

<i>Travaux du Muséum National d'Histoire Naturelle «Grigore Antipa»</i>	Vol. LIV (1)	pp. 115–123	© 30 Juin 2011
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DOI: 10.2478/v10191-011-0009-z

## **PROTECTED LEPIDOPTERAN SPECIES (INSECTA: LEPIDOPTERA) IN NORTH-EAST OF ROMANIA**

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**Abstract.** In the present paper references on the lepidopteran species in need of protection, specified in the EU Habitats Directive, as well as the species included in the Government Emergency Ordinance no. 57/2007 on the regime of the natural protected areas, the conservation of the natural habitats of flora and fauna have been made. Information is provided on the distribution and status of the protected population of Lepidoptera from Botoșani county (North-East of Romania).

**Résumé.** Le travail présente les espèces de lépidoptères nécessitant protection prévues dans la directive Habitats de l'UE et les espèces inscrites dans l'Ordonnance d'urgence du Gouvernement no. 57/2007 sur le régime des zones naturelles protégées, la conservation des habitats naturels de la flore et de la faune. On fournit des informations sur la répartition et la situation actuelle des populations de lépidoptères protégées du département de Botoșani (Nord-Est de la Roumanie). C'est une contribution pour la future base de données qui comprendra toutes les espèces de lépidoptères protégées de Roumanie.

**Key words:** Lepidoptera, North-East Romania, Habitats Directive, protection.

### *INTRODUCTION*

Romania is considered an European country rich in insects. After the integration of Romania in the European Union the legal framework for the protection and the conservation of rare species was adopted.

In the present work there have been made references to the species of Lepidoptera in need of protection specified in the EU Habitats Directive (92/43 EEC):

- ANNEX 2 Animal and plant species of community interest whose conservation requires the designation of special areas of conservation;
- ANNEX 4 Animal and plant species of community interest in need of strict protection.

There are also the species included in the Government Emergency Ordinance no. 57/2007 on the regime of the natural protected areas, the conservation of the natural habitats, of wild flora and fauna:

- ANNEX 3 Animal and plant species whose conservation requires the designation of special areas of conservation;
- ANNEX 4A Species of community interest;
- ANNEX 4B Species of national interest.

#### *The natural environment*

Botoșani county is situated in the North-East of Romania, between the Prut River and Siret River (Fig. 1).

The relief is structured in two sub-units:

- the hills of Siret (formed of Dealul Bour, Șaua Bucecei and Dealul Mare) which have altitudes between 350 m and 587 m, generally covered with forests in which the oak prevails;

- the northern part of Moldavia's plain with an altitude between 60 m and 200 m, with a specific sylvestre vegetation, with islander clusters of forests.

The climate is excessive continental with harsh and long winters. The average temperatures range between 8.6<sup>0</sup> C in Botoșani and 8.3<sup>0</sup> C in Dorohoi. The average annual rainfalls are of 569 mm/year in Botoșani.

The studied area is part of the Continental biogeographical region.

#### MATERIAL AND METHODS

The nocturnal species were collected using a light trap (125-250 watt). The diurnal species were captured using an entomological net.

Higgins et al. (1991), Koch (1991), Lafranchis (2004), Rákósy (1996), Robineau (2007), Tolman (2008) were used in the diagnosis of the species. The systematics of Lepidoptera was used according to Karsholt & Razowski (1996) and Rákósy et al. (2003).

For the species where there is specified the number of specimens by sex, the material can be found in my personal collection.

For the observational data where there is not specified the number of specimens, the species was only observed (eventually caught, identified and released).

#### RESULTS

The following lepidopteran species, listed in Annexes 2 or 3 of the Habitats Directive of the European Union and those included in Annexes 3, 4A or 4B of Government Emergency Ordinance no. 57/2007 on the regime of natural protected areas, the conservation of natural habitats, flora and fauna are presented in systematic order. Table 1 lists the 17 species of Lepidoptera and their presence in different lists or systematic protection.

Table 1

Protected species of Lepidoptera in Botoșani county.

No.	Species	Family	No. RO [Rákósy et al., 2003]	No. EU [Karsholt et al., 1996]	92/43 Habitats' Directive	OUG 57/2007	The Red List of Romania [Rákósy et al., 2003]
1	<i>Proserpinus proserpina</i> (Pallas, 1772)	Sphingidae	3392	6849	Annex 4	Annex 4A	Vulnerable
2	<i>Zerynthia (Zerynthia) polyxena</i> ([Denis & Schiffmüller], 1775)	Papilionidae	3450	6945	Annex 4	Annex 4A	Endangered
3	<i>Parnassius mnemosyne</i> (Linnaeus, 1758)	Papilionidae	3454	6953	Annex 4	Annex 4A	Threatened
4	<i>Leptidea morsei</i> Fenton, 1881	Pieridae	3466	6969	Annex 2, 4	Annex 3, 4A	Endangered
5	<i>Colias chrysotheme</i> (Esper, 1777)	Pieridae	3491	7018		Annex 4B	Vulnerable
6	<i>Lycaena dispar</i> (Haworth, 1802)	Lycaenidae	3504	7036	Annex 2, 4	Annex 3, 4A	Vulnerable
7	<i>Cupido (Cupido) osiris</i> Meigen, 1829	Lycaenidae	3534	7089		Annex 4B	Vulnerable

Table 1 (continued)

No.	Species	Family	No. RO [Rákósy et al., 2003]	No. EU [Karsholt et al., 1996]	92/43 Habitats' Directive	OUG 57/2007	The Red List of Romania [Rákósy et al., 2003]
8	<i>Maculinea arion</i> (Linnaeus, 1758)	Lycaenidae	3551	7112	Annex 4	Annex 4A	Threatened
9	<i>Maculinea nausithous</i> (Bergsträsser, 1779)	Lycaenidae	3553	7114	Annex 2, 4	Annex 3, 4A	Critically endangered
10	<i>Aricia eumedon</i> (Esper, 1780)	Lycaenidae	3566	7143		Annex 4B	Vulnerable
11	<i>Argynnis laodice</i> (Pallas, 1771)	Nymphalidae	3598	7208		Annex 4B	Endangered
12	<i>Euphydryas maturna</i> (Linnaeus, 1758)	Nymphalidae	3633	7266	Annex 2, 4	Annex 3, 4A	Vulnerable
13	<i>Neptis hylas</i> (Linnaeus, 1758)	Nymphalidae	3652	7290		Annex 4B	Vulnerable
14	<i>Lopinga achine</i> (Scopoli, 1763)	Nymphalidae	3670	7315	Annex 4	Annex 4A	Vulnerable
15	<i>Arytrura musculus</i> (Ménétriés, 1859)	Noctuidae	4623	8981	Annex 2, 4	Annex 3, 4A	Endangered
16	<i>Pericallia matronula</i> (Linnaeus, 1758)	Arctiidae	5576	10595		Annex 4B	Vulnerable
17	<i>Euplagia quadripunctaria</i> (Poda, 1761)	Arctiidae	5584	10605	Annex 2	Annex 3	

Table 2

The localities from Botoșani county on which we make references in this work  
(the numbers correspond to localities in figure 1).

Symbol	Locality	Altitude (m)	Comments
1	“Ciornohal” forest from Călărași	200-240	Protected area
2	Berza	90-120	Forest
3	Bobulești	60	River meadow forest
4	Stâncea-Ștefănești		Niculescu (1963)
5	“Cozancea” forest from Sulița	150-200	
6	“Dealul Mare” forest from Vinători	150-200	Forest
7	“Săulea” forest from Viforeni	150-200	
8	Săveni		Lungoci (1972)
9	Avrămeni	250	Forest
10	Cordăreni	200-260	Forest
11	Suharău	180-250	Forest
12	Lozna peat bog	290-300	Protected area
13	Gorovei	330-350	Forest
14	Vîrfu Cîmpului	300-360	Forest
15	Bucecea	260	Siret valley
16	Cătămărești	200-250	Forest
17	Cătămărești Deal	110-120	Sitna valley
18	Cișmea	100	Sitna valley
19	“Rediu” forest from Botoșani	170-200	

Table 2 (continued)

Symbol	Locality	Altitude (m)	Comments
20	“Rai” forest from Zăicești	140-180	
21	Agafon	170-200	Forest
22	Brehuiești	300-320	Forest
23	Balta Arsă	160	Forest
24	Orășeni Vale	160-180	Humid area
25	Schit Orășeni	190-250	
26	Mesteacăn	270-290	Forest
27	Icușeni	240	Siret valley
28	Vorona forest	290-330	Protected area
29	Tudora forest	330-480	Protected area
30	“Runc” forest from Oneaga	450-480	
31	Șupitca	130-200	Forest
32	“Buduhala” forest from Cotu	100-170	
33	Poiana (Flămânzi)	200-300	Forest
34	Frumușica		Szekely (1992)

There are given the places for each species (Fig. 1), abundance and data collection.

#### Abbreviations

For abundance the following abbreviations were used: v.r. = very rare (1-4 specimens/generation); r = rare (5-10 specimens/generation); r.f. = relatively frequent (1-5 specimens/day or night); f = frequent (6-15 specimens/day or night); v.f. = very frequent (more than 16 specimens/day or night).

### LEPIDOPTERA SPECIES LIST

#### Family Sphingidae

##### *Proserpinus proserpina* (Pallas, 1772)

Only two records are known in Botoșani county.

*Personal records.* Schit Orășeni (v.r.): 1 ♂ - 25.V.2010.

*Literature.* Frumușica - 14.VI.1989 (Szekely, 1992).

#### Family Papilionidae

##### *Zerynthia (Zerynthia) polyxena* ([Denis & Schiffermüller], 1775)

This species is found in the Prut floodplain and located in several other resorts in the Eastern Plains of Moldavia.

*Personal records.* Bobulești (r.): 3 ♂♂, 1 ♀ - 11.05.1997; Berza (r.): 1 ♂, 2 ♀♀ - 29.IV.2009; 1 ♂ - 02.V.2010; „Ciornohal” forest from Călărași (v.r.): 1 ♀ - 29.IV.2009; 1 ♂ - 02.V.2010.

*Literature.* Săveni - 02.VI. (Lungoci, 1972).

##### *Parnassius mnemosyne* (Linnaeus, 1758)

The species flies in many forests of Botoșani county (Corduneanu, 1991) where we can find the host plant belonging to *Corydalis* genre.

*Personal records.* Avrămeni (v.f.): 2 ♂♂, 2 ♀♀ - 13.V.1990; Balta Arsă (v.r.): 1 ♂ - 03.VI.1989; „Buduhala” forest from Cotu (v.r.): 1 ♀ - 17.V.1994; Orășeni Vale (v.r.): 2 ♂♂, 1 ♀ - 27.V.1985; „Rediu” forest from Botoșani (r.f.): 2 ♂♂, 1 ♀ - 07.V.

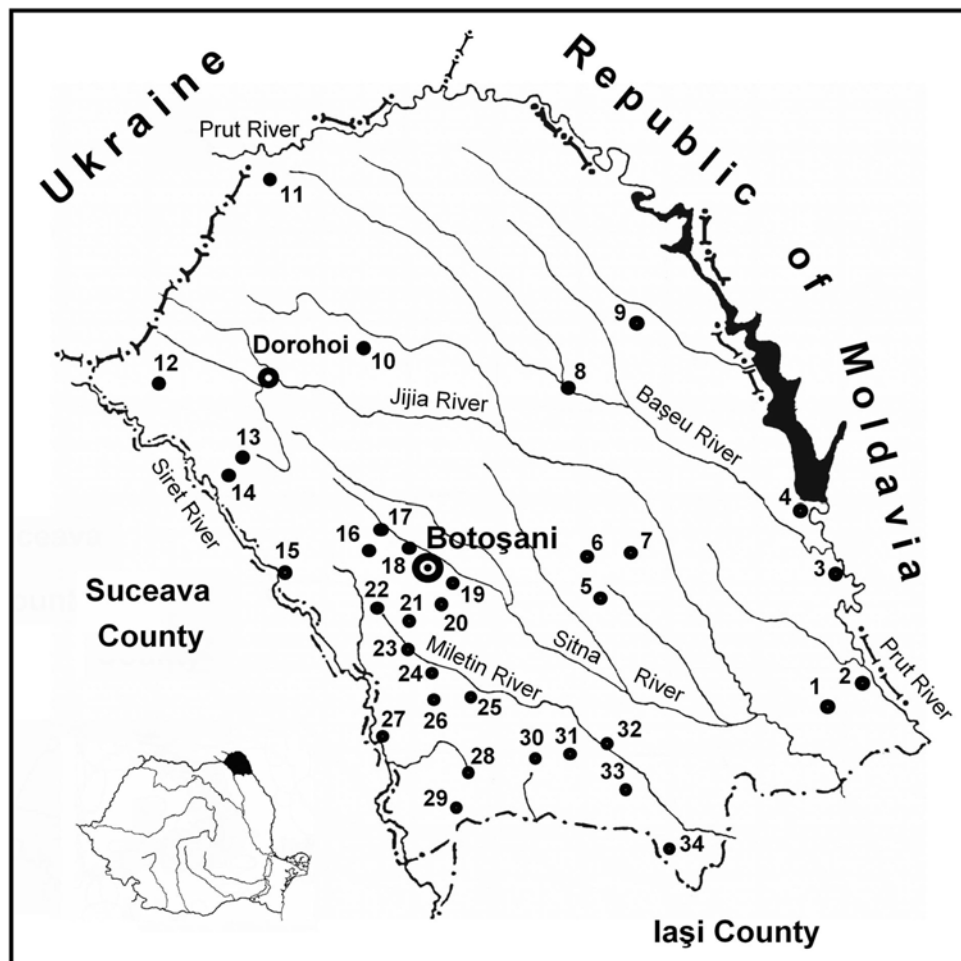


Fig. 1 - The map of Botoșani county in the North-eastern Romania. The numbers correspond to localities on which we make references in this work and they can be found in table 2.

1990, 1 ♂, 1 ♀ - 12.V.1990, 1 ♀ - 29.V.1993, 2 ♂♂, 2 ♀♀ - 30.V.1995, 1 ♂, 1 ♀ - 24.V.1999, 3 ♂♂, 1 ♀ - 18.V.2003, 2 ♂♂, 1 ♀ - 21.V.2003, 3 ♂♂ - 23.V.2006, 1 ♂ - 29.05.2008; „Rai” forest from Zăicești (r.): 31.V.1991, 06.VI.1991, 1 ♂, 1 ♀ - 27.05.1992, 1 ♀ - 01.VI.1995; Șupitca (r.): 1 ♀ - 04.VI.1995 (leg. I. Surugiu).  
*Literature.* „Rediu” forest from Botoșani (Szekely, 1992).

#### Family Pieridae

##### *Leptidea morsei* Fenton, 1881

It is a very rare and strictly localized species (Corduneanu, 1991).

*Personal records.* Cătămărești forest (v.r.): 2 ♂♂, 1 ♀ - 08.V.1994, 1 ♀ - 01.V.1995, 1 ♂, 1 ♀ - 07.V.1995, 1 ♂ - 04.V.1997; Schit Orășeni (v.r.): 1 ♂ - 01.V.1986; Vorona forest (v.r.): 1 ♂ - 06.V.1984.

*Literature.* „Rediu” forest from Botoșani (Szekely, 1992).

*Colias chrysotheme chrysotheme* (Esper, 1777)

Only one record is known.

*Literature.* Stâncă – Ștefănești, VIII. 1902. (Niculescu, 1963).

## Family Lycaenidae

*Lycaena dispar* (Haworth, 1802)

The species is spread in most of the wet areas of the county (Corduneanu, 1991).

*Personal records.* Ağafton (r.f.): 09.VIII.1989, 29.V.1994; Balta Arsă (r.f.): 03.VI.1989; „Rediu” forest from Botoșani (r.): 1 ♂ - 10.VIII.1986; Brehuiești (r.): 1 ♂ - 21.V.1989, 1 ♀ - 06.VI.1989; Bucecea (r.f.): 3 ♂♂, 1 ♀ - 10.VI.1987; Cătămarești Deal (r.f.): 1 ♂ - 28.VIII.1986; Cișmea (r.): 02.VIII.1986; „Buduhala” forest from Cotu (r.f.): 1 ♂ - 17.V.1994; Cordăreni (r.f.): 1 ♂ - 07.VIII.1983; Flămânzi (r.): 1 ♀ - 11.IX.1986; Icușeni (r.): 2 ♀♀ - 14.V.1990, 14.VI.1991; Lozna peat bog (r.): 24.VIII.1985, 09.IX.1986, 1 ♂, 1 ♀ - 08.VI.2009; „Runc” forest from Oneaga (r.): 14.VII.1985, 09.VIII.1992; Orășeni Vale humid area (r.): 27.V.1985, 30.V.1996, 25.VI.2004, 22.VI.2008; Schit Orășeni (r.): 1 ♂ - 01.VIII.1986, 1 ♀ - 03.VIII.1986, 1 ♀ - 02.VII.1993; Suharău forest (r.): 1 ♀ - 08.VIII.1983; Sulița – 01.IX.2007 (leg. I. Surugiu); Șupitca (f.): 3 ♂♂ - 07.IX.1984, 1 ♂ - 14.VIII.1985; Tudora forest (r.): 28.VIII.1985, 1 ♂ - 03.IX.1985, 09.VIII.2009; „Saulea” forest from Viforeni (r.): 17.VI.1989; Vorona forest (r.): 24.VI.1994, 03.VIII.1986, 1 ♂ - 21.VIII.2002, 08.VIII.2010; „Rai” forest from Zăicești (r.): 27.VII.1984, 03.VI.1992.

*Literature.* Frumușica, „Rediu” forest from Botoșani (Szekely, 1992).

*Cupido (Cupido) osiris* Meigen, 1829

It is a very rare and strictly localized species.

*Personal records.* „Rediu” forest from Botoșani (v.r.): 1 ♀ - 01.VIII.1986 (Corduneanu, 1991).

*Literature.* „Rediu” forest from Botoșani (Szekely, 1992).

*Maculinea arion* (Linnaeus, 1758)

There is only one appearance in Botoșani county.

*Literature.* Frumușica (Szekely, 1992).

*Maculinea nausithous* (Bergsträsser, 1779)

Species recently discovered in Botoșani county, in a humid area where there are a few specimens from the host plant *Sanguisorba officinalis*.

*Personal records.* „Lozna” peat bog (v.r.): 1 ♂ - 15.VII.2009.

*Aricia eumedon* (Esper, 1780)

Species recently discovered in Botoșani county.

*Personal records.* „Lozna” peat bog (v.r.): 1 ♂ - 15.VII.2009.

## Family Nymphalidae

*Argynnis laodice* (Pallas, 1771)

There are few records in the forests from the western part of Botoșani county (Corduneanu, 1991).

*Personal records.* Agafton (v.r.): 1 ♂ - 16.VII.1988; Brehuești (v.r.): 1 ♀ - 09.VIII.1988, 01.IX.1988, 1 ♀ - 01.VIII.1989, 31.VII.1993; Poiana (Flămânzi) (v.r.): 1 ♂ - 01.VIII.1984; „Runc” forest from Oneaga (v.r.) 1 ♂ - 17.VII.1986, 1 ♂ - 05.VII.2009; Șupitca (r.) 1 ♂ - 05.VIII.1984, 1 ♂ - 28.VII.1996, 1 ♂ - 04.VIII.1996 (leg. I. Surugiu); Tudora forest (v.r.) 1 ♂ - 12.VII.1983.

*Literature.* „Rediu” forest from Botoșani (Szekely, 1992).

*Euphydryas maturna* (Linnaeus, 1758)

In the “Rediu” forest there is also a vigorous population.

*Personal records.* Balta Arsă (r.): 1 ♂ - 03.VI.1989; “Rediu” forest from Botoșani (v.f.): 1 ♀ - 10.VI.1988, 3 ♂♂ - 31.V.1989, 1 ♀ - 12.VI.1993, 1 ♀ - 09.VI.1993, 1 ♂ - 23.V.1994, 8 ♂♂ - 30.V.1995, 2 ♂♂, 1 ♀ - 05.VI.1995, 29.V.1996, 04.VI.1996, 1 ♀ (ex larva) - 08.VI.1999, 4 ♀♀ - 10.VI.1999, 2 ♂♂, 1 ♀ - 24.V.2002, 3 ♂♂ - 29.V.2008, 1 ♂ - 21.V.2009, 1 ♂, 3 ♀♀ - 10.VI.2009; “Buduhala” forest from Cotu (r.): 21.VI.1993; Orășeni Vale (r.): 1 ♀ - 05.VI.2009; “Cozancea” forest from Sulița (r.): 26.VI.2005; Șupitca (r.): 26.V.1996 (leg. I. Surugiu); “Saulea” forest from Viforeni (r.): 17.VI.1989; “Dealul Mare” forest from Vinători (f.): 2 ♂♂, 1 ♀ - 03.VI.2009; “Rai” forest from Zăicești (r.f.): 20.VI.1991, 03.VI.1992, 19.VI.1992, 06.VI.1993, 01.VI.1995.

*Literature.* „Rediu” forest from Botoșani (Szekely, 1992).

*Neptis hylas* (Linnaeus, 1758)

Isolated specimens have been noticed in many forests of the county (Corduneanu, 1991).

*Personal records.* Agafton (v.r.): 20.VII.1985, 22.VI.1986, 09.VIII.1989, 29.V.1994; Balta Arsă (v.r.): 03.VI.1989; Bobulești (v.r.): 2 ♂♂, 1 ♀ - 11.V.1997; “Rediu” forest from Botoșani (v.r.): 23.VII.1984, 04.VII.1986, 30.VII.1989, 21.V.2003; Cătămărești forest (v.r.): 30.IV.1986, 03.VI.1994; Gorovei forest (v.r.): 12.VIII.1984, 20.VI.1993, 04.VIII.1993, 03.VII.1994; Mesteacăn (v.r.): 10.V.1990; Poiana (Flămânzi) (v.r.): 1 ♂, 1 ♀ - 01.VIII.1984, 11.IX.1986; “Runc” forest from Oneaga (v.r.): 14.VII.1985, 17.VII.1986; Orășeni Vale humid area (r.f.): 25.VI.2004, 08.VI.2006, 24.VI.2007; Schit Orășeni (v.r.): 22.VIII.1985, 1 ♂ - 01.V.1986, 01.VIII.1986; Șupitca (r.): 1 ♀ - 01.V.1983, 05.VIII.1984, 1 ♂, 1 ♀ - 28.VII.1996; Tudora forest (v.r.): 09.VIII.2009; Vîrfu Cîmpului (r.): 29.VI.2003; Vorona forest (r.): 1 ♂ - 23.V.2010, 2 ♂♂, 1 ♀ - 23.VII.2010; “Rai” forest from Zăicești (r.): 20.05.1993, 1 ♂ - 27.07.1984.

*Literature.* Frumușica, “Rediu” forest from Botoșani (Szekely, 1992).

*Lopinga achine achine* (Scopoli, 1763)

It is strictly spotted in the “Rediu” forest from Botoșani (Corduneanu, 1991). It has not been observed after 1996 anymore.

*Personal records.* „Rediu” forest from Botoșani (v.r.): 3 ♂♂ - 31.V.1989, 1 ♂ - 10.VI.1990, 1 ♀ - 21.VI.1991, 1 ♀ - 12.VI.1993, 1 ♂ - 04.VI.1996.

*Literature.* „Rediu” forest from Botoșani (Szekely, 1992).

Family Noctuidae

*Arytrura musculus* (Ménétriés, 1859)

It is a rare species of Eastern-Asian origin (Korea, Japan), which is considered ancient, dating back from the old pre-ice fauna. In Romania, it was known only in the Danube Delta, the South of Dobrogea and the floodplain of the



Mureş River (Rákosy, 1996). I have found this interesting species in a wet area rich in *Salix*, situated in a small basin surrounded by afforested hills, at about 10 km South of Botoşani City (Corduneanu et al., 2007).

*Personal records.* Orăşeni Vale, humid area (v.r.): 1 ♂ - 29.VI.1994, 1 ♂ - 07.VII.1995, 1 ♂ - 25.VI.1996, 1 ♂ - 03.VII.1997, 1 ♂ - 07.VII.1997, 2 ♂♂ - 29.06.1998, 1 ♂ - 01.VII.1998, 1 ♂ - 24.VI.2003, 1 ♂ - 26.VI.2005, 2 ♂♂ - 11.VII.2006, 2 ♂♂ - 15.VI.2007, 1 ♂ - 21.VI.2007, 1 ♂ - 24.VI.2009, 3 ♂♂ - 02.VII.2009, 1 ♂ - 03.VII.2010.

#### Family Arctiidae

##### *Pericallia matronula* (Linnaeus, 1758)

Species frequently reported in Romania from the Oriental Carpathians. The two specimens collected in deciduous forests, situated at the limits between the Moldavia Plain and the Siret Hills, represent an interesting exception.

*Personal records.* Orăşeni Vale: 1 ♂ - 02.VII.1997; Cătămăreşti forest: 1 ♂ - 29.VI.2005.

##### *Euplagia quadripunctaria* (Poda, 1761)

Species flies both by day and by night in many forests of the county.

*Personal records.* Agafton (v.r.): 17.VIII.1993 (night); Brehuieşti (r.): 1 ♂ - 09.VIII.1988 (day), 1 ♀ - 31.VII.1993 (day), 03.VIII.1993 (day); Ionăşeni-Truşeşti (r.): 20.VIII.1995 (night); Orăşeni Vale (r.): 23.VIII.1993 (night), 07.VIII.2004 (night), 1 ♀ - 19.VII.2007 (night); Schit Orăşeni (v.r.): 1 ♀ - 07.VIII.1998 (night), 13.VIII.2004 (night); Şupitca (r.) 28.VII.1996 (day); Tudora forest (v.r.): 1 ♂ - 09.VIII.2009 (day); Vorona forest (r.): 1 ♀ - 14.VIII.1998 (night), 1 ♀ - 06.VIII.2000 (day), 2 ♀♀ - 23.VII.2010 (day).

*Literature.* Frumuşica, "Rediu" forest from Botoşani (Szekely, 1992).

#### DISCUSSION

After the subsequent researches made within the last 30 years we were able to identify 855 species of Lepidoptera in Botoşani county.

Among them there are protected species, such as: *Maculinea nausithous*, *Aricia eumedon*, *Arytrura musculus* and *Pericallia matronula*.

This paper is a contribution for creating a database in which all the sampling places of the protected lepidopteran species of Romania can be included.

#### ACKNOWLEDGEMENTS

I thank all colleagues who have accompanied me in field trips in Botoşani county, specially: Dr. Eng. Cătălin Balan, Eng. Ioan Surugiu and lecturer Dr. Ovidiu Alin Popovici, who have shared my passion and continued their own study on Lepidoptera.

#### SPECII PROTEJATE DE LEPIDOPTERE (INSECTA: LEPIDOPTERA) DIN NORD-ESTUL ROMÂNIEI

#### REZUMAT

În lucrare sunt prezentate informații referitoare la distribuția și starea populațiilor de lepidoptere protejate din județul Botoşani (nord-estul României). Se fac referiri despre speciile de lepidoptere care necesită protecție, menționate în Directiva Habitata a Uniunii Europene, precum și



despre speciile incluse în Ordonanța de urgență a Guvernului nr. 57/2007 privind regimul ariilor naturale protejate, conservarea habitatelor naturale, a florei și faunei sălbatice.

Această lucrare reprezintă o contribuție pentru realizarea unei viitoare baze de date în care să fie cuprinse toate semnalările speciilor protejate de lepidoptere din România.

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Received: January 25, 2010  
Accepted: November 30, 2010

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