 2.V.1945 (2♀) (Majer, 1985); Opuzen (YH 06), 30.V.1995 (4♀), 19.V.1996 (6♀), 4.VI.1996 (3♀); Obod (BN 71), 18.V.1996 (1♀); Obrovac (WJ 59), 2.VI.1996 (1♀); Vransko jezero (WJ 46),

2.VI.1996 (1♀); Lozovac (WJ 75), 3.VI.1996 (1♀); Donje Polje (WJ 74), 3.06.1996 (1♀); Modro Oko (YH 06), 4.VI.1996 (1♀); Badžula (YH 16), 4.VI.1996 (1♀) (Krčmar, 1999); Pribiševci (BR 74), 18.V.1996 (2♀); Borovik (BR 72), 19.V.1996 (1♀); Kutjevo (YL 23), 21.V.1996 (2♀); Zoljan (BR 63), 21.V.1996 (1♀); Normanci (BR 94), 23.V.1996 (1♀); Bokšić Lug (YL 35), 24.V.1996 (4♀); Spačva (CQ 39), 8.VI.1996 (1♀); Podgorje (YL 13), 17.V.1997 (1♀) (Krčmar & Mikuska, 2001); Zavižan (VK 96), 9.VI.2001 (1♀) (Krčmar, 2003); Korenica (WK 56), 2.VI.1996 (1♀); Donji Nikšić (WK 49), 2.VI.1996 (2♀); Prološko jezero (XJ 71), 8.VI.2003 (1♀) (S. Krčmar collection). Modro Oko (YH 06), 14.V.2003 (2♀), 16.V.2003 (1♀), Vriještica (YH 07), 16.V.2003 (4♀), (Krčmar & Merdić, 2007); Vrpolje (BR 90), 20.V.2004 (1♀) (J. Mikuska collection).

7. *Theriopectes tunicatus* (Szilády, 1927)

Dubrovnik (BN 62), 30.V.1949 (2♂), (Moucha, 1965); Opuzen (YH 06), 30.V. 1995 (9♀), 19.V.1996 (8♀), 4.VI.1996 (6♀); Modro Oko, (YH 06), 30.V.1995 (2♀), 4.VI.1996 (10♀); Obod (BN 71), 17.V.1996 (2♀), 18.V.1996 (1♀); Metković (YH 16), 4.VI.1996 (1♀) (Krčmar, 1999); Vriještica (YH 07), 14.V.2003 (2♀, 5♂), 16.V.2003 (6♀, 8♂), 6.VI.2003 (6♀, 25♂); Modro Oko (YH 06), 15.V.2003 (3♀); Ušće Neretve (YH 06), 22.V.2002 (18♀) (Krčmar & Merdić, 2007); Omiš (XJ 31), 8.VI.2003 (1♀); Prološko jezero (XJ 71), 8.VI.2003 (1♀); Orah (XH 98), 7.VI.2003 (1♀); Vriještica (YH 07), 15.VI.2004 (6♂), 19.VI.2004 (1♀); Desne (YH 07), 18.VI.2004 (1♀) (J. Mikuska collection).

8. *Atylotus flavoguttatus* (Szilády, 1915)

Glavina Donja (XJ 71), 21.VI.1995 (1♀) (Krčmar, 1999); Plesmo (XL 41), 30.VI.1995 (1♀), (Krčmar & Leclercq, 1999); Bokšić Lug (YL 35), 2.VII.1994 (2♀), 24.V.1996 (2♀); Čokadinci (CR 04), 30.VII.1994 (1♀) (Krčmar & Mikuska, 2001); Legrad (XM 42), 28.VII.2005 (1♀) (Krčmar et al., 2006a); Prološko jezero (XJ 71), 8.VI.2003 (2♀) (S. Krčmar collection).

9. *Atylotus fulvus* (Meigen, 1804)

Dubrovnik (BN 62) (Brauer, 1880; Strobl, 1898, 1900); Rijeka (VL 51) (Strobl, 1893); Flengi (UL 90), 9.VIII.1975 (3♀); Poreč (UL 90), 2.VIII.1975 (1♂), 10.VIII. 1975 (2♀); Buzet (VL 12), 16.VIII.1975 (1♀); Livade (VL 02), 14.VIII.1975 (2♀) (Leclercq, 1976); Novo Zvečevo (XL 94), 17.VII.1997 (1♀) (Krčmar & Mikuska, 2001); Križpolje (WK 18), 24.VII.1995 (10♀); Haljevo-Beli Manastir (CR 16), 12.VII.2006 (1♀); Jasenak (WL 00), 10.VI.2007 (3♀) (S. Krčmar collection).

10. *Atylotus latistriatus* (Brauer, 1880)

Dubrovnik (BN 62) (Brauer, 1880; Strobl, 1898, 1900).

11. *Atylotus loewianus* (Villeneuve, 1920)

Otočac (WK 16), 18.VII.1960 (5♀); Slunj (WK 49), 18.VII.1960 (1♀) (Leclercq, 1960); Bakar (VL 61), 17.VIII.1902 (1♀), Brod na Savi (BR 60), 15.VIII.1901 (4♀), Čavle (VL 62), 20.VII.1887 (1♀); Krapina (WM 61), (1♀, 1♂); Ogulin (WL 11), 1.VII.1910 (1♀); Pregrada (WM 51), 27.VII.1886 (1♀), 22.VII.1898 (1♀, 2♂); Sadilovac (WK 58), (1♂); Skrad (VL 93), 21.VII.1914 (1♀); Švica (WK 16), 19.VII.1912 (1♀); Viljevo (BR 77), 18.VIII.1915 (1♀); Vinkovci (CR 21), 31.VII.1899 (1♀) (Moucha, 1965); Novska (XL 52), 17.VIII.1963 (4♀), (Leclercq, 1965); Buje (UL 92), 10.VII.1966 (1♀); Lanišće (VL 32), 23.VII.1966 (2♀) (Leclercq, 1968); Buzet (VL 12), 16.VIII.1975 (8♀); Flengi (UL 90), 9.VIII. 1975 (137♀, 3♂); Istarske Toplice (VL 12), 19.VIII.1975 (1♂); Kloštar Istarski (UL 90), 11.VIII. 1975 (92♀); Livade (VL 02), 14.VIII.1975 (250♀); Motovun (VL 02), 14.VIII.1975 (10♀); Poreč (UL 90), 2.VIII. 1975 (1♂), 10.VIII.1975 (15♀), (Leclercq, 1976); Imotski (XJ 71), 25.VIII.1994 (1♀), 8.VIII.1996 (16♀); Knapići (VL 00), 19.VII.1995 (25♀); Kanfanar (VK 19), 20.VII.1995 (18♀); Funtana (UL 90), 21.VII.1995 (13♀); Senj (VK 98), 24.VII.1995 (2♀); Azić Lokva (VK 97), 24.VII.1995 (1♀); Starigrad (WK 30), 25.VII.1995 (3♀), 28.VII.1995 (1♀); Biokovo - Plužine (XH 79), 26.VII.1995 (1♀), 13.VII.1996 (1♀), 9.VIII.1996 (1♀); Omiš (XJ 31), 26.VII.1995 (1♀), 10.VII.1996 (1♀), 7.VIII.1996 (1♀); Dugopolje (XJ 22), 27.VII.1995 (2♀); Bisko (XJ 32), 27.VII.1995 (1♀); Murvica (WJ 28), 27.VII.1995 (5♀); Barić Draga (WK 21), 28.VII.1995 (1♀); Opuzen (YH 06), 11.VII.1996 (1♀); Obod (BN 71), 12.VII.1996 (1♀); Runovići (XJ 80), 12.VII.1996 (12♀); Rtina Miočići (WJ 95), 23.VII.1996 (2♀); Lozovac (WJ 75), 23.VII.1996 (1♀); Turjaci (XJ 33), 8.VIII.1996 (12♀); Dobrinj (VK 69), 29.VI.1997 (1♀), 20.VIII.1997 (1♀); Jurjevo (VK 97), 26.VII.1997 (3♀); Vrbnik (VK 79), 20.VIII.1997 (2♀); Krk jezero (VK 68), 21.VIII.1997 (6♀); Roč (VL 22), 22.VIII.1997 (30♀); Vozilići (VL 30), 22.VIII.1997 (45♀); Poličnik (WJ 29), 23.VIII.1997 (10♀); Sveti Stjepan (VL 31), 22.VIII.1997 (54♀); Bernobići (VL 22), 22.VIII.1997 (1♀) (Krčmar, 1999); Plesmo (XL 41), 30.VI.1995 (1♀); Čigoč (XL 22), 17.VII.1994 (1♀); Kratečko (XL 22), 20.VIII.1997 (1♀) (Krčmar & Leclercq, 1999); Bokane (YL 05), 10.VII.1989 (4♀); Podunavska pumpa (CR 35), 17.VIII.1987 (1♀); Josipovac (CR 15), 25.VII.1992 (1♀), 1.VIII.1992 (2♀); Čokadinci (CR 04), 3.VII.1993 (1♀), 11.VII.1993 (1♀), 4.VIII.1993 (2♀), 23.VIII.1993 (10♀), 2.VII.1995 (1♀); Petrijevc (CR 05), 9.VII.1993 (1♀), 10.VII.1993 (1♀), 8.VIII.1993 (1♀), 11.VIII.1993 (1♀), 12.VIII.1993 (6♀), 13.VIII.1993 (1♀), 16.VII.1994 (2♀), 23.VII.1994 (1♀); Mandićevac (BR 82), 24.VII.1994 (1♀), 27.VII.1994 (1♀); Bokšić Lug - šuma (BR 75), 26.VII.1994 (1♀); Orahovica (YL 24), 26.VII.1994 (1♀); Borovik (BR 72), 30.VII.1994 (20♀, 8♂), 5.VIII.1994 (28♀, 45♂), 16.VIII.1994 (58♀, 5♂), 20.VIII.1994 (23♀), 2.IX.1994 (55♀), 12.IX.1994 (5♀), 3.VII.1995 (2♀), 30.VII.1996 (6♀); Ostrošinci (BR 83), 30.VII.1994 (1♀); Bokšić Lug (YL 35), 9.VIII.1994 (17♀), 8.VII.1995 (3♀), 5.VIII.1997 (9♀); Poganovci (BR 94), 2.IX.1994 (1♀); Kršinci (BR 73), 2.VII.1995 (1♀); Levajska Varoš (BR 72), 15.VII.1995 (12♀); Kondrić (BR 81), 23.VIII.1995 (53♀); Musić (BR 72), 23.VIII.1995 (7♀); Kutjevo (YL 23), 25.VIII.1995 (1♀), 17.VII.1997 (15♀); Zoljan (BR 63), 25.VIII.1995 (5♀); Spačva (CQ 39), 27.VII.1996 (3♀), 21.VIII.1996 (3♀); Babina Greda (CQ 09), 5.VII.1996 (1♀), 13.VII.1996 (4♀), 5.VIII.1996 (5♀), 20.VIII.1996

(28♀), 24.VIII.1996 (9♀); Vrpolje (BR 90), 5.VII.1996 (2♀); Gradište (CR 10), 21.VIII.1996 (6♀); Grudnjak (YL 35), 5.VIII.1996 (7♀); Normanci (BR 94), 23.VIII.1996 (1♀); Čeralije (YL 15), 5.VII.1997 (25♀); Novo Zvečevo (XL 94), 5.VII.1997 (4♀), 17.VII.1997 (2♀); Kamenski Vučjak (XL 93), 17.VII.1997 (1♀); Mikleuš (YL 15), 17.VII.1997 (1♀); Paučje (BR 72), 15.VIII.1997 (16♀); Čeminac (CR 16), 16.VII.1998 (1♀); Haljevo – Beli Manastir (CR 16), 16.VII.1998 (10♀), 4.VIII.1998 (8♀), 10.VIII.1998 (24♀, 4♂), 23.VIII.2000 (19♂, 7♀); Tikveš (CR 36), 27.VII.1998 (1♀), 7.VIII.1998 (1♀), 26.VIII.1998 (1♀), 27.VIII.1998 (1♀), 25.VI.1999 (2♀), 29.VII.1999 (2♀); 26.VIII.1999 (2♀); Kozjak (CR 35), 3.VIII.1998 (1♀); Jelas Polje (YL 10), 25.VII.1998 (1♀); Osijek (CR 24), 15.VI.1999 (2♀); Kopačko jezero (CR 35), 26.VIII.1999 (1♀); Zmajevac (CR 37), 2.VIII.2000 (1♀); Oprisavci (BR 80), 10.VIII.2000 (1♀), (Krčmar & Mikuska, 2001); Oltari (VK 96), 26.VII.1997 (1♀), 28.VII.1995 (1♀); Zavižan (VK 96), 12.VIII.2000 (8♀) (Krčmar, 2003); Tikveš (CR 36), 4.VII.2004 (1♀), 5.VII.2004 (1♀), 6.VII.2004 (1♀), 8.VII.2004 (42♀), 9.VII.2004 (29♀), 10.VII.2004 (1♀), 17.VII.2004 (33♀), 18.VII.2004 (4♀), 19.VII.2004 (30♀), 20.VII.2004 (31♀), 21.VII.2004 (30♀), 22.VII.2004 (9♀), 23.VII.2004 (40♀), 24.VII.2004 (7♀), 1.VIII.2004 (73♀), 2.VIII.2004 (84♀), 3.VIII.2004 (16♀), 5.VIII.2004 (18♀), 6.VIII.2004 (42♀), 9.VIII.2004 (37♀), 12.VIII.2004 (52♀), 15.VIII.2004 (12♀), 16.VIII.2004 (43♀), 18.VIII.2004 (19♀), 19.VIII.2004 (16♀), 24.VIII.2004 (47♀), 30.VIII.2004 (51♀), 25.VIII.2004 (25♀), 27.VIII.2004 (3♀), 3.IX.2004 (22♀) (Krčmar et al., 2005); Repaš (XM 61), 24.VII.1995 (1♀); Ferdinandovac (XM 70), 20.VIII.2005 (1♀); Moslavina Podravska (YL 37), 16.VII.2005 (1♀), 20.VIII.2005 (1♀); Sopje (YL 17), 16.VII.2005 (1♀); Noskovci (YL 27), 16.VII.2005 (2♀) (Krčmar et al., 2006a); Monjoroš – Zmajevac (CR 37), 2.VIII.2005 (1♀), 10.VIII.2005 (1♀), 11.VIII.2005 (1♀), 14.VII.2005 (2♀), 17.VII.2005 (2♀), 31.VII.2005 (2♀) (Krčmar et al., 2006b). Gerovo (VL 74), 14.VII.2002 (1♀); Sunger (VL 81), 18.VII.1993 (1♀) (Krčmar et al., 2008); Trebarljevo (XL 05), 17.VII.1994 (19♀); Donji Čaglić (XL 62), 15.VII.1995 (1♀); Križpolje (WK 18), 24.VII.1995 (37♀); Baške Oštarije (WK 13), 28.VII.1995 (2♀); Brušane (WK 22), 28.VII.1995 (2♀); Šenkovec (XM 14), 17.VIII.1996 (1♀); Velika Kapela (WK 08), 18.VII.1996 (1♀); Donji Nikšić (WK 49), 20.VIII.1997 (19♀); Gvozd (WL 62), 20.VIII.1997 (29♀); Kamenica (WL 30), 20.VIII.1997 (5♀); Petrinja (WL 93), 20.VIII.1997 (30♀); Vojnić (WL 81), 20.VIII.1997 (5♀); Brlog (WK 17), 22.VI.2000 (1♀); Jankovac (YL 13), 3.VII.2002 (2♀); Vransko jezero (WJ 46), 9.VIII.2003 (2♀); Zmajevac 12.VIII.2003 (1♀); Haljevo-Beli Manastir (CR 16), 4.VII.2006 (1♀), 12.VII.2006 (20♀), 13.VII.2006 (5♀), 18.VII.2006 (1♀), 24.VII.2006 (1♀), 1.VIII.2006 (1♀); Monjoroš-Zmajevac (CR 37), 4.VII.2006 (1♀), 16.VII.2006 (1♀), 24.VII.2006 (1♀), 26.VI.2008 (1♀), 10.VII.2006 (12♀), 11.VII.2006 (19♀), 12.VII.2006 (5♀), 13.VII.2006 (2♀), 15.VII.2006 (3♀), 20.VII.2006 (9♀), 23.VII.2006 (5♀), 28.VII.2006 (17♀), 30.VII.2006 (19♀), 11.VII.2008 (5♀), 31.VII.2008 (5♀), 1.VIII.2008 (9♀), 2.VIII.2008 (1♀), 13.VIII.2008 (15♀), 14.VIII.2008 (32♀), 15.VIII.2008 (1♀), 16.VIII.2008 (1♀); Tikveš (CR 36), 4.VII.2006 (3♀), 5.VII.2006 (1♀), 8.VII.2006 (4♀), 11.VII.2006 (26♀), 13.VII.2006 (4♀), 16.VII.2006 (4♀), 18.VII.2006 (1♀), 24.VII.2006 (3♀), 2.VIII.2006 (2♀), 10.VIII.2006 (1♀); Bater (VK 89), 19.VII.2007 (1♀), 20.VII.2007 (1♀), 21.VII.2007 (3♀), 8.VIII.2007 (1♀); 9.VIII.2007 (2♀); Ledenice (VK 89),

19.VII.2007 (1♀), 20.VII.2007 (1♀), 21.VII.2007 (2♀); Jasenak (WL 00), 19.VII.2007 (2♀), 21.VII.2007 (3♀); Novi Vinodolski (VK 89), 19.VII.2007 (3♀), 21.VII.2007 (2♀); 9.VIII.2007 (3♀) (S. Krčmar collection); Uskoci (XL 60), 19.VII.1989 (2♀); Borovik (BR 72), 30.VII.1996 (7♂); Kotlina (CR 27), 24.VI.2004 (1♂); Kopačevo (CR 25), 2.VIII.2003 (3♀), 6.VII.2004 (1♀); Podolje (CR 17), 9.VII.2004 (2♀) (J. Mikuska collection).

12. *Atylotus rusticus* (Linneaus., 1767)

Dubrovnik (BN 62) (Strobl, 1898, 1900); Brezik (WK 32), 6.VII.1960 (2♀); Otočac (WK 17), 18.VII.1960 (14♀) (Leclercq, 1960); Novska (XL 52), 17.VIII.1963 (84♀) (Leclercq, 1965); Pregrada (WM 51), 26.VII.1886 (1♀), 16.VIII.1892 (1♀), 22.VII.1898 (1♀); Zagreb (WL 77), 20.VIII.1886 (1♀), 12.VIII.1893 (1♀); Zlatar (WM 80), 26.VIII.1893 (1♂); Petrinja (WL 93), 17.VIII.1895 (1♀), 20.VIII.1895 (1♀); Brod na Savi (BR 60), 15.VIII.1901 (1♀); Karlovac (WL 43), 12.VII.1904 (2♂); Donja Bistra (WL 68), 27.VII.1909 (1♂); Sunja (XL 22), 30.VIII.1911 (1♂); Mošćenica (XL 03), 1.IX.1911 (2♂); Otočac (WK 16), 11.VII.1912 (1♀); Švica (WK 16), 19.VII.1912 (1♀); Jablanac (VK 95), 3.VI.1914 (1♂); Krapina (WM 61), 26.VII.1910 (1♀, 1♂), (Moucha, 1965); Kopačevo (CR 25), 10.VII.1982 (2♀), 23.VII.1982 (1♀), 28.VIII.1982 (2♀); Eblin-Podunavlje (CR 35), 1.VII.1987 (2♀), 9.VII.1987 (2♀), 11.VII.1987 (1♀), 13.VII.1987 (1♀); Čošak šume-Kopački rit (CR 35), 22.VII.1987 (1♀); Podunavska pumpa - Podunavlje (CR 35), 17.VIII.1987 (2♀), 24.VIII.1987 (8♀), 27.VIII.1987 (1♀); Josipovac (CR 15), 23.VII.1992 (1♀); Čokadinci (CR 04), 11.VII.1993 (1♀), 4.VIII.1993 (1♀), 23.VIII.1993 (25♀); Petrijevcu (CR 05), 9.IX.1993 (2♀), 2.VII.1995 (1♀); Zokov Gaj (YL 35), 2.VII.1994 (1♀); Mandićevac (BR 82), 21.VII.1994 (1♀); Borovik (BR 72), 30.VII.1994 (4♀), 5.VIII.1994 (1♀), 16.VIII.1994 (9♀), 20.VIII.1994 (4♀), 2.IX.1994 (10♀), 12.IX.1994 (7♀); Trebarljevo (XL 05), 17.VII.1994 (3♀); Bokšić Lug (YL 35), 9.VIII.1994 (5♀); Babina Greda (CQ 09), 5.VIII.1996 (2♀), 20.VIII.1996 (28♀), 24.VIII.1996 (7♀); Gradište (CR 10), 21.VIII.1996 (9♀); Spačva (CQ 39), 21.VIII.1996 (1♀); Kozjak (CR 35), 3.VIII.1998 (3♀); Tikveš (CR 36), 5.VI.1998 (1♀), 7.VIII.1998 (1♀), 10.VIII.1998 (1♀), 27.VIII.1998 (1♀), 1.VIII.2004 (1♂), 2.VIII.2004 (1♀), 6.VIII.2004 (1♀), 25.VIII.2004 (3♀), 3.IX.2004 (1♀), 10.IX.2004 (1♀) (Krčmar & Mikuska, 2001; Krčmar et al., 2005); Haljevo-Beli Manastir (CR 16), 10.VIII.1998 (1♀); Zmajevac (CR 37), 10.VIII.1998 (5♀), 14.VI.2000 (1♀) (Krčmar & Mikuska, 2001); Čigoč (XL 22), 17.VII.1994 (1♀), 20.VIII.1997 (1♀); Plesmo (XL 41), 8.VI.1994 (1♀), 30.VI.1995 (2♀); Krapje Đol (XL 41), 30.VI.1995 (1♀); Segetac (XL 42), 30.VI.1995 (2♀); Kratečko (XL 22), 20.VIII.1997 (10♀); Lonja (XL 32), 16.VIII.1998 (1♀) (Krčmar & Leclercq, 1999); Kumrovec (WM 50), 19.VII.1994 (6♀); Jezerane (WK 18), 24.VII.1995 (1♀); Križpolje (WK 18), 24.VII.1995 (30♀); Šenkovec (XM 14), 17.VIII.1996 (1♀); Lipovljani (XL 42), 10.VI.1997 (1♀); Gvozd (WL 62), 20.VIII.1997 (4♀); Petrinja (WL 93), 20.VIII.1997 (17♀); Prološko jezero (XJ 71), 8.VI.2003 (3♀); Kodžomanove staje (XJ 24), 10.VI.2003 (3♀); Zmajevac (CR 37), 12.VIII.2003 (1♀), 11.IX.2003 (1♀) (S. Krčmar collection); Jasenak (WL 00), 25.VI.2003 (7♀); Podolje (CR 17), 9.VII.2004 (1♀) (J. Mikuska collection).

Discussion

The zoogeographical analysis of horse flies in Croatia shows that the Mediterranean species *Dasyrhamphis anthracinus*, *Dasyrhamphis ater*, *Dasyrhamphis umbrinus* and *Theriopectes tunicatus* appear in Croatia only along the Adriatic coast. In general, these four species are distributed in the Mediterranean region (Southern Europe and Northern Africa) (Chvála et al., 1972). The finding of these species in Croatia is a confirmation of the known area of distribution. Furthermore, the Mediterranean species of *Theriopectes gigas* and *Philipomyia graeca* were in addition found in the Alpine and continental regions of Croatia. *Philipomyia graeca* was collected in the continental region in stations on the southern slopes of the Dilj, Krndija and Papuk mountain massifs and in the Alpine region. Some specimens of *Theriopectes gigas* were sampled in the Spačva forest basin in Pannonian region of Croatia. The northern border of distribution of *Theriopectes gigas* and *Philipomyia graeca* is in Central Europe (Chvála et al., 1972; Majer, 1987), and these data represent a contribution to the known area of distribution. *Philipomyia aprica* was found in the Alpine region of Croatia, as well as in the Mediterranean region on the mountains along the Adriatic coast. Despite its distribution in all of the countries of Central Europe (Chvála et al., 1972), this species was not previously found in the Continental and Pannonian regions of Croatia. The boreal Eurasian species *Atylotus fulvus* and *Atylotus rusticus* and South-European *Atylotus loewianus* were collected in the Mediterranean, Alpine, Pannonian and Continental regions of Croatia. *Atylotus fulvus* and *Atylotus rusticus* are distributed throughout the entirety of Europe and reach the territories of most Mediterranean countries (Chvála et al., 1972) and these findings in Croatia also represent a contribution to the known area of distribution. The Afro-Eurasian arid species *Atylotus flavoguttatus* was collected in the Mediterranean, Pannonian and continental regions of Croatia. For this species the centre of distribution is in Central Asia. It is known from the European part of Russia, Romania, South France, Austria, Turkey and from North Africa (Chvála et al., 1972; Kiliç, 1999). The area of distribution for *Atylotus loewianus* consists of the territories of Mediterranean countries whence it reaches Central Europe (Chvála et al., 1972); the finding of this species in Croatia confirms the known area of distribution in Europe. *Atylotus latistriatus* is widely distributed in Europe and has been found in Western, Southern and Eastern Europe and reaches

Central Asia and to North Africa (Chvála et al., 1972). However, it appears only as single individuals and we assume that it is a rare species in Europe. With regard to Croatia, *Atylotus latistriatus* is known only from the literature data (Brauer, 1880, Strobl, 1898, 1900) for the Mediterranean region, at the locality of Dubrovnik and with no information on the exact number of specimens and sampling dates.

Conclusion

The review of collected specimens of horse flies from the genera *Dasyrhamphis*, *Philipomyia*, *Atylotus* and *Theriopectes* and published data referring to the territory of Croatia show that 12 species are mentioned. *Dasyrhamphis anthracinus*, *Dasyrhamphis ater*, *Dasyrhamphis umbrinus* and *Theriopectes tunicatus* were found exclusively in the Mediterranean region along the Adriatic Sea coast. Unlike the boreal Eurasian species *Atylotus fulvus* and *Atylotus rusticus* and South-European *Atylotus loewianus* and Afro-Eurasian arid species *Atylotus flavoguttatus* for which the majority of the specimens were collected in the Continental and Pannonian regions of Croatia. Furthermore, the two Mediterranean species *Philipomyia graeca* and *Theriopectes gigas* were collected in all regions of Croatia, while *Philipomyia aprica* was mostly found in the Alpine region. *Atylotus latistriatus* is known only from information provided in the literature.

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