

## NEW AND RARE SPECIES OF LEPIDOPTERA IN YUGOSLAVIA

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The data about 11 new species of Lepidoptera significant for the fauna of Serbia and Yugoslavia, as well as the data about one quite rare species in Serbian fauna are presented. The distribution of these species in fauna of Yugoslavia are analyzed. The drawings of genitalia are given for some of the species. At the same time the existence of these species in the neighboring countries are analyzed.

KEY WORDS: Lepidoptera, fauna, Yugoslavia.

### INTRODUCTION

Describing of the national fauna of some animal group is the basic aim of Biology. Publication of fauna provides good conditions for the further biological researches and discovering the new facts. Partly because of the historic and economic circumstances on one side and extremely rich fauna on the other side, Yugoslavia is the last European country yet to process its national fauna of Lepidoptera. Recently, ZEČEVIĆ (1996) has united all previously existing data about Lepidoptera in Serbia. He has made a list of 1,334 species. However, it is still far from sufficient and presents only one third of our fauna; so, a more complex and more detailed work is yet to be done on completing the knowledge on Lepidoptera species in our country, with the necessary revision of the existing facts. This paper is the contribution to the expanding of ZEČEVIĆ' s list.

## MATERIAL AND METHODS

Collection of specimens of butterflies was done in a well-known, classic way by entomological net. On the other hand, moths were collected by hunting in light-trap. Taken samples were stuffed and conserved in Jakšić's collection. The production of genitals preparation was done in a standard procedure: maceration in potash, washing to remove potash, dissecting and cleaning, staining dehydrating and hardening and clearing and mounting in Canada balsam. UTM marks are given for all localities where the specimens were collected.

## RESULTS

1. *Hepialus humuli* Linnaeus, 1758 (fam. *Hepialidae*)

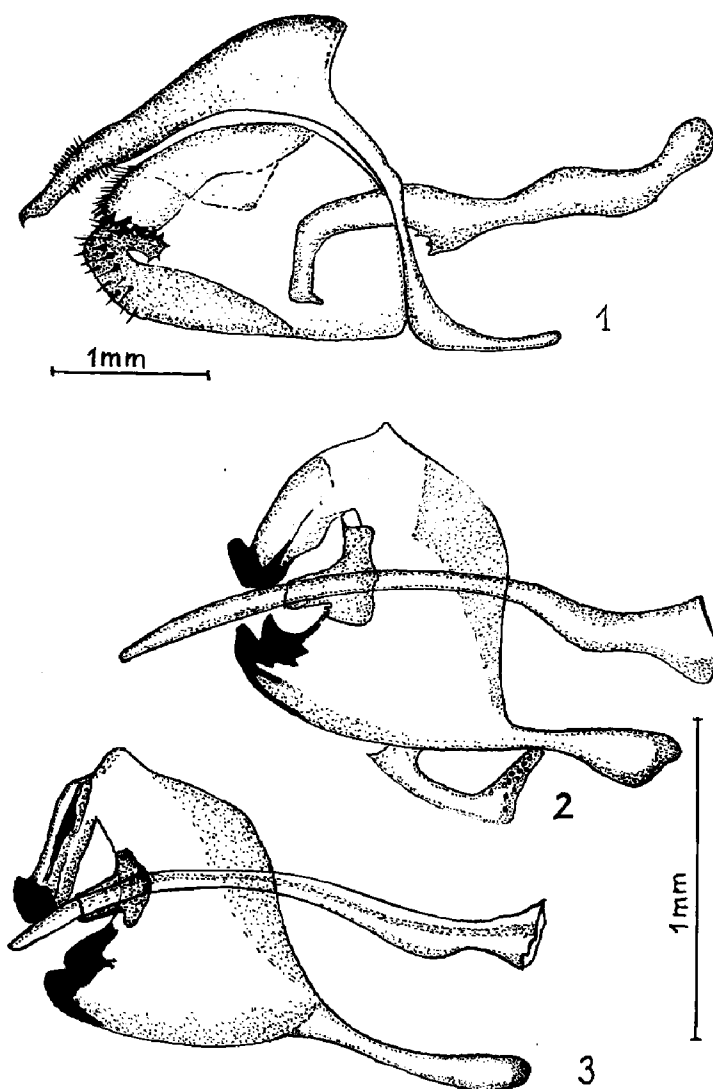
This species has not been found in Serbia yet. It has been found neither in Macedonia (DANIEL, F., 1964), nor in Albania (REBEL & ZERNY, 1931). However, it was found in Bulgaria on Rila mountain (ZLLICH, R., 1936/37), as well as in Montenegro on Durmitor Mt., Žabljak, Medjed (VASIĆ, K. *et al.*, 1990). Larva of this species live underground and feed themselves with the roots of plants from *Cannabinaceae* family e.t.c., especially with plants from the group *Rumex*, *Urtica*, *Taraxacum* and *Humulus*. The species is quite rare, and can be found individually in mountain areas.

We have found one specimen of this species on Šar-planina Mts., Durlov potok, 1800 m (EM 07), 1, 4. VIII 1991., Jakšić P. leg. et coll. This species is new in Serbia.

2. *Zygaena brizae* Esper, 1800 (fam. *Zygaenidae*)

In literature this species has been referred to as subspecies of the species *Z. punctum* Och. However, these two species are today known as two different species. They are mostly distributed in the central part of the Ancient Mediterranean with the difference that *Z. punctum* are distributed on Apennine and Crete Isl., where *Z. brizae* cannot be found. These two species also differ in larval food plant: *Z. brizae* caterpillars prefer on *Cirsium arvense* Linnaeus, while *Z. punctum* prefer on *Eryngium campestre* Linnaeus.

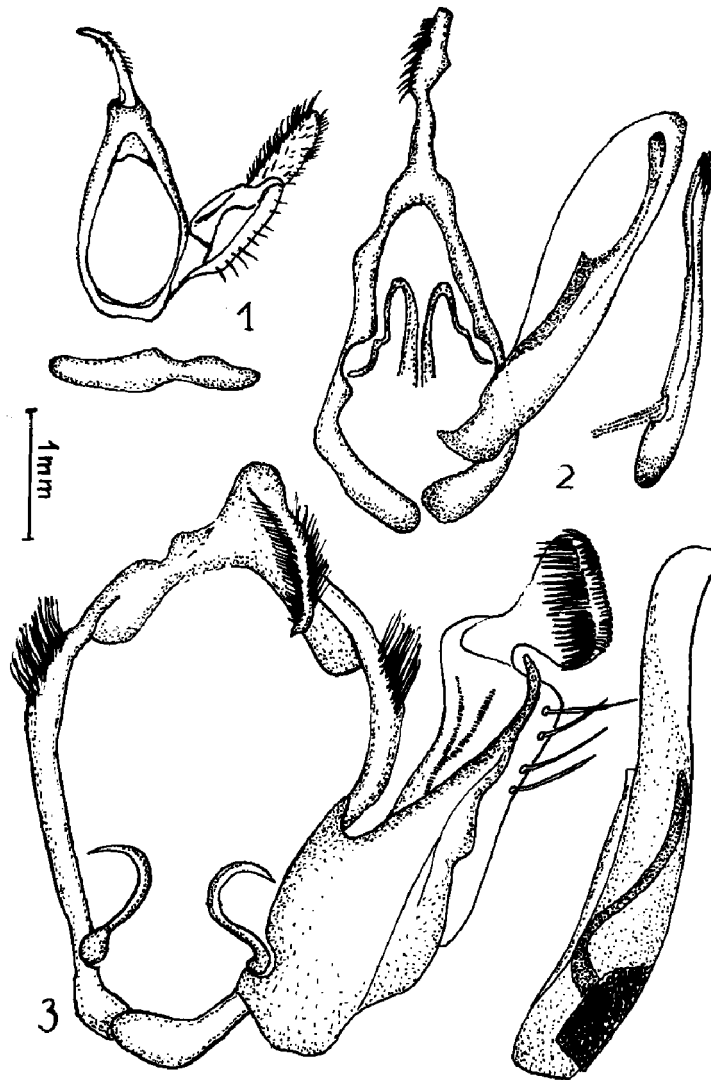
We found this species on locality: Ibarska klisura, Košutovački potok, 500 m (DN 89), 3 ♂♂, 7 ♀♀, 28. V 1985., Jakšić P. leg. et coll. One specimen found in Bački Monoštor (CR 47), 1 ♂, 29. VI 1987, can be seen in



**Fig. 1.** Male genitalia of new butterfly species for the fauna of Yugoslavia.

**Slika 1.** Genitalni aparat mužjaka novih vrsta dnevnih leptira za faunu Jugoslavije.

1. *Spialia phlomidis* H.-S., Paštrik, Gorožup, 700 m, 2.VII 1996., Jakšić P. leg., Prep. no. SR – 2098.
2. *Leptidea reali* Reissinger, 1989. Paštrik, Gorožup, 700 m, 2. VII 1996., Jakšić P. leg. Prep. no. SR – 2109.
3. *Leptidea sinapis* L., Peć, Rugovska klisura, Bjeluhe, 1100 m, 31. VII 1978., Jakšić P. leg. Prep. no. SR – 5949.



**Fig. 2.** Male genitalia of new moths species for the fauna of Yugoslavia..

**Slika 2.** Genitalni aparat mužjaka novih vrsta noćnih leptira za faunu Jugoslavije.

1. *Odice arcuina* Hbn., Ibarska klisura, Košutovac, 500 m, 28. VII 1988., Jakšić P. leg. Prep. no. SR – 1927.
2. *Omphaloscelis lunosa* Haworth, Priština, Grmija, 700 m, 19. V 1982., Jakšić P. leg. Prep. no. SR – 1926.
3. *Sideridis anapehes* Nye, Priština, Grmija, 700 m, 20. VII 1974., Jakšić P. leg. Prep. no. SR – 1925.

Dragan Vajgand's collection (Vajgand leg. et coll.). Figure 1, 1 shows the drawing of genitals of this species.

The species is new in fauna of both Serbia and Yugoslavia.

3. *Spialia phlomidis* (Herrich-Schffer, 1845) (fam. *Hesperiidae*)

This species is distributed on the territory of South Balkan, Asia Minor with Persia and South Russia. Up to now, it has been seen on many localities in Macedonia: on south hillsides of Šar-planina Mt., near the Vardar river, by Treska and Babuna and in the area between the Ohridsko and Prespansko lakes (SCHAUER & JAKŠIĆ, 1988). REBEL & ZERNY (1931) described this species in Albania in the area Ljum Kula.

We found this species on Paštrik Mt., Gorožup, 600 m (DM 67), 2 ♂♂, 2.VII 1996., Jakšić P. leg. et coll. (Fig. 1, 2) in the area of an oak forest (*Quercetum trojanae* s. lat.). In addition to two caught specimens, two more were seen, one of which on the south hillside of Paštrik Mt. at 1,400 m above sea level in the area of a mixed deciduous forest. This species should not be considered as one that has settled in this area recently, for simply nobody has ever collected butterflies in this area before. It is a narrow zone by the river Beli Drim characterized by submediterranean vegetation. Together with this species the following ones have been found on this territory: *Kirinia roxelana* Cr., *Melanargia larissa* Geyer, *Hipparchia syriaca* Stgr. and other (Jakšić P. leg. et coll.). All are representatives of sub-mediterranean fauna.

The species is new in fauna of Serbia and Yugoslavia.

4. *Leptidea reali* Reissinger, 1989 (fam. *Pieridae*)

REAL (1988) first described this species as subspecies *lorkovici* within the species *sinapis* L., as Reissinger proved that this species is unique. LORKOVIĆ (1993) defined the morphological differences between these two species more precisely and made a map of distribution of these species in Croatia and Slovenia. This species is sympatric and synchronic with the species *L. sinapis* L. There are differences between these two species not only in the form of wings, but also in the structure of genitals (Fig. 1, 3 and 1, 4).

We have revised the species *Leptidea sinapis* L. in our collection and set aside the newly described *L. realy* Reissinger species. We have concluded that it is widely distributed on the territory of Yugoslavia. These are the areas where it can be found: Pristina, mons Grmija, 700 m (EN 12), 1 ♂,

3. VII 1978, Jaksic leg. et coll; Durmitor Mt., Crno jezero, Celine, 1500 m (CN 47), 1 ♂, 21. VII 1984, Jaksic P. leg et coll.; Rudnik Mt, 600 m (DP 68), 1 ♂, 28. IV 1985, Jaksic P. leg et coll, and Pastrok Mt., Gorozup, 700 m (DM 67), 1 ♂, 2.VII 1996, Jaksic leg et coll. The species is new in fauna of Serbia and Yugoslavia.

5. *Danaus chrysippus* Linnaeus, 1758 (fam. *Danaidae*)

This is a cosmopolite, migratory species of palaeotropic areas. Their distribution is on New Zeland, Australia, South East Asia, Indian Subcontinent, North Africa and Canary Island. Lately, it has been noticed in the Mediterranean part of Greece, too: North-east Corfu (OWEN, 1991) and in Italy: Lampedusa, whole Sicily, Campania, whole Sardinia, Issole Ponziane (BORGO *et al.*, 1992).

We found one specimen of this species at the Adriatic Coast: Budva, 50 m (CM 28), 1 ♂, 25. IX 1992, Jaksic leg et coll. Also, another specimens were found in Boka Kotorska, Risan, 50 m (CN 10), 1 ♂, 10. IX 1988., Nikitenko Andrej leg et coll.

These species can be expected to be found in even larger numbers when the temperature begins to raise.

The species is new in fauna of Montenegro and Yugoslavia.

6. *Poecilocampa canensis alpina* Daniel und Wolfsberger, 1955 (fam. Lasiocampidae)

This species has already been registrated in Serbia territory (ZEČEVIĆ & RADOVANOVIĆ, 1974; ZEČEVIĆ, 1980). It has been wrongly determined as *P. populi* Linnaeus, even if we can clearly see in the photograph that it is *P. canensis alpina*. The species is known in Montenegro: Durmitor (VASIĆ *et al.*, 1990). It can rarely be found, for it flies during the winter in the period from October till January.

We found this species near Novo Brdo, 800 m (EN 31), 1 ♂, 24. IX 1981; 1 ♂, 15. XI 1982 and 1 ♀, 27. XI 1982, Jaksic P. leg et coll. Probably, further researches will show that this species is more widely distributed on the territory of Serbia.

7. *Lycia zonaris* Denis und Schiffermüller, 1775 (fam. Geometridae)

This local species can be found quite rarely during the springtime when we can find males, since females are without wings. It was found nei-

ther on Durmitor Mts. (TOMIĆ *et al.*, 1990), not in Macedonia (PINKER, 1968). It has not been registered in Albania, either.

We found this species in an oak forest (*Quercetum frainetto-cerris* s. lat.) near Pristina, mons Grmija, 700 m (EN 12), 1 ♂, 28. III 1974 and 1 ♂, 10. IV 1974, Jakšić leg et coll.

It larval food plants are *Artemisia campestris* L., *Salix* sp. and *Populus* sp. and caterpillars could be seen on those plants from May till July. Then a caterpillar begins to form a cocoon and spend winter in the ground.

The species is new in our fauna.

8. *Cygnia sordida* Hübner, 1803 (fam. Arctiidae)

REBEL & ZERNY (1931) didn't find this species in Albania. Neither did DANIEL (1964) in Macedonia. VASIĆ *et al.* (1990) didn't find it on Durmitor Mt.

We have found two specimens of this species: Priština, mons. Grmija, 700 m (EN 12), 1 ♀, 22. VI 1973. and Paštrik Mt., Gorožup, 700 m (DM 67), 1 ♀, 2. VII 1996, Jakšić leg et coll.

The species is new in fauna of Serbia and Yugoslavia.

9. *Sideridis anapheles* Nye, 1975 (fam. Noctuidae)

There are not many facts in literature concerning this species. CARNELUTTI *et al.* (1991) found it on Durmitor Mt. However, it hasn't been discovered in Serbia yet (PETRIK & JOVANIĆ, 1952; ZEČEVIĆ & RADOVANOVIĆ, 1974; VASIĆ & JODAL, 1976; VULEVIĆ, 1988). THURNER (1964) didn't find it in Macedonia, either.

We have discovered one specimen of this species: Priština, mons Grmija, 700 m, (EN 12), 1 ♂, 20. VII 1974, Jakšić leg et coll. Figure 2, 3 shows the genitalia of them.

The species is new in fauna of Serbia.

10. *Omphaloscelis lunosa* Haworth, 1809 (fam Noctuidae)

This rare and local species is not yet find on Durmitor Mt. (CARNELUTTI *et al.*, 1991) neither in Macedonia (THURNER, 1964).

We found one specimen near Priština, mons Grmija, 700 m (EN 12), 1 ♂, 19. V 1982, Jakšić leg et coll. Fig. 2, 2 shows their genitalia.

The species is new in fauna of both Serbia and Yugoslavia.

11. *Odice arcuinna* Hübner, 1790 (fam. Noctuidae)

This species has so far been known only in Macedonia. According to THURNER (1964) its distribution is in Valandovo, Stari Dojran and Drenovo.

We found some specimens near the river Ibar: Ibarska klisura, Košutovac, 500 m (DN 89), 1 ♂ and 2 ♀ ♀, 24. VII 1987; 1 ♂, 28. VII 1988, Jakšić leg et coll. Fig. 2, 1 shows the genitalia of this species. Its larval food plant is from genus *Onosma*. The species is distributed in Western Europe.

The species is new in fauna of Serbia and Yugoslavia.

12. *Eublemma polygramma* Duponchel, 1836 (fam. Noctuidae)

This species too, hasn't been known in Yugoslavia so far. According to THURNER (1964), the species is quite often in Macedonia. HACKER & DERRA (1985) claim that it can be found on many localities in Greece.

We found two specimens near Prizren, in Prizrenska Bistrica Gorge, 530 m (DM 87), 2 ♂ ♂, 22. VII 1986, Jakšić P. leg et coll.

The species is new in fauna of Serbia and Yugoslavia.

## DISCUSSION

We were interested in what were the sources of increasing the numbers of Lepidoptera species in our fauna. Focusing on this in our research, we have discovered that there are three such sources (referring to the previously described Lepidoptera species):

1. The first source are the species that have come from the South and the South-East. Global climatic changes all over the Earth cause the changes of thermal regime, changes in precipitation regime in the area of the Mediterranean, which all together causes significant changes in frequency of climatic extremes. If the global temperature raises for only a degree, the standard global frontier will shift toward the north for some 200 – 300 km. The thermophilous flora and fauna from the south and the southeast follows this shifting. The typical newly determined species in our fauna that belong to this group are the following: *Danaus chrysippus* L., *Odice arcuinna* Hbn. and *Eublemma polygramma* Dup. It is identical case with the species *Colias erate* Esper that has moved in



great number from Black Sea region in to Panonian Plain during this decade.

2. Second source – dividing one complex species into two or more. New ones developing of a sophisticated technology gives possibility of making high class comparisons of biological parameters between two populations of a species. Such comparisons lead us to the discoveries of complex structures of many species and later on to their dividing into two or more sympatric species. There are few such pairs of species on the territory of Yugoslavia: *Hipparchia semele* L. – *H. volgensis* M. P., *Pieris napi* L. – *P. balcana* Lorković, *Erebia epiphron* Knoch – *E. orientalis* Elwes etc. Between newly founded species two can be classified in this category: *Zygaena brizae* Esp. (separated from *Z. punctum* Ochs.) and *Leptidea reali* Reissinger (separated from *L. sinapis* L.).
3. The third source – the fact that our fauna is unexplored enough and that there is quite a small number of individuals within a population. Many species are found in a small number population, on a confined geographical territory, as well as in limited time interval. If researches are not planned and organized properly, such species remain undiscovered for a long period of time. In our case such species are the following: *Hepialus humuli* L., *Spialia phlomidis* H.-S., *Lycia zonaria* D. und S., *Cycnia sordida* Hbn., *Sideridis anapheles* Nye, *Omphaloscelis lunosa* Haw. and *Poecilocampa canensis alpina* D. und W. Taking into account the previously given information that only one third of the lepidoptera species in our fauna is examined and known, we can expect that in future the great number of newly discovered species will come from this group.

## CONCLUSION

Publications of the list of Lepidoptera species in Serbia stimulated the further work to examine this group in more details as well as the revision of already existing facts. In that sense, we have presented in this paper the facts for 12 species of Lepidoptera. Among them, the following species have been found for the first time in Serbian lepidopteres fauna: *H. humuli* L., *Z. brizae* Esp., *S. phlomidis* H.-S., *L. reali* Reiss., *L. zonaria* D. und S., *C. sordida* Hbn., *S. anapheles* Nye, *O. lunosa* Haw., *O. arcuinna* Hbn. and *E. polygramma* Dup.

The species *D. chrysippus* L. is new for Montenegro and Yugoslavia.

The species *P. canensis alpina* Daniel has already been known in Serbia, but the finding of this species has been quoted for its being very rare.

Among these discoveries the three newly determined butterfly species have a special significance in fauna of Yugoslavia, one for Montenegro, one for Serbia and one for both Republics. Take to these new discovered facts, the number of butterflies (*Hesperioidea* and *Papilionoidea*) in

Serbia is 191 species, which is 205 species in Yugoslavia. Here is the list of these species, as group in families:

Hesperiidae .....	23 species
Papilionidae.....	7 species
Pieridae.....	23 species
Lycaenidae.....	56 species
Riodinidae .....	1 species
Libytheidae.....	1 species
Nymphalidae.....	44 species
Danaidae .....	1 species
Satyridae.....	49 species
TOTAL.....	205 species

On the basis of here presented facts we can conclude that Yugoslavia possesses a very rich butterfly fauna.

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## НОВЕ И РЕТКЕ ВРСТЕ LEPIDOPTERA У ФАУНИ ЈУГОСЛАВИЈЕ

П. ЈАКШИЋ И Г. РИСТИЋ

### И з в о д

Презентирани су подаци о 11 нових врста Lepidoptera за фауну Србије и Југославије, као и за једну ретку врсту у фауни Србије. Анализирано је питање извора повећања броја врста у нашој фауни, утврдили смо три таква извора.

1. Прву групу чине новопридошле врсте са југа и југоистока. Због глобалних промена термичког режима и режима падавина долази до значајних промена учесталости климатских екстрема. Глобално отопљење узрокује наступање јужних врста на север. Типичне новоустановљене врсте у нашој фауни које припадају овој групи су: *Danaus chrysippus* L., *Odice arcuinna* Hbn. и *Eiblema polygramma* Dup.
2. Друга група новоутврђених врста је установљена раздвајањем комплексне врсте на две или више нових врста, што је омогућено развојем

софистициране технике. Утврђивањем диференцијалних параметара сложена врста се дели на две или више симпатричних врста. У нашем случају таква је врста *Z. brizae* Esp. (раздвојена од *Z. punctum* Ochs.) и *Leptidea reali* Reissinger (раздвојена од *L. sinapis* L.).

3. Трећи узрок утврђивања нових врста за нашу фауну је релативно слаба проученост наше фауне, што даје могућност утврђивања још неутврђених врста. Многе се врсте јављају у малим популацијама, на уско ограниченим локалитетима и у релативно кратком временском периоду лета адулта. Зато је потребно спроводити организована, планска фаунистичка истраживања. Такве врсте из ове групе су: *H. humuli* L., *S. phlomidis* H.-S., *L. zonaria* D. und S., *C. sordida* Hbn., *S. anapheles* Nye, *O. lunosa* Haw. и *P. canensis alpina* D. und W. Обзиром да је познато тек 1/3 од укупног броја врста *Lepidoptera* наше фауне можемо очекивати да ће убудуће највећи број новоутврђених врста бити управо из ове групе.

ZEČEVIĆEV (1996) списак *Lepidoptera* Србије на коме се налази 1.334 врсте је овим новим подацима допуњен. У оквиру тога броја сада у Србији имамо евидентираних 191 врсту дневних лептира, тј. у Југославији их има 205. Можемо, на основу тога, закључити да Југославија има једну од најбогатијих националних фауна дневних лептира у Европи.

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