

## Butterfly fauna of Ženeva pond near Niška Banja spa center (Lepidoptera: Papilionidae & Hesperioideae) with some notes on endangered species

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### Abstract:

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The article presents the results of research of butterfly species at Ženeva pond near the river Nišava (SE Serbia). In all, the total of 45 species was recorded, representing 23% of Serbian butterfly fauna. Among species recorded, 4 are listed in Red data book of Serbian butterflies and are declared strictly protected in the country, while two are listed in European red list of butterfly and listed in Annex IV of the EU Habitats Directive, namely *Lycaena dispar* and *Zerynthia polyxena*.

**Key words:** butterfly fauna, conservation, Niška banja

### Introduction

197 butterfly species recorded for Serbia so far indicate both good knowledge and a high diversity of this group of insects (Popović & Đurić, 2011). However, the great majority of the published studies are concentrated on the most interesting localities such as mountains and gorges, rarely discussing less interesting locations and most parts of Vojvodina region (see maps in Jakšić (ed.), 2008; Popović & Đurić, 2011). Better knowledge on butterfly fauna of this poorly researched areas should make basis for establishing a good Emerald and Natura 2000 networks and especially for publishing an profound Atlas of Serbian Butterflies.

In this paper, butterfly fauna of a locality that the residents call Ženeva is presented. The researched area presents a small hot water pond filled from the hot water spring from Niška Banja spa center. The locality is situated 10 km SE of Niš city and about 1.5 km E from Niška Banja

(43°18'12,72" N, 22°00'25,66" E) at an altitude of 206 m a.s.l. No data on fauna of this locality are available, and it could be interesting to research impact of hot water on the diversity of insects.

### Material and methods

The research activities were performed throughout year 2011. The location was visited regularly with two weeks intervals by the group of biology students from Biological Society "Dr Sava Petrović" and NGO "HabiProt".

Most of the butterflies were captured with entomological nets, and released after identification. In cases where immediate identification was not possible, specimens were collected and preserved in the second author's collection. Identification was made according to Tolman & Lewington (2008), while taxonomic order and nomenclature were arranged according to the European Red list of Butterflies (Van Swaay et al., 2010).

**Table 1.** List of butterflies recorded on investigated area

No.	Species name	Observation dates
<b>Family: HESPERIIDAE</b>		
01.	<i>Erynnis tages</i> (Linnaeus 1758)	25.04.2011.
02.	<i>Ochlodes sylvanus</i> (Esper 1777)	31.07.2011.; 04.09.2011.
<b>Family: PAPILIONIDAE</b>		
03.	<i>Zerynthia polyxena</i> (Denis & Schiffermuller 1775)	05.06.2011.
04.	<i>Zerynthia cerisy</i> (Godart 1824)	05.06.2011.
05.	<i>Iphiclides podalirius</i> (Linnaeus 1758)	25.04.2011.
06.	<i>Papilio machaon</i> Linnaeus 1758	25.04.2011.; 22.06.2011.
<b>Family: PIERIDAE</b>		
07.	<i>Leptidea sinapis</i> (Linnaeus 1758)	25.04.2011.; 22.06.2011.; 31.07.2011.
08.	<i>Anthocharis cardamines</i> (Linnaeus 1758)	25.04.2011.
09.	<i>Pieris rapae</i> (Linnaeus 1758)	25.04.2011.; 05.06.2011.; 31.07.2011.; 02.10.2011.; 16.10.2011.
10.	<i>Pieris napi</i> (Linnaeus 1758)	27.03.2011., 25.04.2011.
11.	<i>Pieris balcana</i> Lorkovic 1970	22.06.2011.; 31.07.2011.; 30.08.2011.; 04.09.2011.; 02.10.2011.
12.	<i>Pontia edusa</i> (Fabricius 1777)	27.03.2011.
13.	<i>Colias croceus</i> (Fourcroy 1785)	31.07.2011.; 30.08.2011.; 04.09.2011.; 02.10.2011.; 16.10.2011.; 30.10.2011.; 05.11.2011.
14.	<i>Colias alfacariensis</i> Ribbe 1905	05.06.2011.; 22.06.2011.; 31.07.2011.; 30.08.2011.; 04.09.2011.; 02.10.2011.; 16.10.2011.; 30.10.2011.
15.	<i>Gonepteryx rhamni</i> (Linnaeus 1758)	27.03.2011.; 25.04.2011.
<b>Family: LYCAENIDAE</b>		
16.	<i>Lycaena phlaeas</i> (Linnaeus 1761)	30.10.2011.
17.	<i>Lycaena dispar</i> (Haworth 1802)	05.06.2011.; 31.07.2011.
18.	<i>Leptotes pirithous</i> (Linnaeus 1767)	30.08.2011.; 04.09.2011.
19.	<i>Cupido argiades</i> (Pallas 1771)	25.04.2011.; 08.05.2011.; 22.06.2011.; 30.08.2011.; 04.09.2011.
20.	<i>Celastrina argiolus</i> (Linnaeus 1758)	27.03.2011.
21.	<i>Plebejus idas</i> (Linnaeus 1761)	31.07.2011., 30.08.2011.
22.	<i>Polyommatus amandus</i> (Schneider 1792)	05.06.2011.
23.	<i>Polyommatus icarus</i> (Rottemburg 1775)	05.06.2011.; 22.06.2011.; 31.07.2011.; 04.09.2011.; 02.10.2011.; 16.10.2011.
<b>Family: NYMPHALIDAE</b>		
24.	<i>Argynnis paphia</i> (Linnaeus 1758)	30.08.2011.
25.	<i>Issoria lathonia</i> (Linnaeus 1758)	31.07.2011.
26.	<i>Brenthis daphne</i> (Bergstrasser 1780)	05.06.2011.
27.	<i>Boloria dia</i> (Linnaeus 1767)	25.4.2011.; 31.07.2011.
28.	<i>Vanessa atalanta</i> (Linnaeus 1758)	27.03.2011.; 04.09.2011.; 02.10.2011.; 30.10.2011.; 05.11.2011.
29.	<i>Aglais io</i> (Linnaeus 1758)	13.03.2011.; 27.03.2011.; 22.06.2011.; 30.08.2011.

30.	<i>Polygonia c-album</i> (Linnaeus 1758)	27.03.2011.; 25.04.2011.; 31.07.2011.; 04.09.2011.
31.	<i>Araschnia levana</i> (Linnaeus 1758)	25.04.2011.; 22.06.2011.; 31.07.2011.
32.	<i>Nymphalis polychloros</i> (Linnaeus 1758)	13.03.2011.; 27.03.2011.
33.	<i>Melitaea phoebe</i> (Denis & Schiffermuller 1775)	31.07.2011.
34.	<i>Melitaea didyma</i> (Esper 1778)	05.06.2011.; 22.06.2011.; 31.07.2011.; 30.08.2011.
35.	<i>Melitaea athalia</i> (Rottemburg 1775)	05.06.2011.
36.	<i>Neptis sappho</i> (Pallas 1771)	25.04.2011.; 31.07.2011.
37.	<i>Apatura ilia</i> (Denis & Schiffermuller 1775)	05.06.2011.; 31.07.2011.
38.	<i>Kirinia roxelana</i> (Cramer 1777)	31.07.2011.
39.	<i>Pararge aegeria</i> (Linnaeus 1758)	25.04.2011.; 31.07.2011.; 04.09.2011.
40.	<i>Lasiommata megera</i> (Linnaeus 1767)	25.04.2011.; 30.08.2011.
41.	<i>Coenonympha pamphilus</i> (Linnaeus 1758)	08.05.2011.; 05.06.2011.; 22.06.2011.; 31.07.2011.; 30.08.2011.; 04.09.2011.; 02.10.2011.
42.	<i>Maniola jurtina</i> (Linnaeus 1758)	05.06.2011.; 22.06.2011.; 31.07.2011.; 30.08.2011.
43.	<i>Erebia medusa</i> (Denis & Schiffermuller 1775)	08.05.2011.
44.	<i>Melanargia galathea</i> (Linnaeus 1758)	22.06.2011.
45.	<i>Brintesia circe</i> (Fabricius 1775)	22.06.2011.

## Results and discussion

During this study a total of 45 butterflies species from 5 families were recorded.

According to Red Data Book of Serbian Butterflies (Jakšić, 2003), *Papilio machaon* (Figure 1) is threatened as endangered (E), while *Zerynthia polyxena* (Figure 2) and *Lycaena dispar* (Figure 3) are vulnerable (V) representatives of Serbian fauna. At European level *Zerynthia cerisy* (Figure 4) is declared near threatened (NT) (Van S w a y et. al, 2010).

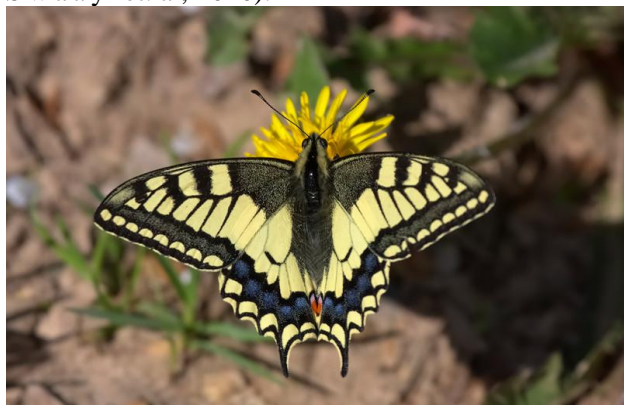


Figure 1. *Papilio machaon*. Photo: Miloš Popović



Figure 2. *Zerynthia polyxena*. Photo: Miloš Popović



Figure3. *Lycaena dispar*. Photo: Miloš Popović



**Figure 4.** *Zerynthia cerisy*. Photo: Miloš Popović

*Lycaena dispar*, *Papilio machaon* and *Zerynthia polyxena* are strictly protected species according to Serbian legislature on nature protection (Anonymous 2010a,b). At the same time, *Lycaena dispar* is being listed on the Annex II of the Habitats Directive (92/43/EEC) as one of the target species in declaring Natura 2000 sites and in the Bern convention (T-PSV/PA (2011) 7) as target species for declaring Emerald sites. Both *Zerynthia polyxena* and *Lycaena dispar* are listed under Annex IV of the Habitats Directive, as a species of high conservation value. *Zerynthia* species are feeding on *Aristolochia clematitis* Linnaeus 1753 which is very abundant at the locality. Butterflies are known to inhabit lowland meadows near streams and rivers, usually close to the agricultural fields (Popović & Đurić, 2011; authors, pers. observation), thus the biggest threat probably comes from modern agriculture and use of pesticides. Modernization of agriculture in Serbia goes toward enlarging agricultural fields and drying wet meadows, which should have negative impact on the butterfly host plant. When threats are considered, Jakšić (2003) mentions natural predators, global pollution and construction of dams as a main threat.

Current populations of *Lycaena dispar* in Serbia are stable in the lowland wet meadows, marshes, near rivers and streams, where small local populations of butterflies are present (Jakšić, 2003; Popović & Đurić, 2010). The Serbian populations belong to bivoltine subspecies *L. dispar rutila* Werneburg 1864, which use three species of *Rumex* Linnaeus 1753 as their host plant. Other European subspecies (*L. dispar dispar* Haworth 1803 and *L. dispar batavus* Oberthur 1923) are univoltine feeding only on *Rumex hydrolapathum* Huds 1778 (see Tolman & Lewington, 2008). Serbian subspecies is therefore more abundant and probably less prone to extinction. The butterfly life cycle is strictly connected with wetland habitats, where butterfly mortality is dependent of seasonal floods (Nicholls & Pullin, 2003;

Martin & Pullin, 2004a,b), while the extinction is directly caused by wetland alterations (Net (ed.), 1993). Thus the links between local populations and possibility of recolonizations are essential factors for species survival. Since Serbian rivers were not well managed in the past years, the butterfly populations may have good interconnection providing their long-term survival. Biggest threats probably came from drying flooded areas for agricultural purposes and succession towards forest ecosystem due to land abandonment. As other threats Jakšić (2003) mentioned natural predators, building of dams and deforestation, but, except building of dams, these factors are less likely to significantly affect survival of *L. dispar*.

## Conclusion

The butterfly fauna of this locality is not completely explored, and further surveys should be made to complete the scientific data. The investigations could be extended to the wider area of Niška Banja, in order to include more diverse habitats.

Although the researched locality is very small it shows a significant number of important butterfly species. Having in mind the importance of wetland habitats for butterfly species, more effort should be made in their research and conservation. Small local patches of valuable habitats could prove vital for survival of some threatened species. Additionally, in this case, the proximity of urban area could be used to promote natural values and to enable students of Natural Faculty and Mathematics to perform their field studies. Further research and campaign with local people is needed in order to determine if this small region deserves certain level of protection.

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