

## Geographical distribution of Tabanids (Diptera: Tabanidae) of the Drava river along the Somogy County (Hungary), the Koprivničko-križevačka and one part Virovitičko-podravaska County (Croatia)

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MAJER J., KRČMAR S.: *Geographical distribution of Tabanids (Diptera: Tabanidae) of the Drava river along the Somogy County (Hungary), the Koprivničko-križevačka and one part Virovitičko-podravaska County (Croatia).*

**Abstract:** The faunistic research of Tabanids along the Somogy County both in the Hungarian and Croatian side of the Drava river resulted in the recording of 42 Tabanid species of which *Atylotus flavoguttatus* (Szilády, 1915), *Hybomitra distinguenda* (Verrall, 1909), *Heptatoma pellucens* (Fabricius, 1776) and *Haematopota italica* Meigen, 1804 were new for the study area.

**Keywords:** Wetland, UTM map, new species.

### Introduction

The mid and lower course of the river Drava (305 km) it is located between Hungarian and Croatian state borders and form great valleys with large floodplains. However, the beginning of the 19 century large parts of the wetlands in the Drava valley have been excluded from the floods by dykes except the parts of the river along the Somogy county. The anthropogenic impact has changed both the water regime of the river and the groundwater flow. Nevertheless, in comparison to other European river valleys, the ecological situation is still good. Despite the fact that the flood areas on Hungarian and Croatian sections of river Drava are home to wading birds, fish and a multitude of insects, there are relatively little data about its Diptera fauna. Among the Diptera from the point of view of medical and veterinary entomology the most important species belong to horse flies (Tabanidae) and mosquitoes (Culicidae), which are frequently vectors of various disease agents (KRINSKY, 1976; CARN, 1996; VAZZELLE-FALCOZ et al. 1997; THOMSON & CONOR, 2000). The Tabanidae are considered to be among the major diptera pests of man and animals worldwide, but this group is undoubtedly the last studied (FOIL, 1989). Due to this lack of data, faunistic and ecological studies were initiated to contribute to the knowledge of biodiversity of the insect fauna along Hungarian and Croatian sections of river Drava.

### Material and methods

The common faunistic and ecological research of Tabanids along Hungarian and Croatian sections of river Drava were carried out. The river has remained in natural or semi natural condition (as meandering freely) in along the Somogy County (Hungary), and along the Koprivničko-križevačka and one part Virovitičko-podravaska County (Croatia). The horse flies were collected on several localities in Hungary and in Croatia along the wetland areas and the oxbows belonging to the Drava River.

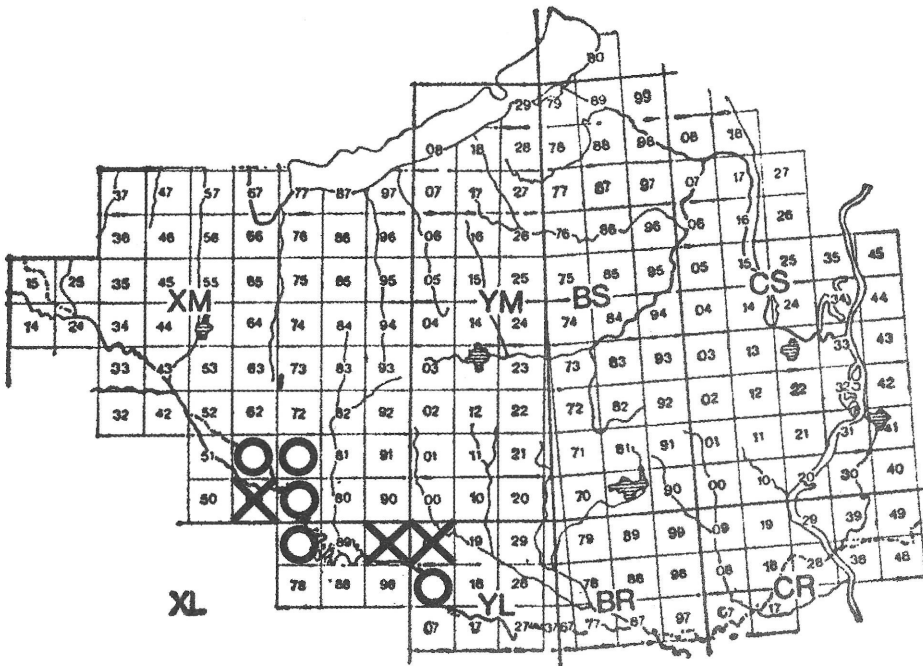
There are pastures, pet lands, common oak wood, white willow and black poplar forests. The Tabanids were primarily collected by means of an entomological net on the car or by hand in a car and by the Malaise traps. Collected Tabanids were stored in 70% alcohol, and only later dried, and pinned. All the Tabanids collected in Croatia are kept in the insect collections of the Department of Biology in Osijek. Also, specimens collected in Hungary are deposited in the insect collections of Department of General and Applied Ecology, Faculty of Science Pécs University. The sampled specimens were determined according to the key CHVÁLA et al. (1972), MAJER (1987), and OLSUFJEV (1977). The used classification follows Palaearctic Catalogue (CHVÁLA, 1988).

1. Table: Occurrence of species in the UTM grids

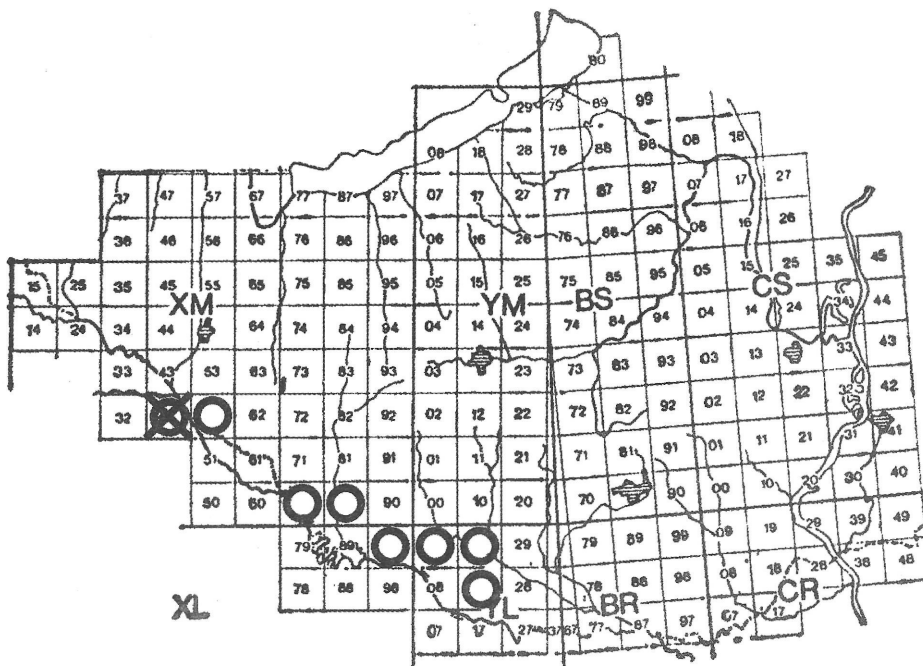
SPECIES	XM42	XM50	XM51	XM52	XM60	XM61	XL79	XL89	XL70	XL71	XL88	XL98	XL99	YL07	YL08	YL09
1 <i>Atylotus fulvus</i> (Meigen, 1820)					X								X			X
2 <i>Atylotus loewianus</i> (Vileneuve, 1920)						X	X		X	X					X	X
3 <i>Atylotus rusticus</i> (Linné, 1767)		X			X	X		X	X				X		X	X
4 <i>Atylotus flavoguttatus</i> (Szilády, 1915)		X														
5 <i>Chrysops caecutiens</i> (Linnaeus, 1758)		X			X	X	X		X	X	X				X	X
6 <i>Chrysops flavipes</i> Meigen, 1804													X		X	X
7 <i>Chrysops italicus</i> Meigen, 1804													X		X	X
8 <i>Chrysops paralellogrammus</i> Zeller, 1842		X				X	X		X	X	X				X	X
9 <i>Chrysops relictus</i> Meigen, 1820		X	X		X	X	X	X	X	X			X		X	X
10 <i>Chrysops rufipes</i> Meigen, 1820													X			
11 <i>Chrysops viduus</i> Meigen, 1820		X			X	X	X	X	X	X		X	X	X	X	X
12 <i>Haematopota crassicornis</i> Wahlberg, 1848													X			
13 <i>Haematopota grandis</i> Meigen, 1820																X
14 <i>Haematopota italica</i> Meigen, 1804		X							X	X			X	X		X
15 <i>Haematopota pluvialis</i> (Linnaeus, 1758)		X	X	X	X	X	X	X	X	X		X	X	X	X	X
16 <i>Haematopota scutellata</i> (Olsufjev, Moucha & Chvala, 1964)		X														X
17 <i>Haematopota subcylindrica</i> Pandellé, 1883		X			X	X	X		X	X					X	X
18 <i>Hybomitra acuminata</i> (Loew, 1858)						X			X	X						X
19 <i>Hybomitra bimaculata</i> (Macquart, 1826)		X			X		X		X	X	X	X		X	X	X
20 <i>Hybomitra ciureai</i> Séguin, 1937		X			X	X	X	X	X	X			X	X	X	X
21 <i>Hybomitra distinguenda</i> (Verrall, 1909)		X					X									X
22 <i>Hybomitra muehlfeldi</i> Brauer, 1880					X	X		X	X	X				X	X	
23 <i>Hybomitra solttialis</i> Meigen, 1820							X		X							X
24 <i>Hybomitra ucrainica</i> Olsufjev, 1952										X						
25 <i>Tabanus autumnalis</i> Linnaeus, 1761		X			X	X	X		X	X			X		X	X
26 <i>Tabanus bovinus</i> Linnaeus, 1758		X	X		X	X			X	X			X		X	X
27 <i>Tabanus bromius</i> Linnaeus, 1758		X			X	X	X	X	X	X					X	X
28 <i>Tabanus cordiger</i> Meigen, 1820									X					X		
29 <i>Tabanus exclusus</i> Pandellé, 1883														X		
30 <i>Tabanus glaucopsis</i> Meigen, 1820		X											X			X
31 <i>Tabanus maculicornis</i> Zetterstedt, 1842		X			X	X	X		X	X	X	X	X	X	X	X
32 <i>Tabanus miki</i> Brauer, 1880																X
33 <i>Tabanus quatornotatus</i> Meigen, 1820																X
34 <i>Tabanus spectabilis</i> Loew, 1858		X											X			
35 <i>Tabanus spodopteris</i> Meigen, 1820				X					X				X			X
36 <i>Tabanus sudeticus</i> Zeller, 1842		X	X		X	X	X	X	X			X	X	X	X	X
37 <i>Tabanus tergestinus</i> Egger, 1859							X	X				X	X		X	X
38 <i>Tabanus unifasciatus</i> Loew, 1858																X
39 <i>Therioplectes gigas</i> (Herbst, 1787)		X							X							X
40 <i>Heptatoma p. pellucens</i> (Fabricius, 1776)		X			X											X
41 <i>Philipomyia aprica</i> Meigen, 1820									X							X
42 <i>Philipomyia graeca</i> Fabricius, 1794																X

## Results

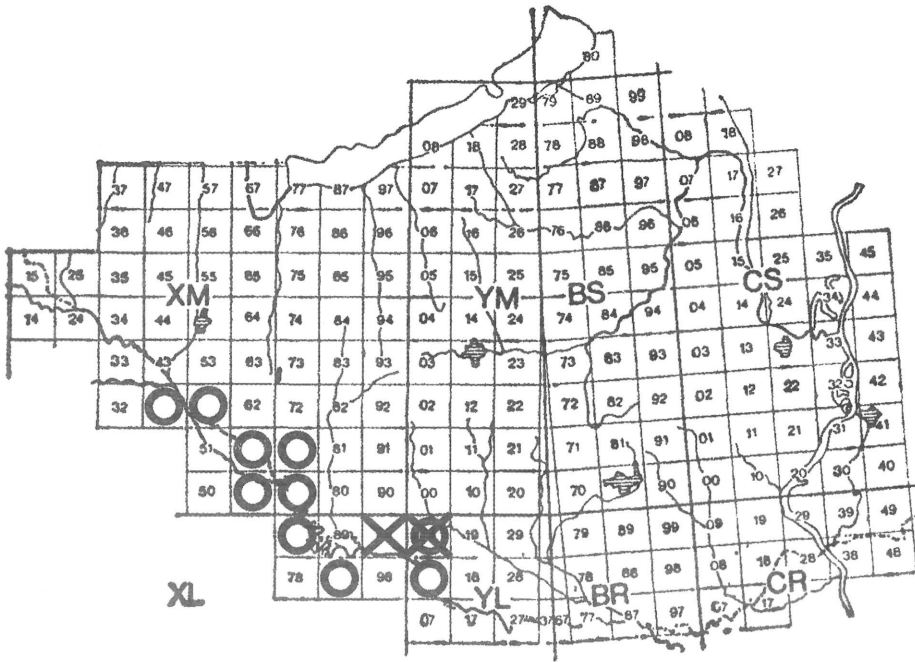
All together 42 species of Tabanids were determined (Table 1.) along the Hungarian and Croatian sections of the Drava river belonging to the Somogy county so far (MAJER, 1983, 1985, 2001; MAJER & KRČMAR, 1998; 2005, TÓTH, 2000, 2003). The determined species were classified into genera: *Chrysops*, *Atylotus*, *Therioplectes*, *Hybomitra*, *Tabanus*, *Heptatoma*, *Philipomyia* and *Haematopota*. On the Croatian side of the Drava some species proved to new for the regional fauna of the *Atylotus flavoguttatus* (Szilády, 1915), *Hybomitra distinguenda* (Verrall, 1909), *Heptatoma pellucens* (Fabricius, 1776) and *Haematopota italica* Meigen, 1804. The species *Atylotus flavoguttatus* was represented by 1 specimen within the sample. They were collected in Legrad (XM 42), 28 July 2005 (1♀). Beside the region along



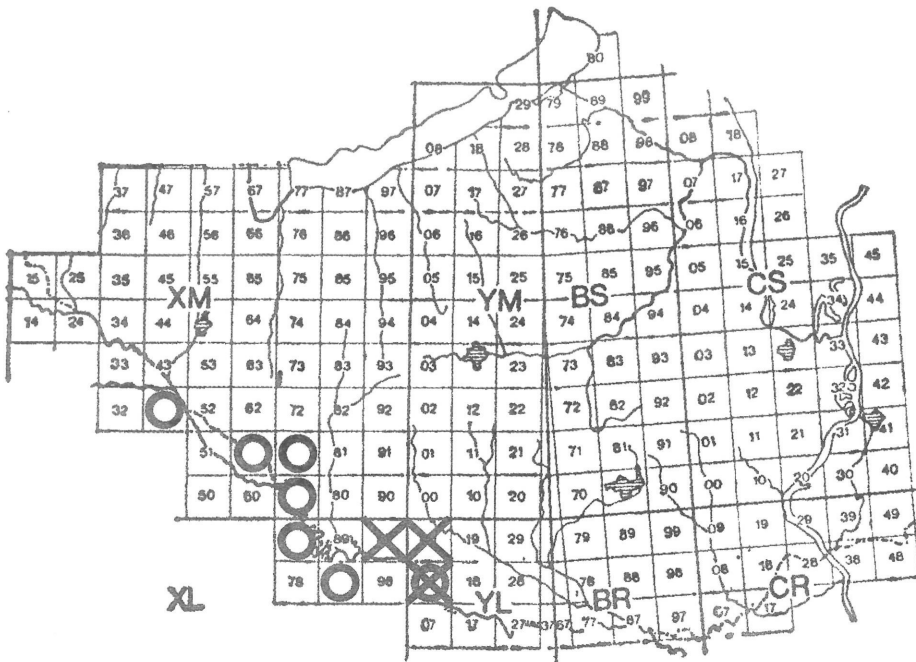
1-1. Fig.: Occurrence of *Atylotus fulvus* (Meigen, 1820) (sign X) and *Atylotus loewianus* (Villeneuve, 1920) (sign O) – along the Drava river in Somogy County



1-2. Fig.: Occurrence of *Atylotus flavoguttatus* (Szilády, 1915) (sign X) and *Atylotus rusticus* (Linné, 1767) (sign O) – along the Drava river in Somogy County



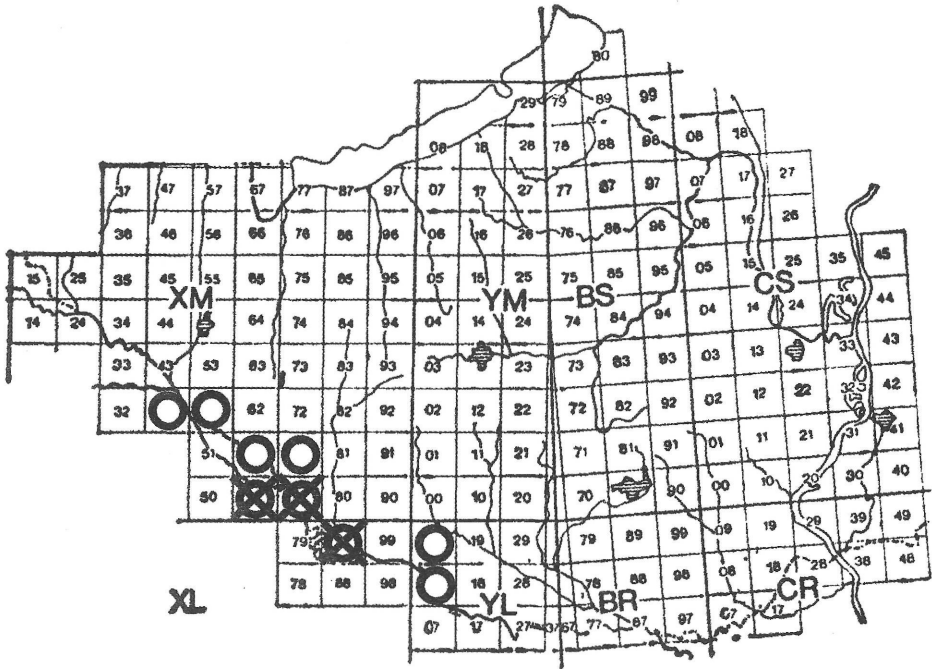
1-3. Map. Occurrence of *Chrysops flavipes* Meigen, 1804 (sign X) and (sign O) *Chrysops caecutiens* (Linnaeus, 1758) – along the Drava river in Somogy County



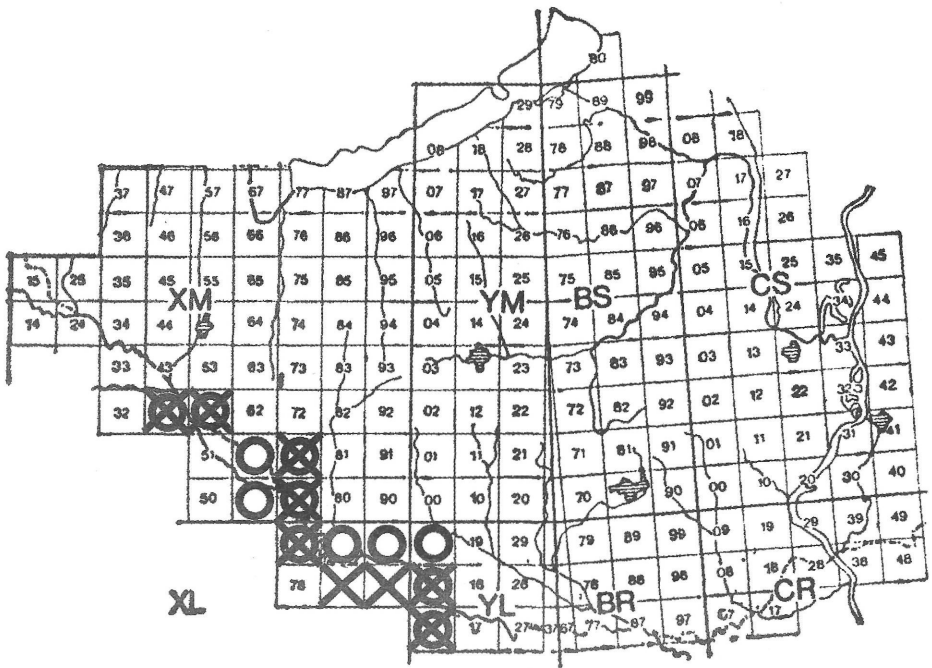
2-1. Map. Occurrence of *Chrysops italicus* Meigen, 1804 (sign X) and (sign O) *Chrysops parallelogrammus* Zeller, 1842 – along the Drava river in Somogy County







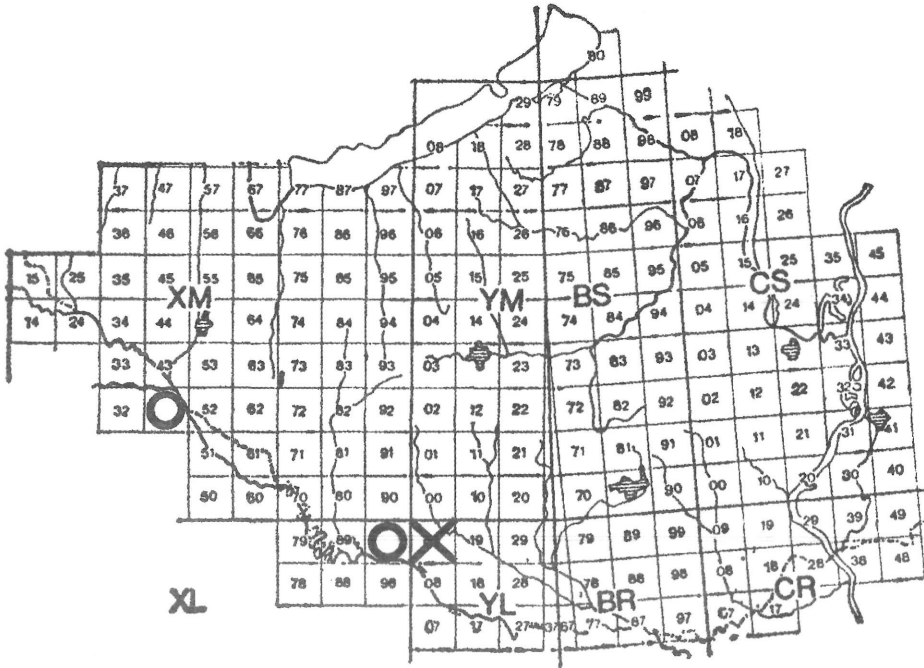
3-3. Fig.: Occurrence of *Hybomitra acuminata* (Loew, 1858) (sign X) and *Haematopota subcylindrica* Pandellé, 1883 (sign O) – along the Drava river in Somogy County



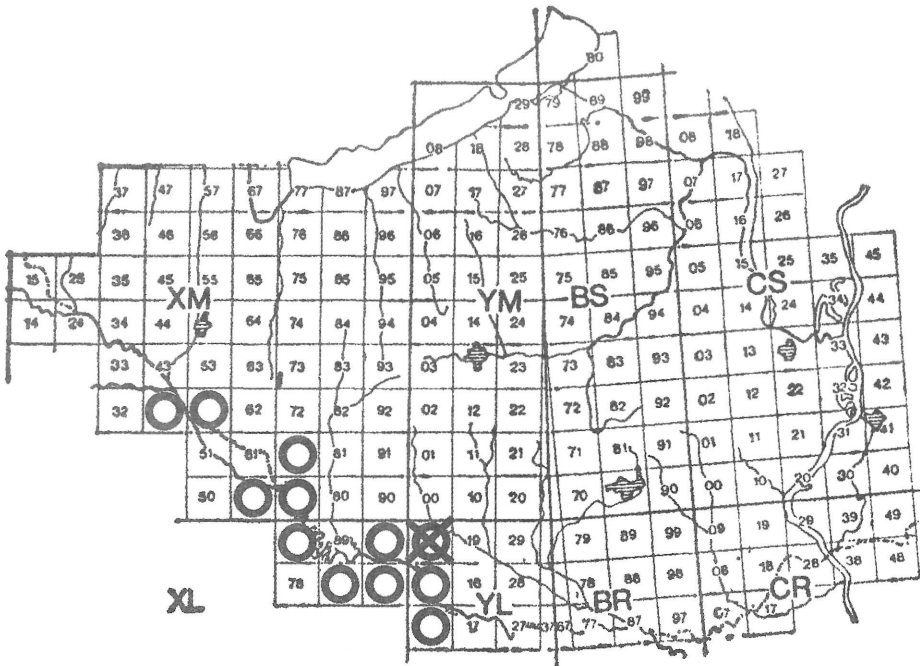
4-1. Fig.: Occurrence of *Hybomitra bimaculata* (Macquart, 1826) (sign X) and *Hybomitra ciureai* Séguéy, 1937 (sign O) – along the Drava river in Somogy County



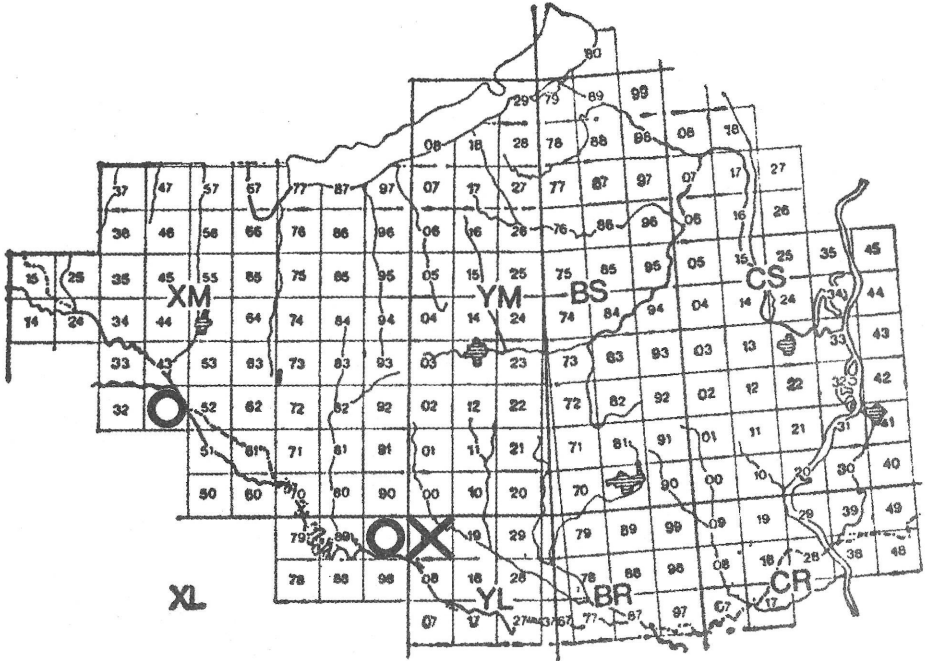




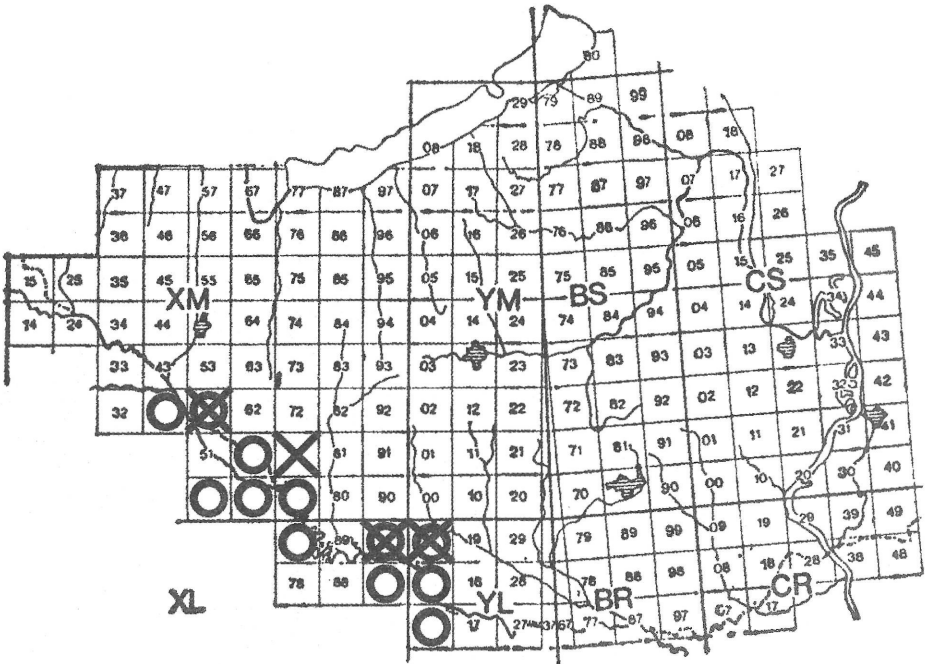
5-3. Fig.: Occurrence of *Tabanus exclusus* Pandellé, 1883 (sign X) and *Tabanus glaucopsis* Meigen, 1820 (sign O) – along the Drava river in Somogy County



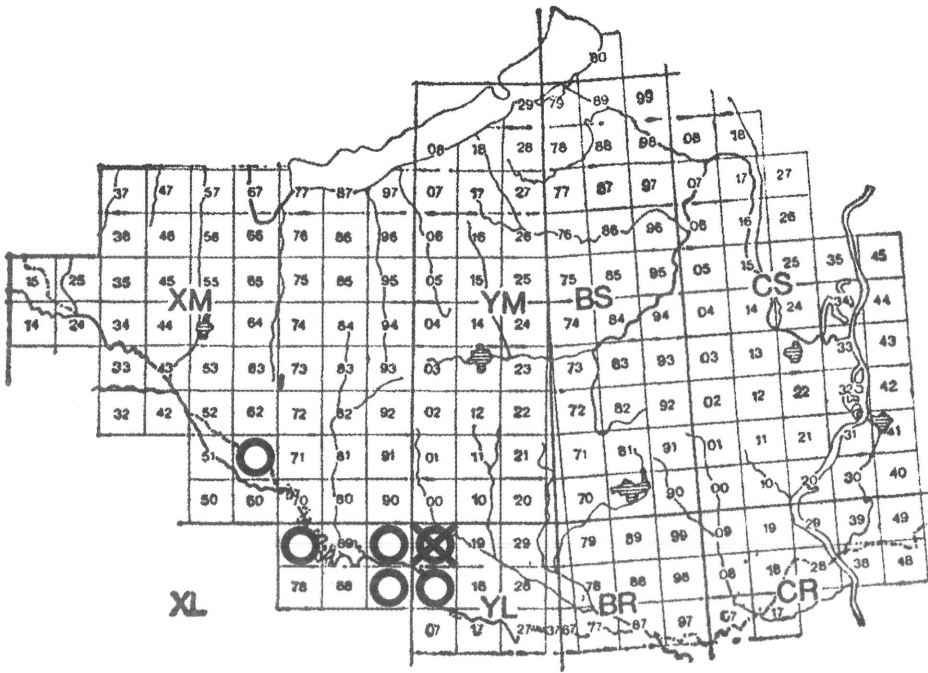
6-1. Fig.: Occurrence of *Tabanus miki* Brauer, 1880 (sign X) and *Tabanus maculicornis* Zetterstedt, 1842 (sign O) – along the Drava river in Somogy County



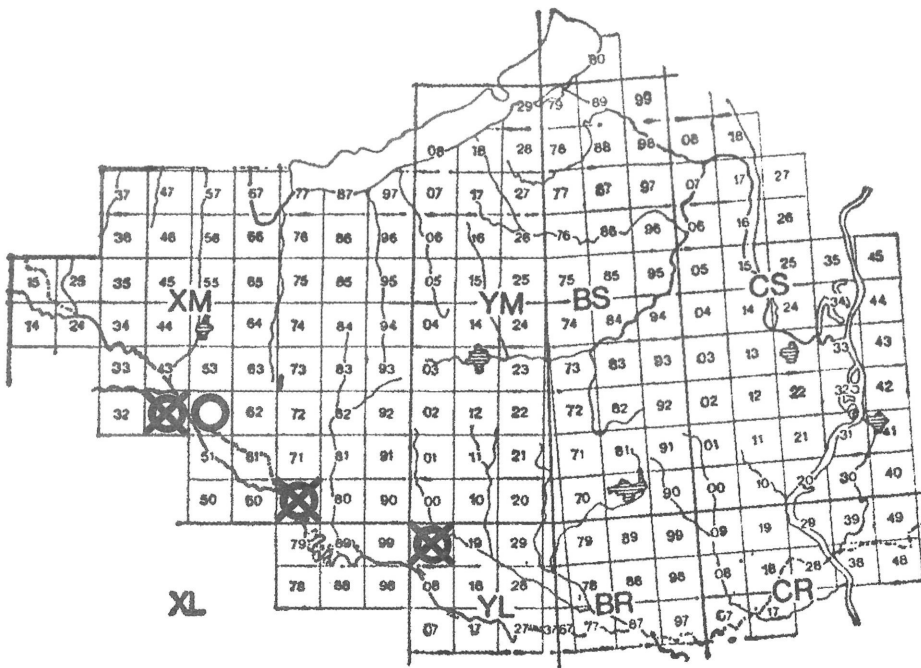
6-2. Fig.: Occurrence of *Tabanus quatornotatus* Meigen, 1820 (sign X) and *Tabanus spectabilis* Loew, 1858 (sign O) – along the Drava river in Somogy County



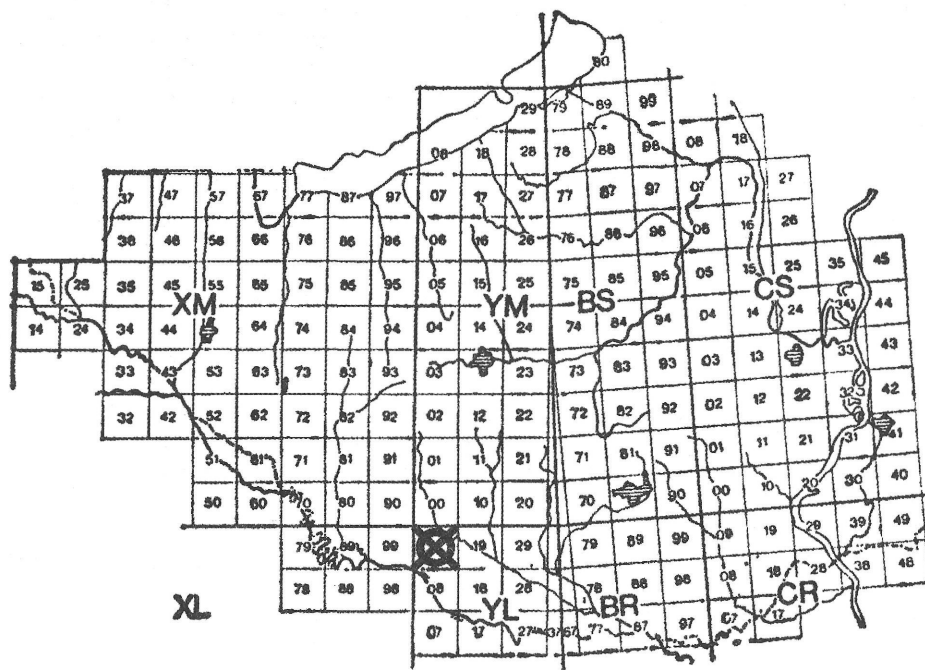
6-3. Fig.: Occurrence of *Tabanus spodopterus* Meigen, 1820 (sign X) and *Tabanus sudeticus* Zeller, 1842 (sign O) – along the Drava river in Somogy County



7-1. Fig.: Occurrence of *Tabanus unifasciatus* Loew, 1858 (sign X) and *Tabanus tergestinus* Egger, 1859 (sign O) – along the Drava river in Somogy County



7-2. Fig.: Occurrence of *Theriopteles gigas* (Herbst, 1787) (sign X) and *Heptatoma p. pellucens* (Fabricius, 1776) (sign O) – along the Drava river in Somogy County



7-3. Fig.: Occurrence of *Philipomyia aprica* Meigen, 1820 (sign X) and *Philipomyia graeca* Fabricius, 1794 (sign O) – along the Drava river in Somogy County

Drava River, this species was also recorded in eastern Croatia and in the Mediterranean part of Croatia (MAJER et al. 1995; KRČMAR, 1999). The second new species is *Hybomitra distinguenda* collected at the locality in Brodić (XL 79), 18 June 2005 (1♀). This species appears exclusively on the mountain massifs of Eastern Croatia, in habitats overgrown with woods of oak and beech (KRČMAR & MIKUSKA, 2001). The third new species is *Heptatoma pellucens* collected on the localities: Legrad (XM 42), 28 July 2005 (1♀), Ferdinandovac (XM 70), 20 August 2005 (1♀). This species inhabits various types of biotopes and never occur in large number. Finally, fourth new species in the Croatian side is *Haematopota italica* collected on the two localities: Novaki (YL 07), 18 June 2005 (1♀) and Ferdinandovac (XM 70), 20 August 2005 (1♀). Also, *Haematopota italica* inhabits various types of biotopes especially near water but is never a common species. Upon the basis of the data published in entomological periodicals and on the basis results of this study along Hungarian and Croatian sections of the Drava river 42 species of Tabanids was determined (Table 1). Occurrence of every each species registered along the Drava River was illustrated on the UTM 1-7 maps (Figs).

### Discussion

The review of the references and of the articles published in entomological periodicals and also on the basis of this study 42 species of horse flies were determined for the flood-areas on Hungarian and Croatian sections of river Drava. The collected sample contains four new species for the study area of which *Atylotus flavoguttatus* is recently been found in Croatia for the first time (MAJER et al. 1995). This species lives in most Mediterranean countries and in Asia from where they fly as far as into Central Europe (CHVÁLA et al. 1972).

The collecting of the samples of the species *Atylotus flavoguttatus* extend the known area of spreading of this species in Europe. Moreover the collected sample includes the species *Hybomitra ucrainica* new for the Hungarian fauna (MAJER & KRČMAR, 1998). It has been recorded on one locality on the Hungarian banks of river Drava. *Hy. ucrainica* is a little known species of the genus *Hybomitra* and thus its distribution area is still not fully recognized. This species was described recently on the material collected in Ukraine, and specimens of this species were also recorded in Turkey, Moldavia and Rumania around the Danube delta (OLSUFJEV, 1977; PARVU & GIRAY, 1984). Several specimens have also been determined in Eastern Austria (MALLY, 1986). In Croatia this species were mostly collected in habitats overgrown with reeds along the Karašica, Danube, Drava, Sava and Neretva rivers (KRČMAR et al. 2003). The distribution of this species is rather unknown because it is frequently mistaken for a very similar species *Hybomitra ciureai* (Mally, 1986). The collected sample also includes several Mediterranean species: *Chrysops flavipes*, *Chrysops italicus*, *Tabanus exclusus*, *Tabanus spectabilis*, and *Tabanus spodopterus* which are represented by a smaller number of specimens (MAJER, 1983, 1985, 2001; TÓTH, 2000, 2003). The specimens of these Mediterranean species were mostly collected in the Barcs Juniper Woodland in Hungary (MAJER, 1983, 1985, 2001; TÓTH, 2000, 2003). However, this Mediterranean species not found presently either there or in other parts along of the Drava river. Larvae of the most determined Mediterranean species live in the soils with high percentage of salt and their imagos occasionally reach some salty habitats in Central Europe (CHVÁLA et al. 1972). This is the most probable explanation why several Mediterranean species were also collected along river of Drava which, by the way, should be no exception. Since the northern border of distribution of these Mediterranean species is on the territories of Austria, Czech Republic, Slovakia and Hungary (CHVÁLA et al. 1972). In addition to these Mediterranean species, in Croatia distribution area for the species *Chrysops parallelogrammus* mostly follows river valley of Drava. As regards that specimens of *Ch. parallelogrammus* were collected in Croatia only on the stations that are in the immediate vicinity of the river Drava. The majority of the species determined along the Drava River belong to the Boreal – Eurasian species (27). Apart from the Boreal – Eurasian species the collected sample also included horse flies belonging to Mediterranean group (6), South European group (5), Afro-Eurasian arid group (3), and European group (1) species (Table 1). From the point of view of medical or veterinary entomology, attention should be paid to the females of the most abundant species of horse flies, such as *Tabanus bromius* and *Haematopota pluvialis* regarding the fact that they are the vectors of spiroplasmas (LE GOFF et al. 1991; VAZZELLE-FALCOZ et al. 1997). Furthermore, the species *T. bromius* and *Hae. pluvialis* are also the most abundant species in the some flood areas in Croatian sections of the river Danube (KRČMAR, 2004). Unlike from *T. bromius* and *Hae. pluvialis* the majority of species collected in this study were of sparse or low abundance (Table 1). This study was extended to cover both sides of river Drava and because of greatly contribute to the knowledge of the fauna of horse flies and also to the knowledge of the distribution of particular species in this part of Europe. The qualitative structure of the determined 42 species indicates a great wealth of the horsefly fauna in this marginal part of the Pannonian Plain, especially in the view of the fact that the horsefly fauna of this part of Hungary makes up 59,01% of the fauna of horse flies in Hungary. The flight period of Tabanids mostly depend on the seasonal meteorological variability that occurs periodically from one year to another and have a significant influence on the duration of tabanid flight activity. These 42 tabanid species are certainly not the final number of species on the study area, since only during this research we have identified 4 species of Tabanids that were not recorded during previous studies. We presume that some other species of Tabanids are present in the region as well, because Tabanids can fly rather far. This assumption suggests the necessity to continue with systematic entomological research.

The present knowledge is not the final status of horse flies fauna on the study area. We also can expect some species along of river Drava that are already known in neighbouring areas.

### Acknowledgement

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## **Somogy-megye (Magyarország), Kapronca- és részben Verőce-megye (Horvátország) Dráva-menti bögölyeinek földrajzi előfordulása.**

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A Dráva menti területek bögöly (Diptera: Tabanidae) faunája módszeres vizsgálatát kezdtük meg Horvátország és Magyarország közötti bilaterális tudományos együttműködés (TÉT) keretében. A dolgozat az eddig elért eredményeinket tartalmazza. A vizsgálati területeken, napjainkig összesen 42 bögölyfajt sikerült kimutatni. Ezek közül az *Atylotus flavoguttatus* (SZILÁDY, 1915), *Hybomitra distinguenda* (VERRALL, 1909), *Heptatoma pellucens* (FABRICIUS, 1776) és *Haematopota italica* Meigen, 1804 a horvát oldali részekben korábban még nem voltak ismertek. A magyar oldalon több, újabb előfordulási helyet sikerült regisztrálni. Az egyes fajok előfordulását UTM térképen ábrázoltunk.