

Horse Flies (Tabanidae) a Contribution to the Knowledge about the Biodiversity of Lonjsko Polje

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Abstract

The study of the horseflies on the territory of the Lonjsko Polje Nature Park resulted in the determination of 20 species of horseflies classified into 5 genera. *Tabanus bromius* and *Tabanus maculicornis* make up 71,02% of the fauna of horseflies in the area. The collected material included also the species *Atylotus flavoguttatus* and *Haematopota bigoti* that have only recently been recorded in Croatia for the first time. All collected specimens are females.

Keywords : Diptera, Tabanidae, biodiversity, Croatia.

Introduction

The Lonjsko Polje Nature Park, located in the river basin of the rivers Sava and Lonja, is one of the rare preserved flood regions of Europe. It is one of the largest and best-preserved wet biotopes in Europe. The Lonjsko Polje Nature Park encompasses an area of 50,650 ha. It is located between Sisak and Nova Gradiška. The park's northern boundary is the highway from Zagreb to Slavonski Brod, and its southern border is the river Sava (SCHNEIDER-JACOBY & ERN, 1993). The soil of the Nature Park is an alluvium of the Sava river that came into existence thanks to a slight decline of the river bed of the Sava river, so that its flood waters remain there, especially in the depressions off the river banks, for a long time and thus create the foundation for a rich flora and fauna in Lonjsko Polje. Between the inundated areas there are large unfenced pastures of 10.00 ha in size (SCHNEIDER-JACOBY, 1994). Since this habitat has all the characteristics of a wet biotope, it is rich with species that are, at least in one part of their life, bound to water (SCHNEIDER-JACOBY & ERN, 1993). Among the species that also live in the area are the horseflies (Tabanidae). They emerge mostly around the end of May and are most abundant during the summer months when throughout the day and to-

wards the evening they disturb various endothermic animals. Horse flies participate in the transmission of various diseases of cattle and of humans (FOIL, 1989; FOIL *et al.*, 1989) and are therefore the object of numerous medical research projects. Indigent data on the fauna of insects in the Lonjsko Polje Nature Park have initiated this faunal research which contributes to a better understanding and to a greater knowledge of biological diversity in the region.

Material and methods

Faunal research work on horseflies in the territory of the Lonjsko Polje Nature Park was carried out in June of 1994, 1995, 1996, 1997, in July 1994, and in August of 1997 and 1998. Several specimens were also collected earlier, in June and July 1990. The horseflies were collected at the following stations: Veliki Strug (XL 60), Košutarica (XL 51), Puska (XL 42), Sigetac (XL 42), Plesmo (XL 41), Drenov Bok (XL 41), Jasenovac (XL 41), Krapje Đol (XL 41), Mužilovica (XL 32), Trebež (XL 32), Lonja (XL 32), Kratečko (XL 22) and Čigoč (XL 22), (Fig. 1). The stations are in the immediate vicinity of the rivers Sava and Lonja and they are overgrown with wood communities of oak-trees and broom (*Genisto elatae* - *Quercetum roboris*). Horseflies

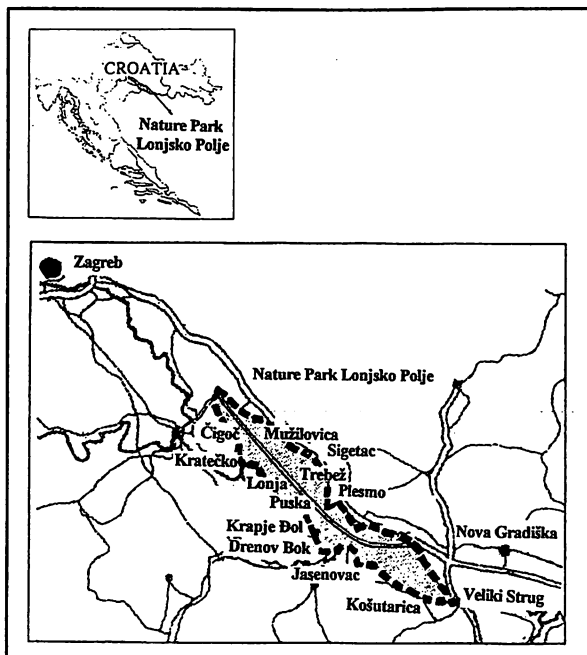


Fig. 1. Lonjsko Polje Nature Park - Croatia.

were mostly collected by means of a sampling net on grazing cattle, on large unfenced pastures and a few specimens were also caught by hand in a car parked on the forest margin. The collected specimens were analyzed and determined according to the keys: CHVÁLA *et al.* (1972) and MAJER (1987). The names of the species were written according to the catalogue of CHVÁLA (1988).

Results

On the territory of the Lonjsko Polje Nature Park, a total of 1001 specimens of horseflies were collected. The collected specimens were classified into 20 species (Table 1). The genus mostly represented is *Tabanus* with 6 species, followed by *Hybomitra* with 5 species and *Chrysops*, *Atylotus* and *Haematopota*, each with 3 species. The most abundant species of horseflies in the studied area is *Tabanus bromius* with a share of 38,16% in the collected sample. All collected specimens are females, and they were collected on 13 stations covering 6 fields on the UTM grid of Croatia. Most of the collected horseflies were caught on the stations: Sigetac, Plesmo and Krapje Đol. The horseflies caught on these stations comprise 82,71% of all collected specimens (Table 2).

List of the horse flies, including dates, and number of the specimens caught on the territory of the Lonjsko Polje Nature Park .

1. *Chrysops caecutiens* (L., 1758): Sigetac, 30. VI.1995 (1♀).
2. *Chrysops relictus* MEIGEN, 1820: Krapje Đol, 20.VI.1996 (3♀♀); Trebež, 14.VII.1990 (7♀♀).
3. *Chrysops viduatus* (FABRICIUS, 1794): Puska, 8.VI.1994 (2♀♀); Plesmo, 8.VI.1994 (1♀), 30. VI.1995 (2♀♀); Mužilovica, 17.VII.1994 (3♀♀); Sigetac, 30.VI.1995 (26♀♀); Trebež, 14.VII.1990 (3♀♀).
4. *Atylotus flavoguttatus* (SZILÁDY, 1915): Plesmo, 30.VI.1995 (1♀).
5. *Atylotus loewianus* (VILLENEUVE, 1920): Čigoč, 17.VII.1994 (1♀); Plesmo, 30.VI.1995 (1♀); Kratečko, 20.VIII.1997 (1♀).
6. *Atylotus rusticus* (L., 1767): Plesmo, 8.VI. 1994 (1♀), 30.VI.1995 (2♀♀); Čigoč, 17.VII. 1994 (1♀), 20.VIII.1997 (1♀); Krapje Đol, 30.VI.1995 (1♀); Sigetac, 30.VI.1995 (2♀♀); Kratečko, 20.VIII.1997 (10♀♀); Lonja, 16. VIII.1998 (1♀).
7. *Hybomitra bimaculata* (MACQUART, 1826): Trebež, 14.VII.1990 (1♀); Plesmo, 8.VI.1994 (1♀), 30.VI.1995 (5♀♀); Krapje Đol, 30.VI. 1995 (3♀♀), 20.VI.1996 (3♀♀); Sigetac, 30. VI.1995 (8♀♀); Košutarica, 20.VI.1996 (6♀♀); Jasenovac, 20.VI.1996 (1♀).
8. *Hybomitra ciureai* (SÉGUY, 1937): Trebež, 14.VII.1990 (1♀); Plesmo, 8.VI.1994 (2♀♀), 30.VI.1995 (2♀♀); Drenov Bok, 8.VI.1994 (1♀); Čigoč, 17.VII.1994 (2♀♀); Mužilovica, 17.VII.1994 (1♀); Krapje Đol, 30.VI.1995 (6♀♀), 20.VI.1996 (1♀); Sigetac, 30.VI.1995 (2♀♀); Jasenovac, 20.VI.1996 (1♀).
9. *Hybomitra distinguenda* (VERRALL, 1909): Krapje Đol, 30.VI.1995 (1♀).
10. *Hybomitra muehlfeldi* (BRAUER, 1880): Trebež, 14.VII.1990 (1♀); Plesmo, 8.VI.1994 (1♀); Drenov Bok, 8.VI.1994 (1♀); Sigetac, 30.VI.1995 (1♀); Košutarica, 20.VI.1996 (1♀); Krapje Đol, 20.VI.1996 (1♀).
11. *Hybomitra solstitialis* (MEIGEN, 1820): Plesmo, 30.VI.1995 (3♀♀); Krapje Đol, 30.VI. 1995 (1♀), 20.VI.1996 (2♀♀); Sigetac, 30.VI. 1995 (3♀♀).
12. *Tabanus autumnalis* L., 1761: Plesmo, 8.VI. 1994 (2♀♀), 30.VI.1995 (2♀♀); Sigetac, 30. VI.1995 (1♀); Krapje Đol, 20.VI.1996 (3♀♀).

13. *Tabanus bovinus* L., 1758: Plesmo, 8.VI.1994 (6♀♀), 30.VI.1995 (1♀); Čigoč, 17.VII.1994 (1♀); Sigetac, 30.VI.1995 (1♀); Krapje Đol, 20.VI.1996 (1♀).
14. *Tabanus bromius* L., 1758: Veliki Strug, 27.VI.1990 (1♀); Košutarica, 27.VI.1990 (16♀♀), 20.VI.1996 (2♀♀); Trebež, 14.VII.1990 (8♀♀); Plesmo, 8.VI.1994 (51♀♀), 30.VI.1995 (121♀♀); Drenov Bok, 8.VI.1994 (6♀♀); Puska, 8.VI.1994 (4♀♀); Čigoč, 17.VII.1994 (12♀♀), 30.VI.1997 (1♀); Mužilovica, 17.VII.1994 (2♀♀); Krapje Đol, 30.VI.1995 (96♀♀), 20.VI.1996 (30♀♀); Sigetac, 30.VI.1995 (26♀♀); Jasenovac, 20.VI.1996 (5♀♀); Lonja, 16.VIII.1998 (1♀).
15. *Tabanus maculicornis* ZETTERSTEDT, 1842: Veliki Strug, 27.VI.1990 (2♀♀); Košutarica, 27.VI.1990 (2♀♀), 20.VI.1996 (1♀); Trebež, 14.VII.1990 (2♀♀); Plesmo, 8.VI.1994 (27♀♀), 30.VI.1995 (28♀♀); Drenov Bok, 8.VI.1994 (3♀♀); Puska, 8.VI.1994 (10♀♀); Krapje Đol, 30.VI.1995 (38♀♀), 20.VI.1996 (11♀♀); Sigetac, 30.VI.1995 (203♀♀); Jasenovac, 20.VI.1996 (2♀♀).
16. *Tabanus sudeticus* ZELLER, 1842: Veliki Strug, 27.VI.1990 (1♀); Trebež, 14.VII.1990 (7♀♀); Plesmo, 8.VI.1994 (3♀♀), 30.VI.1995 (31♀♀); Krapje Đol, 30.VI.1995 (2♀♀), 20.VI.1996 (2♀♀); Sigetac, 30.VI.1995 (25♀♀); Košutarica, 20.VI.1996 (6♀♀); Jasenovac, 20.VI.1996 (3♀♀).
17. *Tabanus tergestinus* EGGER, 1859: Plesmo, 30.VI.1995 (3♀♀).
18. *Haematopota bigoti* GOBERT, 1880: Plesmo, 30.VI.1995 (1♀); Kratečko, 20.VIII.1997 (1♀).
19. *Haematopota pluvialis* (L., 1758): Veliki Strug, 27.VI.1990 (1♀); Košutarica, 27.VI.1990 (1♀); Trebež, 14.VII.1990 (11♀♀); Plesmo, 8.VI.1994 (6♀♀), 30.VI.1995 (1♀); Čigoč, 17.VII.1994 (1♀), 24.VI.1996 (1♀); Mužilovica, 17.VII.1994 (5♀♀); Krapje Đol, 30.VI.1995 (1♀), 20.VI.1996 (1♀); Sigetac, 30.VI.1995 (15♀♀); Jasenovac, 20.VI.1996 (1♀); Kratečko, 20.VIII.1997 (1♀); Lonja, 16.VIII.1998 (3♀♀).
20. *Haematopota subcylindrica* PANDELLÉ, 1883: Čigoč, 17.VII.1994 (1♀); Plesmo, 30.VI.1995 (2♀♀); Kratečko, 20.VIII.1997 (1♀).

Table 1. The number of collected species of horse flies on the territory of the Nature Park Lonjsko Polje.

Species	Collected specimens	%
<i>Tabanus bromius</i> L., 1758	382	38,16
<i>Tabanus maculicornis</i> Zetterstedt, 1842	329	32,86
<i>Tabanus sudeticus</i> Zeller, 1842	80	7,99
<i>Haematopota pluvialis</i> (L., 1758)	49	4,89
<i>Chrysops viduatus</i> (Fabricius, 1794)	37	3,69
<i>Hybomitra bimaculata</i> (Macquart, 1826)	28	2,79
<i>Atylotus rusticus</i> (L., 1767)	19	1,89
<i>Hybomitra ciureai</i> (Séguy, 1937)	19	1,89
<i>Chrysops relictus</i> Meigen, 1820	10	0,99
<i>Tabanus bovinus</i> L., 1758	10	0,99
<i>Hybomitra solstitialis</i> (Meigen, 1820)	9	0,89
<i>Tabanus autumnalis</i> L., 1761	8	0,79
<i>Hybomitra muehlfeldi</i> (Brauer, 1880)	6	0,59
<i>Haematopota subcylindrica</i> Pandellé, 1883	4	0,39
<i>Atylotus loewianus</i> (Villeneuve, 1920)	3	0,29
<i>Tabanus tergestinus</i> Egger, 1859	3	0,29
<i>Haematopota bigoti</i> Gobert, 1880	2	0,19
<i>Chrysops caecutiens</i> (L., 1758)	1	0,09
<i>Atylotus flavoguttatus</i> (Szilády, 1915)	1	0,09
<i>Hybomitra distinguenda</i> (Verrall, 1909)	1	0,09
20	1001	100

Table 2. Number of collected horsefly specimens on the territory of the Nature Park Lonjsko Polje.

Localities	UTM	Collected specimens	%
Sigetac	XL 42	314	31,36
Plesmo	XL 41	307	30,66
Krapje Dol	XL 41	207	20,67
Trebež	XL 32	41	4,09
Košutarica	XL 51	35	3,49
Čigoč	XL 22	22	2,19
Puska	XL 42	16	1,59
Kratečko	XL 22	14	1,39
Jasenovac	XL 41	13	1,29
Drenov Bok	XL 41	11	1,09
Mužilovica	XL 32	11	1,09
Veliki Strug	XL 60	5	0,49
Lonja	XL 32	5	0,49
13		1001	100

Discussion

The territory of the Nature Park consists of vast oak woods intersected with picturesque pasture grounds like a mosaic, with old cattle breeders' cabins and numerous water areas constituting one of the most valuable faunal regions of Europe, particularly in terms of breeding birds (SCHNEIDER-JACOBY, 1994). The international importance of this region was confirmed when in 1993 the Park of Nature Lonjsko Polje was put on the List of Wetlands of International Importance (Ramsar Convention) because of the extreme importance and state of preservation of its wet biotopes (SCHNEIDER-JACOBY, 1994). The insect fauna of the Nature Park is rather uninvestigated. The only published data are those on dragonflies (Odonata), 43 species of which were ascertained in the park (SCHNEIDER-JACOBY, 1994). In the reviewed literature no data were found on the fauna of horseflies in the studied area. However, in the immediate vicinity of the Nature Park, on the stations in Novska (XL 52) and Sunja (XL 11) previous studies revealed the presence of the following species: *Chrysops caecutiens*, *Chrysops flavipes*, *Atylotus loewiannus*, *Atylotus rusticus*, *Tabanus bromius* and *Tabanus sudeticus* (LECLERCQ, 1965, 1968; MOUCHA, 1965). Five of the above species were also discovered in the Lonjsko Polje Nature Park. *Chrysops flavipes* was not found because it is a Mediterranean

species that only sporadically reaches the territory of Central Europe (CHVÁLA *et al.*, 1972). During the research, the species *Atylotus flavoguttatus* and *Haematopota bigoti* were ascertained. These two species were only recently recorded in Croatia (MAJER *et al.*, 1995; KRČMAR & MIKUSKA, 1994). The species *Tabanus bromius* and *Tabanus maculicornis* are the most abundant species in the studied area, since they were recorded on most stations. The two species belong to the most frequent species of the family Tabanidae that are widespread throughout Europe (CHVÁLA *et al.* 1972). Most of the established species (15) belong to the boreal - Euroasian type of fauna according to OLSUFJEV (1977). For the species *Atylots loewianus*, *Atylotus flavoguttatus*, *Tabanus tergestinus* and *Haematopota bigoti* centers of abundance lie in the Mediterranean region. These (4) species are represented with a smaller number of specimens, since Central Europe is the northern border of their distribution. All collected specimens are females. They were in most cases caught while taking a blood meal on the cattle. The number of specimens collected on individual stations depends on the presence of cattle during the vegetation season. This explains the great difference in the number of collected specimens and species of horseflies in comparison to other stations where cattle are present only periodically, (Sigetac, Plesmo) or where there are no cattle at all. The major cause may be the lack of regularity in research activities. The qualitative structure of the 20 identified species of horseflies in the Lonjsko Polje Nature Park indicates the necessity to continue with faunal and ecological research, because these 20 species are certainly not the final number of species of horseflies in the park. The determined species make up a mere 26,31% of the horsefly fauna of Croatia.

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**On two species of Phasmatodea in the collection of the
Institut royal des Sciences naturelles de Belgique, Bruxelles,
including the description of a new species**

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Abstract

One new species of Phasmatodea (*Nesiophasma zanus* sp. n.) as well as the egg of *Phasma marosensis* HENNEMANN 1998 are described and illustrated. The specimens discussed are preserved in the collection of the Institut royal des Sciences naturelles de Belgique, Bruxelles.

Keywords : Phasmatodea, IRSNB, *Nesiophasma zanus*, *Phasma marosensis*, new species, eggs, description.

While photographing and checking the Phasmatodea type material preserved in the Institut royal des Sciences naturelles de Belgique in Brussels, one new species could be identified. One of the two specimens of a species previously described by the author in a paper dealing with the stick-insect fauna of Sulawesi, had an egg in its ovipositor which is described below. The terminology for the description of the eggs is that of SELICK (1997).

***Nesiophasma zanus* sp. n.**

Tirachoidea zanus REDTENBACHER in litt., VANSCHUYTENBROEK & COOLS, 1981 : 17.- Bull.

Inst. r. Sci. nat. Belg., 53(23).

Holotype, female : Nouvelle Guinee, Fruhstorfer (coll. IRSN).

REDTENBACHER placed a label with the name "*Tirachoidea zanus* Redt. sp. n." on this specimen, a name which was not published in his monograph "Die Insektenfamilie der Phasmiden 1906-1908" nor in any other publication. The name is therefore unpublished but is taken over from REDTENBACHER and used for this species.

The new species is most closely related to *Nesiophasma spinulosum* (BRUNNER v.W., 1907) [= *Nesiophasma eremothocus* GÜNTHER, 1934], but