



ORIGINAL RESEARCH PAPER

RARE SPECIES OF INSECTS IN ANTHROPOGENIC ECOSYSTEMS LOCATED IN SOUTHEASTERN ROMANIA

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SYNOPSIS

Key words:
anthropogenic
ecosystems Galati,
insects diversity,
rare species,
Romania

The present study brings new data on diversity of insect fauna in anthropogenic ecosystems located near Galati (Romania).

In the study area 192 species of insects were identified belonging to 5 orders: Odonata (14 species), Orthoptera (15 species), Hemiptera (51 species), Coleoptera (86 species) and Lepidoptera (26 species). 4 were identified as rare species, 3 of which are protected by law.

Lycaena dispar rutila Werneburg, 1846 (Fam. Lycaenidae), *Heteropterus morpheus morpheus* Pallas, 1771 (Fam. Hesperidae), and *Gomphus flavipes* Charpentier, 1825 (Fam. Gomphidae) are strictly localized species in Romania and are included in both the lists of the Bern Convention and the Habitats Directive, Annex 2, 3A, 4A.

The paper also analyzes the human impact on these ecosystems and highlights the consequences of human activities on the populations of insects and their diversity.

INTRODUCTION

Insects are the largest component of the invertebrate world with a particular ecological plasticity, being found both in natural ecosystems (grasslands, forests, meadows etc.) and artificial ecosystems (agroecosystems). At all stages of development many species of insects are closely related to vegetation, which is used as a support for oviposition, trophic source for larvae, adults and pupae shelter. Insects are also good indicators of environment, reacting immediately to negative human impact. Studies on the structure of entomofauna in this area have not been made, but in neighboring wetlands, various studies, mainly focused on the fauna of diurnal butterflies and dragonflies, were performed.

MATERIALS AND METHODS

The studied ecosystems are located on the outskirts of Galati, in the buffer zone, near protected areas: ROSPA0070 Prut Flood-VIădești-Frumușița, special bird protection site and ROSCI0105 Lower Prut Flood Plain, community importance site from the Natural Park of the Lower Prut Flood Plain. Investigated habitats are mostly anthropogenic, dominated by ruderal vegetation. The study area, located near the Prut River, which flows into the Danube, also hosts characteristic habitats of poplar, poplar and willow, invaded by planted acacia and *Amorpha fruticosa*.

Entomological material was collected with an entomological net, bimonthly, during March 2012 to September 2012. Qualitative and quantitative analyses were made, which allowed assessments of ecological indicators on insect populations in the study area.

RESULTS AND DISCUSSION

The inventory of epigeal entomofauna led to the identification, during the study period, of a total of 1393 specimens of 192 species of insects belonging to 53 families and 5 Order as follows: Odonata (14 species), Orthoptera (15 species), Hemiptera (51 species), Coleoptera (86 species) and Lepidoptera (26 species) (Table 1). Most species belongs to the Order Coleoptera, followed by the Order Hemiptera (Fig. 1).

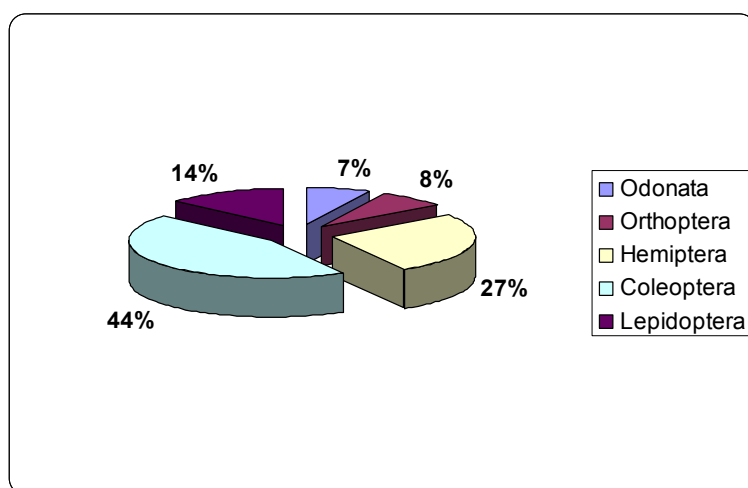


Figure 1:
Distribution of insect species identified in the study area, by the Orders.

Table 1: List of identified insects in the study area.

No.	Order	Family	Species	Specimens
	ODONATA	Platycnemididae	<i>Platycnemis pennipes</i> Pallas, 1771	13
		Coenagrionidae	<i>Ischnura elegans</i> Vander Linden, 1820	47
			<i>Ischnura pumilio</i> Charpentier, 1825	2
			<i>Coenagrion puella</i> Linnaeus, 1758	1
			<i>Erythromma najas</i> Hansemann 1823	1
			<i>Erythromma viridulum</i> Charpentier 1840	1
		Aeshnidae	<i>Aeshna isosceles</i> Muller 1767	3
			<i>Aeshna affinis</i> Vander Linden 1820	11
			<i>Anax imperator</i> Leach 1815	1
		Libellulidae	<i>Orthetrum albistylum</i> Selys, 1848	2
			<i>Orthetrum cancelatum</i> Linnaeus, 1758	14
			<i>Sympetrum sanguineum</i> Muller 1764	30
			<i>Sympetrum meridionale</i> Selys 1841	28
		Gomphidae	<i>Gomphus flavipes</i> Charpentier 1825	6
		ORTHOPTERA	Acrididae	<i>Acrida ungarica</i> Herbst 1786
	<i>Chorthippus loratus</i> Fischer de Waldheim 1846			9
	<i>Chorthippus dichrous</i> Eversmann 1859			2
	<i>Euchorthippus declivus</i> Brisout de Barneville 1848			3
	<i>Paracaloptenus caloptenoides</i> Brunner von Wattenwyl 1861			1
	<i>Omocestus minutus</i> Brulle 1832			17
	<i>Omocestus rufipes</i> Zetterstedt 1821			24
	<i>Aiolopus thalassinus</i> Fabricius 1781			1
	Conocephalidae		<i>Conocephalus fuscus</i> Fabricius 1793	4
	Gryllidae		<i>Oecanthus pellucens</i> Scopoli 1763	5
	Tettigoniidae		<i>Tettigonia viridissima</i> (Linnaeus 1758)	7
	Tetrigidae		<i>Tetrix undulata</i> Sowerby 1806	1
			<i>Tetrix subulata</i> (Linnaeus, 1758)	1
	Phaneropteridae		<i>Phaneroptera nana</i> Fieber 1853	5
			<i>Phaneroptera falcata</i> Poda 1761	1
	HEMIPTERA	Reduviidae	<i>Coranus griseus</i> (Rossi, 1790)	1
			<i>Pygolampis bidentata</i> (Goeze, 1778)	1
		Nabidae	<i>Nabis ferus</i> Linnaeus 1758	14
		Miridae	<i>Adelphocoris lineolatus</i> (Goeze 1778)	8
			<i>Deraeocoris ruber</i> Linnaeus 1758	1
			<i>Stenodema laevigata</i> Linnaeus 1758	9
			<i>Capsus ater</i> (Linnaeus, 1758)	6
		Membracidae	<i>Stictocephala bisonia</i> Kopp & Yonke 1977	14

No.	Order	Family	Species	Specimens	
		Cydnidae	<i>Tritomegas bicolor</i> Linnaeus 1758	3	
		Pentatomidae	<i>Dolycoris baccarum</i> Linnaeus 1758	13	
			<i>Aelia acuminata</i> Linnaeus, 1758	33	
			<i>Aelia rostrata</i> Boheman, 1852	15	
			<i>Ancyrosoma leucogrammes</i> (Gmelin, 1790)	2	
			<i>Eurydema oleracea</i> (Linnaeus 1758)	1	
			<i>Eurydema ventralis</i> Kolenati, 1846	6	
			<i>Eysarcoris aeneus</i> (Scopoli, 1763)	8	
			<i>Neottiglossa leporina</i> (Herrich-Schaeffer, 1830)	6	
			<i>Rhaphigaster nebulosa</i> (Poda, 1761)	2	
			<i>Sciocoris sulcatus</i> Fieber, 1851	10	
			Lygaeidae	<i>Ischnodemus sabuleti</i> Fallen 1826	35
				<i>Beosus maritimus</i> (Scopoli 1763)	2
				<i>Rhyparochromus vulgaris</i> Schilling, 1829	1
		<i>Beosus</i> sp.		1	
		<i>Acompus rufipes</i> Wolff 1804		1	
		<i>Beosus quadripunctatus</i> Müller 1766		2	
		<i>Nysius senecionis</i> (Schilling, 1829)		5	
		<i>Henestaris halophilus</i> (Burmeister, 1835)		8	
		<i>Lygaeus equestris</i> (Linnaeus, 1758)		2	
		<i>Geocoris erythrocephalus</i> (Lepeletier & Serville, 1825)		2	
		<i>Peritrechus gracilicornis</i> Puton, 1877		5	
		<i>Peritrechus nubilus</i> (Fallen, 1807)		4	
		Rhopalidae		<i>Rhopalus parumpunctatus</i> Schilling, 1829	2
			<i>Rhopalus maculatus</i> (Fieber, 1837)	1	
			<i>Brachycarenum tigrinus</i> Schilling 1829	5	
			<i>Stictopleurus abutilon</i> (Rossi 1790)	1	
			<i>Stictopleurus punctatonervosus</i> (Goeze, 1778)	1	
			<i>Stictopleurus pictus</i> Fieber 1861	3	
			<i>Myrmus miriformis</i> (Fallen, 1807)	95	
			<i>Liorhyssus hyalinus</i> (Fabricius 1794)	6	
			<i>Maccevethus errans caucasicus</i> (Kolenati, 1845)	1	
		Tingidae	<i>Monosteira unicastata</i> Mulsant & Rey, 1852	32	
		Coreidae	<i>Coreus marginatus</i> (Linnaeus, 1758)	4	
			<i>Ceraleptus gracilicornis</i> (Herrich-Schaeffer, 1835)	1	
		Pyrrhocoridae	<i>Pyrrhocoris apterus</i> Linnaeus 1758	1	

No.	Order	Family	Species	Specimens	
		Scutelleridae	<i>Odontotarsus purpureolineatus</i> (Rossi, 1790)	1	
			<i>Graphosoma lineatum</i> (Linnaeus, 1758)	6	
			<i>Psacasta neglecta</i> (Herrich-Schaeffer, 1837)	2	
		Dyctiopharidae	<i>Dictyophara (Dictyophara) europaea</i> (Linnaeus 1767)	1	
		Cixiidae	<i>Hyalesthes obsoletus</i> Signoret 1865	1	
		Cicadellidae	<i>Cicadella viridis</i> (Linnaeus 1758)	6	
		Aphrophoridae	<i>Philaenus spumarius</i> (Linnaeus 1758)	10	
	COLEOPTERA	Cerambycidae	<i>Calamobius filum</i> Rossi 1790	32	
				<i>Phytoecia millefolii</i> (Adams, 1817)	1
				<i>Agapanthia violacea</i> Fabricius 1775	3
				<i>Agapanthia villosoviridescens</i> De Geer 1775	1
				<i>Theophilea subcylindricollis</i> Hladil, 1988	13
				<i>Chlorophorus varius</i> Muller 1766	4
			Carabidae	<i>Brachinus crepitans</i> Linnaeus 1758	1
				<i>Pterostichus melas</i> Creutzer 1799	4
				<i>Pterostichus niger</i> Schaller 1783	2
				<i>Harpalus affinis</i> Schrank 1781	2
				<i>Pseudoophonus rufipes</i> De Geer 1774	1
				<i>Amara ingenua</i> Duftschmid 1812	1
				<i>Oodes helopioides</i> Fabricius 1792	1
			Anthicidae	<i>Anthelephila pedestris</i> (Rossi 1790)	16
				<i>Notoxus monoceros</i> (Linnaeus, 1760)	1
			Apionidae	<i>Apion frumentarium</i> Linnaeus 1758	1
			Cantharidae	<i>Cantharis rustica</i> Fallen 1807	8
				<i>Cantharis livida</i> Linnaeus, 1758	1
				<i>Crudosilis ruficollis</i> (Fabricius 1775)	5
				<i>Rhagonycha fulva</i> Scopoli 1763	10
			Cetoniidae	<i>Netocia cuprea</i> Fabricius 1775	2
				<i>Cetonia aurata</i> Linnaeus 1762	4
				<i>Oxythyrea funesta</i> (Poda 1761)	25
				<i>Valgus hemipterus</i> Linnaeus 1758	4
			Coccinellidae	<i>Hippodamia (Adonia) variegata</i> (Goeze 1777)	1
				<i>Hippodamia septemmaculata</i> (De Geer, 1775)	1
				<i>Stethorus punctillum</i> Weise 1891	1
				<i>Tytthaspis sedecimpunctata</i> Linnaeus 1758	23
				<i>Psyllobora vigintiduopunctata</i> Linnaeus 1758	5
				<i>Propylea quatuordecimpunctata</i> Linnaeus	14

No.	Order	Family	Species	Specimens	
			1758		
			<i>Coccinella septempunctata</i> Linnaeus 1758	12	
			<i>Harmonia axyridis</i> Pallas 1773	1	
			<i>Harmonia quadripunctata</i> Pontoppidan, 1763	1	
			<i>Coccinula quatuordecimpustulata</i> Linnaeus 1758	13	
		Chrysomelidae	<i>Cryptocephalus octacosmus</i> Bedel, 1891	5	
			<i>Clytra laeviuscula</i> Ratzeburg 1837	2	
			<i>Clytra quadripunctata quadripunctata</i> Linnaeus 1758	2	
			<i>Gastrophysa polygoni</i> Linnaeus 1758	7	
			<i>Galeruca pomonae</i> Scopoli 1763	4	
			<i>Chrysomela tremulae</i> Fabricius 1787	1	
			<i>Chrysomela populi populi</i> Linnaeus 1758	1	
			<i>Chrysolina fastuosa fastuosa</i> Scopoli 1763	2	
			<i>Agelastica alni alni</i> Linnaeus 1758	1	
			<i>Plagiosterna aenea</i> Linnaeus 1758	5	
			<i>Oulema melanopus</i> Linnaeus 1758	1	
			<i>Cassida stigmatica</i> Suffrian 1844	4	
			<i>Gonioctena fornicata</i> Bruggemann 1873	7	
			<i>Phyllobrotica quadrimaculata</i> Linnaeus 1758	2	
			<i>Hypocassida subferruginea</i> Schrank 1776	1	
			<i>Labidostomis longimana</i> Linnaeus 1760	1	
			Curculionidae	<i>Polydrusus impressifrons</i> Gyllenhal 1834	1
				<i>Larinus (Phyllonomeus) planus</i> (Fabricius 1792)	2
				<i>Larinus turbinatus</i> Gyllenhal, 1835	2
				<i>Larinus obtusus</i> Gyllenhal 1835	2
		<i>Lixus iridis</i> Olivier 1807		7	
		<i>Lixus fasciculatus</i> Boheman, 1835		4	
		<i>Lixus cardui</i> Olivier 1807		2	
		<i>Lixus ochraceus</i> Boheman, 1843		1	
		<i>Lixus pulverulentus</i> (Scopoli, 1763)		4	
		<i>Cleonis pigra</i> Scopoli 1763	4		
			<i>Sitona lineatus</i> Linnaeus 1758	20	
			<i>Sitona humeralis</i> Stephens 1831	4	
			<i>Phyllobius argentatus</i> Linnaeus 1758	2	
			<i>Coeliodes ruber</i> Marsham 1802	3	
			<i>Tychius quinquepunctatus</i> (Linnaeus, 1758)	1	
		Elateridae	<i>Drasterius bimaculatus</i> (Rossi 1790)	1	

No.	Order	Family	Species	Specimens	
			<i>Agriotes sputator</i> Linnaeus 1758	5	
			<i>Agriotes lineatus</i> (Linnaeus, 1767)	2	
			<i>Athous zebei</i> Bach 1854	2	
		Buprestidae	<i>Trachys minutus</i> Linnaeus, 1758	1	
		Tenebrionidae	<i>Lagria hirta</i> Linnaeus 1758	9	
			<i>Opatrum sabulosum</i> Linnaeus, 1761	1	
		Dasytidae	<i>Danacea (Danacea) pallipes</i> (Panzer 1795)	1	
		Malachiidae	<i>Malachius bipustulatus</i> Linnaeus 1758	27	
			<i>Malachius aeneus</i> Linnaeus 1758	2	
			<i>Clanoptilus geniculatus</i> (Germar, 1824)	11	
		Rutelidae	<i>Phyllopertha horticola</i> Linnaeus 1758	4	
		Meloidae	<i>Mylabris variabilis</i> Pallas 1781	6	
		Mordellidae	<i>Hoshihananomia perlata</i> Sulzer 1776	3	
			<i>Mordella holomelaena</i> Apfelbeck 1914	1	
		Oedemeridae	<i>Oedemera femorata</i> Scopoli 1763	5	
			<i>Oedemera viriscens</i> Linnaeus 1767	1	
		Salpingidae	<i>Vincenzellus ruficollis</i> Panzer 1794	3	
		Silphidae	<i>Ablattaria laevigata</i> (Fabricius 1775)	1	
			<i>Tachyporus hypnorum</i> Fabricius, 1775	12	
		Staphilinidae	<i>Paederus riparius</i> Linnaeus 1758	9	
	LEPIDOPTERA	Hesperiidae	<i>Carcharodus alceae</i> Esper 1780	12	
				<i>Ochlodes sylvanus sylvanus</i> Esper 1777	34
				<i>Heteropterus morpheus morpheus</i> Pallas 1771	16
			Lycaenidae	<i>Celastrina argiolus argiolus</i> Linnaeus 1758	17
				<i>Lycaena dispar rutila</i> Werneburg 1864	6
				<i>Lycaena thersamon thersamon</i> Esper, 1784	1
				<i>Lycaena phleas phleas</i> Linnaeus 1761	6
				<i>Polyommatus icarus icarus</i> Rottemburg 1775	27
			Nymphalidae	<i>Issoria lathonia lathonia</i> Linnaeus 1758	5
				<i>Argynis pandora pandora</i> Denis&Schiffermuller 1775	4
				<i>Vanessa atalanta</i> Linnaeus 1758	5
				<i>Vanessa cardui</i> Linnaeus 1758	8
				<i>Maniola jurtina jurtina</i> Linnaeus 1758	9
				<i>Melitaea phoebe</i> Denis & Schiffermuller 1775	1
				<i>Lasiommata megera megera</i> Linnaeus 1767	2
				<i>Polygonia c-album</i> Linnaeus 1758	3
				<i>Coenonympha pamphilus</i> Linnaeus 1758	47
			Pieridae	<i>Colias erate erate</i> Esper 1805	18

No.	Order	Family	Species	Specimens
			<i>Colias croceus croceus</i> Fourcroy, 1785	3
			<i>Pieris rapae rapae</i> Linnaeus 1758	20
			<i>Pieris napi napi</i> Linnaeus 1758	6
			<i>Pieris brassicae brassicae</i> Linnaeus 1758	8
			<i>Pontia edusa edusa</i> Fabricius 1777	45
			<i>Leptidea sinapis sinapis</i> Linnaeus, 1758	1
			<i>Anthocharis cardamines cardamines</i> Linnaeus 1758	4
		Papilionidae	<i>Iphiclides podalirius podalirius</i> Linnaeus, 1758	4
TOTAL	5	53	192	1393

Of the 192 identified species of insects, 4 are rare in Romanian fauna, three of which are protected by law:

Lycaena dispar rutila Werneburg, 1846
Fam. Lycaenidae, Ord. Lepidoptera (Fig. 2)

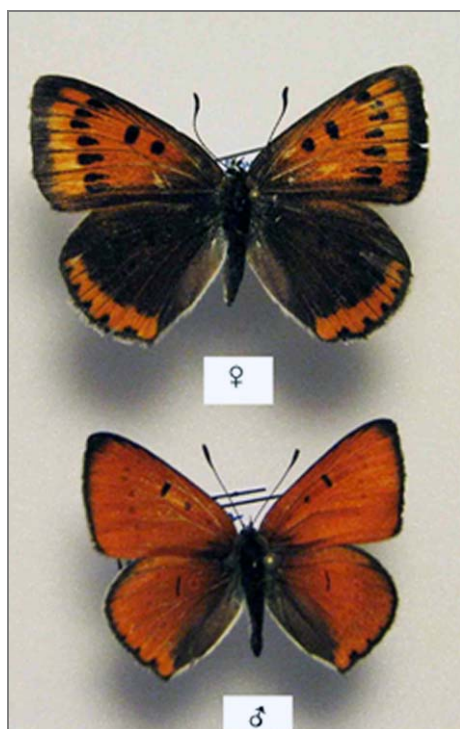


Figure 2:
Lycaena dispar rutila Werneburg,
1846 (original photo).

ECOLOGY: species living in wet meadows, marshy meadows, marshes, banks of lakes and floodplains. This species prefers habitats hydrophilic, with tall grasses

(*Phragmition* alliances, *Magnocaricion*, *Agropyro-Rumicion crispi* or *Lolio Potentillion anserinae*), located in proximity to water courses, wetlands (Rakosy, 2007). In the Galati county area the species has been identified inside The Natural Park of the Lower Prut Flood Plain, in Vlășcuța, Vlădești, Pochina and Mața Rădeanu (Cristescu, 2011).

In the study area the species was identified at the edge of the poplar and willow forest, on the Danube banks, where the larvae's host plants grow (*Rumex aquaticus*, *Rumex hydrolapathum*, *Rumex crispus*, *Rumex obtusifolius*), on May 20, 2012, when three individuals were collected (1 ♂ and 2 ♀), but also in the poplar forest glade and on the floodable channel edge (Fig. 3).



Figure 3:
Lycaena dispar rutila, Fam.
Lycaenidae - species habitat
(original photo).

BIOLOGY: the adult flight period is from mid-May to August, inclusive.

LEVEL OF ENDANGERMENT: nationally, the species is considered vulnerable; is a protected species, being included in the Annexes 2, 3A, 4A of the Habitats Directive.

Heteropterus morpheus morpheus Pallas, 1771

Fam. HesperIIDae, Ord. Lepidoptera (Fig. 4)

ECOLOGY: it is a species found only in wetlands, in swampy meadows and forest, forests fringe communities. Although it was recorded from most of Romania's historical regions, except for vast areas in the south (Rákosy et al. 2003), this may be misleading as *H. morpheus* is a very local species in the country with few known colonies. In the Galati county area the species has been found inside The Natural Park of the Lower Prut Flood Plain, in Tuluțești village range (Cristescu 2011). In the study area the species was identified by a number of 16 specimens, on the edge of Bădălan Pier (fig. 5), as well as the floodable channel edge (fig. 6), and on the selvedges of the poplar forest also.

BIOLOGY: the adult flight period is from mid-June to August. The larvae feeds on hygrophilic plant species, such as *Calamagrotis canescens*, *Phragmites australis* or *Molinia caerulea*. The species overwinters in the larval stage (Szekely, 2008).



Figure 4:
Heteropterus morpheus morpheus, Pallas, 1771.

LEVEL OF ENDANGERMENT: In Romania, this species is listed on annex 3B of the Minister Order no. 1.198/2005, while in the Romanian Red List for butterflies (Rákosy, 2003) it is considered to be endangered at a national level, with populations ranging from vulnerable to endangered according to regional particularities.



Figure 5: Pier Bădălan, habitat for *Heteropterus morpheus morpheus* (original photo).



Figure 6: Foodable channel, habitat for *Heteropterus morpheus morpheus* (original photo).

Given the localized distribution of this species in our country, and ecological preferences relating to a humid environment, finding this species in the study area have of particular importance because it is a good environmental indicator. Changing population downward or its disappearance can be immediately correlated to pronounced degradation of the environment it is linked to.

Gomphus flavipes Charpentier, 1825

Fam. Gomphidae, Ord. Odonata

ECOLOGY: it is a European species. It has the biggest geographical range among the European Gomphid species, occurring from France to eastern Siberia.

The species has a very patchy occurrence in Central Europe and has become rare in Western Europe. This species is found near the smoothly flowing water, and wooded banks. In Romania the species has been reported in the Banat region, Ocna Sibiului (Sibiu county), Sf. Gheorghe (Covasna county), Tecuci and Drăgănești (Galati county), Pojorâta (Suceava county) and Letea (Tulcea county) (Cârdei & Bulimar, 1965).

In the study area the species was identified at the edge of the poplar and willow forest, on the Danube banks, on the pier which enables access to Zătun - Cotul Pisicii, and has its right bank bordered by *Amorpha fruticosa* (fig. 7). Five specimens were collected on 7 June 2012.



Figure 7:
Bădălan Pier area,
bordered by *Amorpha*
***fruticosa*,**
habitat for *Gomphus*
***flavipes*.**

(original photo)

BIOLOGY: the adult flight period is from June to August.

LEVEL OF ENDANGERMENT: At the European level, the species is included in Annex 4 of the Habitats Directive and Annex II of the Bern Convention.

Paracaloptenus caloptenoides Brunner von Wattenwyl, 1861

Fam. Acrididae, Ord. Orthoptera (Fig. 8)

ECOLOGY: it is a geophilic and thermophilic species, found in grasslands, meadows and forests.

In Romania it's very rare, being found mainly in the south (Iorgu & Iorgu, 2008).

In the study area the species was collected from the right bank vegetation of Bădălan Pier (Fig. 9), with the coordinates given in Table 1. One single specimen was collected on 22 August 2012.

BIOLOGY: adults occur in late July.



Figure 8: *Paracaloptenus caloptenoides*
Brunner von Wattenwyl, 1861.



Figure 9: Ruderal vegetation on the right bank of Bădălan Pier, habitat for *Paracaloptenus caloptenoides*.
(original photo)

In the studied area, there are a number of specific human activities that may have undesirable repercussions on entomofauna. In what follows, we draw attention to them and their impact on insect diversity:

- the reed arson on the access pier banks and on the sides of the crops (March, April 2012) - burning of vegetation has a negative impact on insects which, at that time of the year, can be found in the egg stage, larva or pupa;
- the area is used, frequently, as picnic area, which results in the accumulation of considerable amounts of waste (plastic bottles, bags, bottles, aluminum cans etc.) that stifles the vegetation with direct consequences on entomofauna. This is noticeable throughout the year, since the waste left behind is not biodegradable and affects the ecosystem indefinitely;
- other human activities, seen on every field research, included fishing and hunting;
- withal, grazing is an activity particularly seen, on the flooded canal bank, Danube bank and on the edge of Bădălan Pier. In September, the edge of Bădălan Pier was mowed and this usually reduce the number of insect populations that lay their eggs in fall, on herbaceous vegetation, for wintering.

CONCLUSIONS

Insects are related, at all stages of the development, to the vegetation of their habitat. Given the anthropic character outstanding on the investigated area, which is considered the transition zone to adjacent natural areas (Prut-Vlădești-Frumusita Special Protection site, ROSCI0105 Low Prut Floodplain, Site of Community Importance and Floodplain Natural Park Lower Prut) is necessary to reduce human impact (grazing, mowing, arson, weekend tourism) as a measure to protect

entomofauna. Also, protected species, *Lycaena dispar rutila*, *Heteropterus morpheus morpheus*, *Gomphus flavipes* are related to wetland habitats and hygrophile vegetation, so protection of this type of habitat is the main measure of species conservation.

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- *** Habitats Directive - Council Directive 92/43 EEC for the conservation of natural habitats and the wild fauna and flora, adopted on 21 May 1992
- *** Bern Convention - Convention for the conservation of wildlife and natural habitats in Europe adopted at Bern on 19 September 1979

SPECII RARE DE INSECTE DIN ECOSISTEME ANTROPIZATE

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Rezumat

Studiul prezent aduce date noi privind diversitatea faunei de insecte din ecosisteme antropizate localizate în apropierea municipiului Galați (Romania). Aceste ecosisteme sunt poziționate pe malul stâng al fluviului Dunărea, la

confluenta cu raul Prut, fiind practic la limita extrem sudică a Parcului Natural Lunca Joasă Prutului Inferior și extremitatea vestică a Rezervatiei Biosferei Delta Dunării. În zona studiată au fost identificate 192 specii ce aparțin la 5 ordine de insecte: Ord. Odonata (14 specii), Ord. Orthoptera (15 specii), Ord. Hemiptera (51 specii), Ord. Coleoptera (86 specii) și Ord. Lepidoptera (26 specii). Au fost identificate 4 specii rare, 3 dintre ele fiind protejate prin lege.

Lycaena dispar rutila Werneburg 1846, Fam. Lycaenidae, *Heteropterus morpheus morpheus* Pallas 1771, Fam. Hesperidae, și *Gomphus flavipes* Charpentier 1825, Fam. Gomphidae sunt specii cu localizare strictă în România fiind incluse atât în listele Convenției de la Berna cât și în Directiva habitate, anexele 2, 3A, 4A.

Lucrarea analizează, de asemenea, impactul antropic asupra acestor ecosisteme și subliniază care sunt consecințele activităților umane asupra populațiilor de insecte și diversității acestora.

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