

## Planthoppers and leafhoppers of the Przedborski Landscape Park (Hemiptera: Fulgoromorpha et Cicadomorpha)

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**ABSTRACT.** Faunistic research on planthoppers and leafhoppers was carried out in 2009 at 20 collecting sites located in the central part of the Przedborski Landscape Park. Insects were sampled using a standard sweep-net during the growing season from May until September. A total of 663 specimens representing 101 species were collected, which constitute about 19% of the Polish planthopper and leafhopper fauna. *Zygina lunaris* (MULSANT et REY, 1855) was recorded in Poland for the first time. Additional localities for rare species such as *Eurybregma nigrolineata* SCOTT, 1875, *Balcanocerus larvatus* (HERRICH-SCHÄFFER, 1837), *Eupteryx adspersa* (HERRICH-SCHÄFFER, 1838), *Zygina schneideri* (GÜNTHART, 1974), *Metalimnus steini* (FIEBER, 1869), *Diplocolenus bohemani* (ZETTERSTEDT, 1840) and *Erzaleus metrius* (FLOR, 1861) are also given.

**KEY WORDS:** Planthoppers, leafhoppers, Fulgoromorpha, Cicadomorpha, Przedborski Landscape Park, new species.

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### INTRODUCTION

The Przedborski Landscape Park (Fig. 1) was established in 1988 to protect the unique wildlife and landscape of Central Poland including the River Pilica valley, the woodlands of the former Pilicka Forest and the hills formed from Jurassic and Cretaceous rocks (WALCZAK et al. 2001).

According to the physico-geographical regionalization of Poland (KONDRACKI 2000), it is located within the macroregion of the Przedbórz Upland (north-western part of the

subprovince of the Małopolska Upland) and consists of parts of four mezoregions: the Przedbórz-Małogoszcz Hill Range in the central part of the park, the Włoszczowa Basin in the north-east and the Łopuszno and Opoczno Hills in the north. The park lies in the Łódź and Świętokrzyskie provinces.

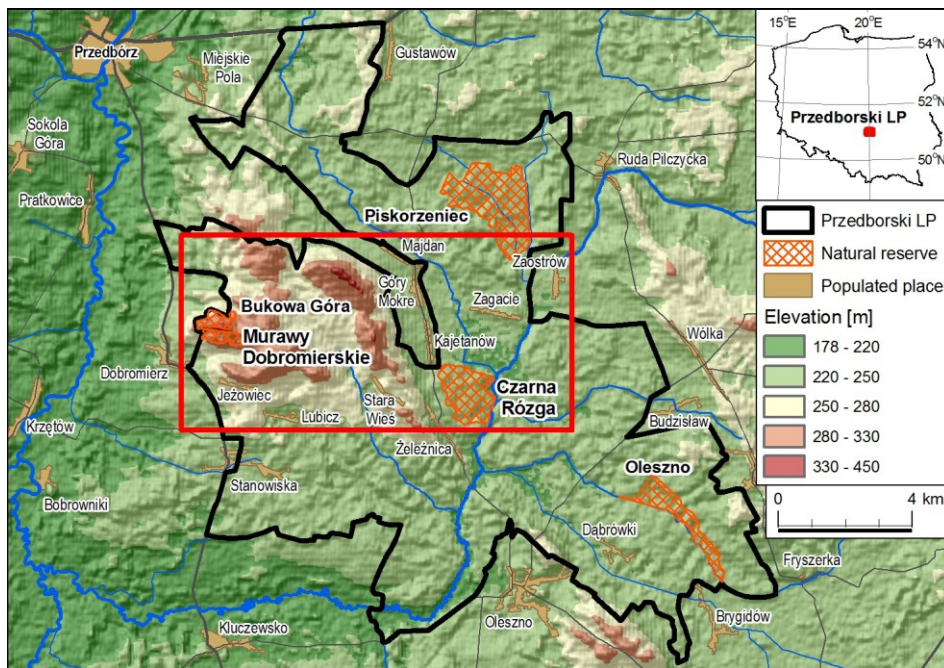


Fig. 1. Przedborski Landscape Park – the study area is delimited by the red rectangle.

With regard to geology, Mesozoic formations predominate in the study area. These are mainly Upper Cretaceous rock strata, deposited in a shallow depression; but Jurassic and Triassic rocks also occur in the south-eastern part (Świętokrzyskie Mts. anticlinorium). They all form ranges of hills (up to 300 m) with valleys filled with Quaternary sands and clays of the Oder Glaciation.

The vascular plant flora of the area consists of 964 species, and its richness reflects the great differentiation of habitats and the presence of natural or semi-natural ecosystems that are the main local hot-spots of biological diversity. Sixty-two taxa are listed as protected by law and five are noted in The Polish Red Data Book of Plants (WNUK 1998).

Given the diversity of these ecosystems, insects seems to be a rich and diverse group of invertebrates in the Przedborski Landscape Park, however, knowledge of this insect fauna

is very scant. So far, barely 60 species of terrestrial insects belonging to five orders (Orthoptera, Lepidoptera, Coleoptera, Diptera and Hymenoptera) have been recorded; there are no data on planthoppers or leafhoppers (WNUK 1998).

The most pristine areas are protected in the following nature reserves (RĄKOWSKI et al. 2006, 2007, WNUK 1988):

“Bukowa Góra” Nature Reserve – a woodland of 34.49 ha covering the top and northern slope of a large, limestone hill; established to protect a complex of three types of beech forest: *Carici-Fagetum*, *Dentario enneaphylidis-Fagetum* and *Luzulo pilosae-Fagetum*.

“Oleszno” Nature Reserve – a woodland of 54 ha in the Zabrodzie Basin; established to protect a complex of rich forest communities including *Circaeo-Alnetum*, *Tilio-Carpinetum* and *Ribo nigri-Alnetum*.

“Piskorzaniec” Nature Reserve – the largest nature reserve of 409.19 ha located within the boundaries of the Przedborski Landscape Park; established to protect raised-bog ecosystems and damp alder-birch and pine forests.

“Murawy Dobromierskie” Nature Reserve – the steppe-like vegetation covering the limestone hill near the villages of Rączki and Dobromierz; established to protect psammophilous and xerothermic grassland plant communities and their rich flora and fauna.

“Czarna Różga” Nature Reserve – a woodland of 185.60 ha near the village of Żeleźnica established to protect natural ecosystems of moist deciduous forests with numerous old trees as natural monuments and rare plants protected by law; the identified forest communities are *Ribo nigri-Alnetum*, *Circaeo-Alnetum*, *Tilio-Carpinetum*, *Abietetum polonicum* and *Vaccinio uliginosi-Pinetum*

### Acknowledgements

The authors are grateful to Dr Igor Malenovsky (Moravské Zemske Museum, Brno) for the confirmation of the identity of *Zygina lunaris* and *Zygina schneideri*. Additionally, we would also like to thank Justyna Haładaj and Dominika Machunik – students of the MSc Environmental Protection course at Jan Długosz University – for their help in collecting the study material.

### STUDY AREA AND METHODS

Field studies were carried out during the growing season of 2009, from May to September, by sweep-netting, which is a standard method for sampling field layer and arboricolous hoppers (STEWART 2002, NICKEL 2008).

The material in the nature reserves was collected under the following permits: for “Czarna Różga” NR – RDOS-10-WP.N.I.-6630-13/09/db (Regional Nature Conservator

Office in Łódź) and for “Murawy Dobromierskie” NR and “Bukowa Góra” NR – RDOŚ-26-WPN.I.6632-30/09/pm. (Regional Nature Conservator Office in Kielce).

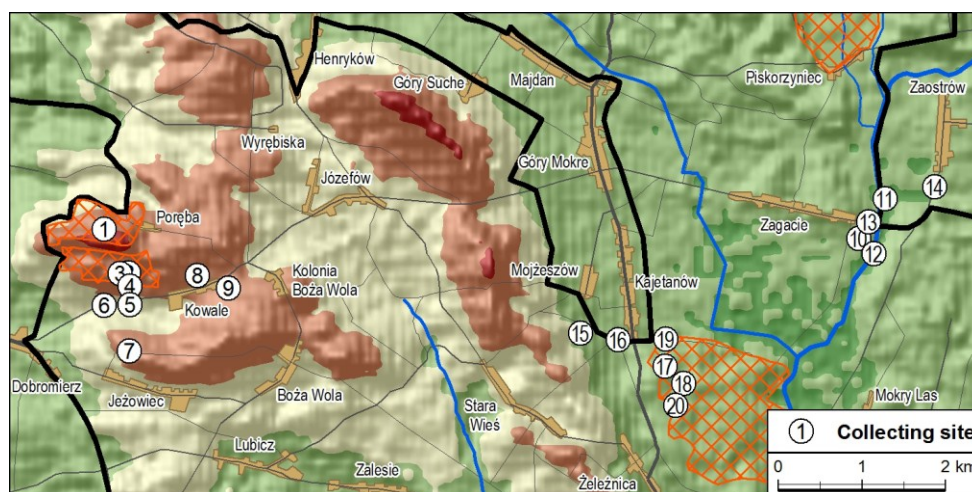
The specimens collected are deposited in the Department of Zoology and Animal Ecology, Jan Długosz University, Częstochowa.

According to the zoogeographical division of Poland presented in the Catalogue of Polish Fauna (NAST 1976), all the sites belong to the Małopolska Upland division and, except for site 14, are situated within the Przedborski Landscape Park (Fig. 2). Excluding sites 15 and 16, the remainder belong to the “Natura 2000” site under the name “Ostoja Przedborska” No. PLH260004 ([www.natura2000.gdos.gov.pl](http://www.natura2000.gdos.gov.pl)).

The survey covered 20 collecting sites, which are briefly described below. The nomenclature of the vegetation units follows that of MATUSZKIEWICZ (2001):

1. “Bukowa Góra” Nature Reserve [UTM DB25] – complex of beech forest communities: the assemblages *Fagus sylvatica-Crucjata glabra*, *Dentario enneaphylli-Fagetum* OBERD. 1957 ex W. et A. MAT. 1960 and *Luzulo pilosae-Fagetum* W. MAT. et A. MAT. 1973 covering the limestone hill;
2. “Murawy Dobromierskie” Nature Reserve [UTM DB25] – the xerothermic grassland assemblage *Thalictro-Salvietum pratensis* MEDW.-KORNAŚ 1959 covering the plateau of the limestone hill;
3. “Murawy Dobromierskie” Nature Reserve [UTM DB25] – the psammophilous grassland assemblage *Spergulo vernalis-Corynephorum* (R. TX. 1928) LIBB. 1933 on the sandy side of a ravine;
4. “Murawy Dobromierskie” Nature Reserve [UTM DB25] – xerothermic shrubs (*Rosa* spp., *Cornus* sp., *Ligustrum vulgare* L., *Prunus spinosa* L.) of the class *Rhamno-Prunetea* RIVAS GODAY et GARB. 1961 alongside a path climbing up the hill;
5. Dobromierz, road to Mokre Hills [UTM DB25] – well developed sandy grassland assemblage *Diantho-Armerietum elongate* KRAUSCH 1959;
6. Dobromierz, road to Góry Mokre [UTM DB25] – roadside ruderal vegetation of the class *Artemisietea vulgaris* LOHM., PRSG et R. TX. in R. TX. 1950;
7. Jeżowiec Hill, east of Dobromierz [UTM DB25] – xerothermic grassland of the class *Festuco-Brometea* BR.-BL. et R. TX. 1943;
8. Kowale [UTM DB25] – a meadow of the assemblage *Arrhenatheretum elatioris* BR.-BL. ex SCHERR. 1925 (syn. *Arrhenatheretum medioeuropaeum*);
9. Kowale [UTM DB25], barley field – segetal communities of the order *Centauretalia cyanii* R.TX. 1950;
10. Zagacie [UTM DB35] – complex of meadows of the order *Arrhenatheretalia elatioris* PAWL. 1928;
11. Zagacie [UTM DB35] – complex of moist meadows of the order *Molinietaalia caeruleae*

- W. KOCH 1926;
12. Zagacie [UTM DB35], bankside vegetation on the River Czarna Pilczycka – rushes of the alliance *Magnocaricion* KOCH 1926;
  13. Zagacie [UTM DB35] – roadside shrubs and trees (*Populus tremula* L., *Prunus spinosa* L.);
  14. Zaostrów [UTM DB35] – roadside ruderal vegetation of the class *Artemisietea vulgaris* LOHM., PRSG et R. TX. in R. TX. 1950;
  15. Kolonia Stara Wieś near Kajetanów [UTM DB25] – sandy grassland of the assemblage *Diantho-Armerietum elongate* KRAUSCH 1959;
  16. Kolonia Stara Wieś near Kajetanów [UTM DB35] – roadside ruderal vegetation of the class *Artemisietea vulgaris* LOHM., PRSG et R. TX. in R. TX. 1950;
  17. “Czarna Różga” Nature Reserve [UTM DB35] – alder forest of the assemblage *Ribesio nigri-Alnetum* SOL.-GÓRN. (1975) 1987;
  18. “Czarna Różga” Nature Reserve [UTM DB35] – mixed fir upland forest *Abietetum polonicum* (DZIUB. 1928) BR.-BL. et VLIEG. 1939;
  19. “Czarna Różga” Nature Reserve [UTM DB35] – ecotone between the forest and the meadow;
  20. “Czarna Różga” Nature Reserve [UTM DB34] – forest path.



**Fig. 2.** Location of collecting sites within the study area (characteristics of the collecting sites are given in the “Study Area and Methods” section).

## RESULTS AND DISCUSSION

## List of species

Fulgoromorpha EVANS, 1946

Cixiidae SPINOLA, 1839

*Cixius nervosus* (LINNAEUS, 1758): [1] – 1♀, 18.06.2009.

Delphacidae LEACH, 1815

*Stenocranus minutus* (FABRICIUS, 1787): [2] – 1♂, 1♀, 15.05.2009; *Stenocranus fuscovittatus* (STÅL, 1858): [11] – 7♂♂, 8♀♀, 20.09.2009; *Conomelus anceps* (GERMAR, 1821): [11] – 1♀, 20.09.2009; *Eurybregma nigrolineata* SCOTT, 1875: [7] – 2♂♂, 3♀♀, 18.06.2009; *Stiroma affinis* FIEBER, 1866: [11] – 3♂♂, 2♀♀, 18.06.2009; *Megadelphax sordidulus* (STÅL, 1853): [6] – 3♂♂, 8♀♀, 15.05.2009; [7] – 8♂♂, 10♀♀, 15.05.2009; *Laodelphax striatellus* (FALLÉN, 1826): [9] – 2♂♂, 1♀, 15.07.2009; [11] – 1♂, 15.07.2009; *Hyledelphax elegantulus* (BOHEMAN, 1847): [6] – 5♂♂, 15.05.2009; [7] – 1♂, 20.08.2009; *Mirabella albifrons* (FIEBER, 1879): [10] – 2♂♂, 15.07.2009; *Delphacodes capnodes* (SCOTT, 1870): [17] – 1♀, 18.06.2009; *Muirodelphax aubei* (PERRIS, 1857): [5] – 4♂♂, 1♀, 15.07.2009; [6] – 1♀, 15.05.2009; [7] – 2♀♀, 18.06.2009, 1♀, 20.08.2009; *Acanthodelphax denticauda* (BOHEMAN, 1845): [11] – 9♂♂, 9♀♀, 15.07.2009; *Acanthodelphax spinosus* (FIEBER, 1866): [10] – 5♂♂, 4♀♀, 15.07.2009; [18–20] – 3♂♂, 4♀♀, 15.05.2009; *Criomorphus albomarginatus* CURTIS, 1833: [11] – 1♂, 18.06.2009; [18–20] – 1♂, 4♀♀, 15.05.2009; *Javesella pellucida* (FABRICIUS, 1794): [5] – 2♂♂, 15.07.2009; [10] – 2♂♂, 8♀♀, 15.05.2009; 3♂♂, 2♀♀, 15.07.2009; [11] – 1♀, 15.07.2009; [18–20] – 5♂♂, 14♀♀, 15.05.2009; *Ribautodelphax albostriatus* (FIEBER, 1866): [10] – 4♂♂, 15.05.2009; 12♂♂, 8♀♀, 15.07.2009; [11] – 1♂, 2♀♀, 15.07.2009; *Ribautodelphax collinus* (BOHEMAN, 1847): [10] – 1♂, 2♀♀, 15.05.2009; [18] – 1♂, 15.05.2009.

Tettigometridae GERMAR, 1821

*Tettigometra impressopunctata* DUFOUR, 1846: [7] – 1♂, 20.08.2009; *Tettigometra leucophaea* PREYSSLER, 1792: [9] – 2♂♂, 15.07.2009.

## Cicadomorpha EVANS, 1946

## Aphrophoridae AMYOT ET SERVILLE, 1843

*Lepyronia coleoptrata* (LINNAEUS, 1758): [2] – 1♂, 18.06.2009; *Neophilaenus campestris* (FALLÉN, 1805): [2] – 2♂♂, 2♀♀, 18.06.2009; *Neophilaenus minor* (KIRSCHBAUM, 1868): [3] – 1♂, 3♀♀, 29.07.2008; *Aphrophora alni* (FALLÉN, 1805): [2] – 1♂, 18.06.2009.

## Membracidae RAFINESQUE, 1815

*Gargara genistae* (FABRICIUS, 1775): [2] – 1♂, 5♀♀, 20.08.2009.

## Cicadellidae LATREILLE, 1825

*Megophthalmus scanicus* (FALLÉN, 1806): [1] – 1♂, 15.07.2009; [3] – 1♀, 15.07.2009; *Macropsis prasina* (BOHEMAN, 1852): [6] – 2♀♀, 15.07.2009, on *Salix* sp.; *Macropsis fuscinervis* (BOHEMAN 1845): [18–19] – 2♀♀, 4 larvae, 18.06.2009; *Macropsis fuscula* (ZETTERSTEDT, 1828): [17–18] – 1♂, 18.06.2009; *Anaceratagallia ribauti* (OSSIANNILSSON, 1938): [2] – 4♂♂, 18.06.2009; *Populicerus populi* (LINNAEUS, 1761): [13] – 3♂♂, 6♀♀, 15.07.2009, on *Populus tremula* L.; *Balcanocerus larvatus* (HERRICH-SCHÄFFER, 1837): [4] – 1♀, 15.07.2009; *Eupelix cuspidata* (FABRICIUS, 1775): [6] – 3♂♂, 15.05.2009; *Aphrodes bicincta* (SCHRANK, 1776): [7] – 1♀, 20.08.2009; [9] – 1♀, 15.07.2009; [10] – 2♀♀, 15.07.2009; *Aphrodes makarovi* (ZACHVATKIN, 1948): [17] – 1♀, 15.07.2009; *Planaphrodes trifasciata* (FOURCROY, 1785): [2] – 1♂, 15.07.2009; *Stroggylocephalus agrestis* (FALLÉN, 1806): [1] – 1♀, 20.09.2009; *Cicadella viridis* (LINNAEUS, 1758): [10] – 2♀♀, 15.07.2009; *Erythria aureola* (FALLÉN, 1806): [7] – 4♂♂, 18♀♀, 18.06.2009; *Emelyanoviana mollicula* (BOHEMAN, 1845): [6] – 1♂, 15.05.2009; [7] – 3♀♀, 18.06.2009; [15] – 1♂, 5.05.2009; *Forcipata citrinella* (ZETTERSTEDT, 1828): [17] – 1♂, 15.07.2009; *Notus flavipennis* (ZETTERSTEDT, 1828): [11] – 13♂♂, 7♀♀, 20.09.2009; *Empoasca pteridis* (DAHLBOM, 1850): [2] – 1♂, 2♀♀, 20.09.2009; *Kybos rufescens* (MELICHAR, 1896): [6] – 1♂, 1♀, 20.08.2009, on *Salix viminalis* L.; *Chlorita paoli* (OSSIANNILSSON, 1939): [6] – 1♂, 1♀, 15.05.2009; [15] – 8♂♂, 6♀♀, 15.05.2009; *Fagocyba cruenta* (HERRICH-SCHÄFFER, 1838): [1] – 4♂♂, 3♀♀, 18.06.2009; 1♂, 15.07.2009; 1♂, 18.06.2009, on *Fagus sylvatica* L. [18] – 2♂♂, 2♀♀, 18.06.2009; *Edwardsiana rosae* (LINNAEUS, 1758): [4] – 4♀♀, 20.09.2009, on *Rosa* sp.; *Linnavuoriana sexmaculata* (HARDY, 1850): [11] – 2♀♀, 20.09.2009, on *Salix cinerea* L.; *Eupteryx aurata* (LINNAEUS, 1758): [16] – 1♀, 18.06.2009; *Eupteryx adspersa* (HERRICH-SCHÄFFER, 1838): [6] – 1♀, 15.05.2009; *Eupteryx urticae* (FABRICIUS, 1803): [16] – 1♂, 18.06.2009; *Eupteryx calcarata* OSSIANNILSSON, 1936: [17] – 1♀, 15.07.2009; *Eupteryx*

*cyclops* MATSUMURA, 1906: [12] – 1♂, 18.06.2009; [16] – 3♂♂, 7♀♀, 18.06.2009; *Eupteryx collina* FLOR, 1861: [1] – 2♀♀, 18.06.2009; *Eupteryx vittata* (LINNAEUS, 1758): [11] – 3♀♀, 20.09.2009; *Eupteryx notata* CURTIS, 1937: [3] – 1♂, 15.05.2009; *Alnetoidia alneti* (DAHLBOM, 1850): [17] – 1♂, 18.06.2009; *Zygina lunaris* (MULSANT et REY, 1855): [2] – 1♀, 20.08.2009; *Zygina schneideri* (GÜNTHART, 1974): [4] – 1♀, 15.07.2009, 1♀, 20.09.2009, on *Rosa* sp.; *Arboridia velata* (RIBAUT, 1952): [18] – 1♀, 20.09.2009, on *Quercus robur* L.; *Fieberiella septentrionalis* WAGNER, 1963: [6] – 1♂, 15.07.2009; *Nealiturus fenestratus* (HERRICH-SCHÄFFER, 1834): [6] – 1♀, 15.07.2009; *Balclutha punctata* (FABRICIUS, 1775) sensu WAGNER, 1939: [10] – 2♀♀, 15.07.2009; [18–20] – 1♂, 9♀♀, 15.05.2009; *Balclutha rhenana* WAGNER, 1939: [14] – 1♂, 15.05.2009; *Macrosteles laevis* (RIBAUT, 1927): [2] – 4♀♀, 3♂♂, 20.08.2009; [10] – 2♂♂, 15.05.2009; 1♂, 15.07.2009; *Macrosteles quadripunctulatus* (KIRSCHBAUM, 1868): [9] – 1♂, 1♀, 15.07.2009; 2♀♀, 20.09.2009; *Doratura stylata* (BOHEMAN, 1847): [9] – 1♀, 20.09.2009; [10] – 3♂♂, 3♀♀, 18.06.2009; 4♂♂, 15.07.2009; 3♂♂, 1♀, 20.09.2009; *Doratura impudica* HORVÁTH, 1897: [5] – 5♂♂, 15.07.2009; *Lamprotettix nitidulus* (FABRICIUS, 1787): [1] – 1♀, 15.07.2009; *Allygus mixtus* (FABRICIUS, 1794): [17] – 1♀, 15.07.2009; *Allygus modestus* SCOTT, 1876: [8] – 1♀, 15.07.2009; *Graphocraerus ventralis* (FALLÉN, 1806): [5] – 1♀, 15.07.2009; [6] – 1♂, 15.05.2009; [10] – 1♀, 15.07.2009; *Hardya tenuis* (GERMAR, 1821): [1] – 1♀, 15.07.2009; [3] – 1♀, 15.07.2009; [6] – 1♀, 15.07.2009; [9] – 10♂♂, 9♀♀, 15.07.2009; *Rhopalopyx preysleri* (HERRICH-SCHÄFFER, 1838): [2] – 1♀, 20.08.2009; [10] – 2♂♂, 15.07.2009; *Rhopalopyx vitripennis* (FLOR, 1861): [7] – 2♂♂, 1♀, 20.08.2009; *Elymana sulphurella* (ZETTERSTEDT, 1828): [10] – 2♀♀, 15.07.2009; [12] – 1♀, 18.06.2009; *Cicadula persimilis* (EDWARDS, 1920): [8] – 1♂, 3♀♀, 18.06.2009; [12] – 1♀, 18.06.2009; *Cicadula flori* (J. SAHLBERG, 1871): [11] – 5♂♂, 2♀♀, 18.06.2009; *Cicadula quadrinotata* (FABRICIUS, 1794): [11] – 5♂♂, 3♀♀, 20.09.2009; *Cicadula frontalis* (HERRICH-SCHÄFFER, 1835): [11] – 2♀♀, 20.09.2009; *Speudotettix subfuscus* (FALLÉN, 1806): [17] – 1♀, 15.07.2009; *Thamnotettix confinis* ZETTERSTEDT, 1828: [20] – 1♀, 15.05.2009; *Macustus grisescens* (ZETTERSTEDT, 1828): [14] – 1♂, 15.05.2009; *Athysanus argentarius* METCALF, 1955: [10] – 2♂♂, 2♀♀, 15.07.2009; *Stictocoris picturatus* (C. SHALBERG, 1842): [2] – 1♀, 15.07.2009; *Laburrus impictifrons* (BOHEMAN, 1852): [5] – 4♂♂, 2♀♀, 15.07.2009; *Euscelis incisus* (KIRSCHBAUM, 1858): [10] – 17♂♂, 11♀♀, 15.07.2009; [15] – 1♀, 15.05.2009; *Metalimnus steini* (FIEBER, 1869): [2] – 1♂, 20.09.2009; *Psammotettix alienus* (DAHLBOM, 1850): [7] – 2♂♂, 4♀♀, 15.07.2009; [9] – 10♂♂, 13♀♀, 15.07.2009; *Psammotettix cephalotes* (HERRICH-SCHÄFFER, 1834): [8] – 2♀♀, 18.06.2009; *Psammotettix confinis* (DAHLBOM, 1850): [5] – 1♂, 20.08.2009; [6] – 2♀♀, 15.05.2009; [9] – 3♂♂, 8♀♀, 20.09.2009; [10] – 2♀♀, 15.07.2009; 3♂♂, 2♀♀, 20.08.2009; [15] – 3♂♂, 1♀, 15.05.2009; *Psammotettix excisus* MATSUMURA, 1906: [5] – 2♂♂, 15.07.2009; [7] – 13♂♂, 4♀♀, 20.08.2009; *Psammotettix nodosus* (RIBAUT, 1925): [10] – 2♂♂, 1♀, 15.05.2009; *Errastunus ocellaris* (FALLÉN, 1806): [11] – 10♂♂,



15.07.2009; 2♂♂, 1♀, 20.09.2009; [17] – 1♀, 18.06. 2009; *Turrutus socialis* (FLOR, 1861): [5] – 2♂♂, 15.07.2009; [6] – 8♂♂, 1♀, 15.05.2009; [7] – 29♂♂, 52♀♀, 18.06.2009; 6♂♂, 4♀♀, 20.08.2009; [15] – 1♂, 15.07.2009; *Jassargus flori* (FIEBER, 1869): [10] – 1♂, 1♀, 15.07.2009; *Diplocolenus bohemani* (ZETTERSTEDT, 1840): [3] – 1♀, 20.08.2009; *Verdanus abdominalis* (FABRICIUS, 1803): [2] – 1♀, 18.06.2009; *Arthaldeus pascuellus* (FALLÉN, 1826): [2] – 1♂, 18.06.2009; [12] – 1♂, 18.06.2009; *Mocuellus collinus* (BOHEMAN, 1850): [3] – 5♂♂, 6♀♀, 20.08.2009; *Erzaleus metrius* (FLOR, 1861): [11] – 1♂, 1♀, 18.06.2009.

### New and rare species in the Polish fauna

#### *Eurybregma nigrolineata* SCOTT, 1875

[7] – Jeżowiec Hill, east of Dobromierz [UTM DB25] – xerothermic grassland of the class *Festuco-Brometea* BR.-BL. et R. TX. 1943, 2♂♂, 3♀♀, 18.06.2009.

The genus *Eurybregma* SCOTT is represented in Europe by two species: *E. nigrolineata* SCOTT, 1875 in central parts and *E. porcus* EMELJANOV, 1964 known from the Balkan Peninsula and European Russia, recently also recorded in Finland (SÖDERMAN 2007).

*E. nigrolineata* was regarded as being extremely rare in Poland, given in NAST'S Catalogus Faunae Poloniae (1976) from only one locality in Lower Silesia (Wielisław Złotoryjski). However, over the last 10 years the number of records restricted to Southern Poland has increased significantly, which supports the view of NICKEL (2003, 2010) that the species can be treated as a south-eastern European invader, continuously expanding its range north- and westwards. It occurs in different grassland habitats like meadows, pastures, ruderal vegetation, and is trophically associated with grasses, mainly *Elymus repens* (L.) GOULD, *Dactylis glomerata* L. and *Holcus lanatus* L.

#### *Balcanocerus larvatus* (HERRICH-SCHÄFFER, 1837):

[4] – “Murawy Dobromierskie” Nature Reserve [UTM DB25] – xerothermic shrubs (*Rosa* spp., *Cornus* sp., *Ligustrum vulgare* L., *Prunus spinosa* L.) of the class *Rhamno-Prunetea* RIVAS GODAY et GARB. 1961 alongside the path climbing up the hill, 1♀, 15.07.2009.

This is a south European species, in Poland known only from the Małopolska Upland – the Góry Pieprzowe near Sandomierz (SMRECZYŃSKI 1955). Both localities are near the northern range limit of its occurrence in central Europe. In Germany it lives on *Prunus spinosa* in sun-exposed sites, mainly pastures and meadows with scattered shrubs, embankments, forest margins and hedges (NICKEL 2003).

*Eupteryx adpersa* (HERRICH-SCHÄFFER, 1838)

[6] – Dobromierz, road to Góry Mokre [UTM DB25] – roadside ruderal vegetation of the class *Artemisietea vulgaris* LOHM., PRSG et R. TX. in R. TX. 1950, 1♂, 15.07.2009; [15] – Kolonia Stara Wieś near Kajetanów [UTM DB25] – the sandy grassland assemblage *Diantho-Armerietum elongate* KRAUSCH 1959, 1♀, 15.05.2009.

This species is quite rare in Poland, so far recorded only from the following sites: Lubelska Upland – Opoka Duża near Kraśnik (DWORKOWSKA 1970), Roztocze Upland – Zwierzyniec near Zamość, Narol near Lubaczów, Lipowiec near Biłgoraj, Nowiny near Tomaszów Lubelski (DWORKOWSKA 1970), Sandomierska Lowland – Horyniec near Lubaczów (DWORKOWSKA 1970).

The species is of Ponto-Caspian origin, with scattered localities mainly in Central and Eastern Europe. In Germany at the north-western edge of its range, it is found mainly along dry waysides and in ruderal sites on various substrates (preferably sand, limestone and gypsum). The food plant is *Artemisia absinthium* L. (NICKEL 2003).

*Zygina lunaris* (MULSANT et REY, 1855)

Species new to the Polish fauna: [2] – “Murawy Dobromierskie” Nature Reserve [UTM DB25], the xerothermic grassland assemblage *Thalictro-Salvietum pratensis* MEDW.-KORNAŚ 1959 covering the plateau of the limestone hill, on *Rosa* sp., 1♀, 20.08.2009, D. Świerczewski det., I. Malenovský rev.

The species was described by MULSANT and REY (1855) from south-eastern France (Hyères, Provence), and later RIBAUT (1936) reported it from more northerly localities in lower Loire valley. NAST (1987) mentions it also from Portugal and Spain. Further records are from Germany – along the southern upper Rhine (LAUTERER & MALENOVSKÝ 1995), Switzerland – Basel (MÜHLETHALER 2001) and Luxembourg (NIEDRINGHAUS et al. 2010a, 2010b). According to NICKEL (2010), the species in Germany seems to be a recent invader from south-western Europe as the number of localities have increased significantly in the last few years extending the known range into an area of the south-western and western Länder (Rhineland-Palatinate, Baden-Württemberg, Bavaria, North Rhine-Westphalia). The locality given in this paper is the first record of the species in Central Europe.

In Germany and Switzerland the species is usually found in urban parks and rural-urban fringes, where it is common on *Salix alba* L., *S. fragilis* L., *S. babylonica* L. and *S. purpurea* L., migrating to *Acer* spp. and *Rosa* spp. in autumn (NICKEL 2003, MÜHLETHALER 2001).

*Zygina schneideri* (GÜNTHART, 1974):

[4] – “Murawy Dobromierskie” Nature Reserve [UTM DB25] – xerothermic shrubs of the

class *Rhamno-Prunetea* RIVAS GODAY et GARB. 1961 alongside the path climbing up the hill, 1♀, 15.07.2009, 1♀, 20.09.2009, on *Rosa* sp., D. Świerczewski det., I. Malenovský rev.

Additional localities of this species as well as its geographical distribution and biology can be found in the paper by ŚWIERCZEWSKI & WALCZAK (2011).

***Metalimnus steini* (FIEBER, 1869)**

[2] – “Murawy Dobromierskie” Nature Reserve [UTM DB25] – the xerothermic grassland assemblage *Thalictro-Salvietum pratensis* MEDW.-KORNAŚ 1959 covering the plateau of the limestone hill, 1♂, 20.09.2009.

Additional localities of this species as well as its geographical distribution and biology can be found in the paper by ŚWIERCZEWSKI & WALCZAK (2011).

***Diplocolenus bohemani* (ZETTERSTEDT, 1840)**

[3] – “Murawy Dobromierskie” Nature Reserve [UTM DB25] – the psammophilous grassland assemblage *Spergulo vernalis-Corynephorum* (R. TX. 1928) LIBB. 1933 on the sandy side of a ravine, 1♀, 20.08.2009.

This is a Euro-Siberian species, known in Poland from the following localities: Baltic Coast – Wierzchucino near Puck (ENDERLEIN 1908); Pomeranian Lake District – Kalisz Pomorski (GĘBICKI 1980, unpubl.); Wielkopolsko-Kujawska Lowland – Bagna near Oborniki, Gułtowy near Środa, Radojewo near Poznań (SZULCZEWSKI 1933); Białowieża Forest (NAST 1976); Upper Silesia – Boruszowice near Brynek (ROŻNOWSKA 1989), Niegowonice near Dąbrowa Górnicza (SICIŃSKA 1977); Małopolska Upland – Pińczów (GĘBICKI 1987); Western Beskidy Mts. – Stary Sącz near Nowy Sącz (SMRECZYŃSKI 1954); Eastern Beskidy Mts. – Gamrat near Jasło (SMRECZYŃSKI 1954); Pieniny Mts. (NAST 1976).

In Germany it occurs in tall, usually scattered stands of grasses in temporarily moist to dry, sunny to moderately shady sites of almost all altitudes. In lowland and upland areas the species is confined to limestone and gypsum hills where it probably feeds on *Bromus erectus* HUDS. (NICKEL 2003).

***Erzaleus metrius* (FLOR, 1861):**

[11] – Zagacie [UTM DB35] – complex of moist meadows of the order *Molinietalia caeruleae* W. Koch 1926, 1♂, 1♀, 18.06.2009.

This is a Siberian species, in Europe confined to its northern and central regions. It is quite rare in Poland and known only from the following localities: Pomeranian Lake

District – Bielinek near Chojna (HAUPT 1933, 1935), Masurian Lake District – Gamerki near Olsztyn (NAST 1955), Mazovian Lowland – Ożarów near Pruszków (NAST 1955), Podlasie Lowland – Dorohusk near Chełm (NAST 1938), Upper Silesia – Łebki near Herby, “Cisy nad Liswartą” Nature Reserve (ŚWIERCZEWSKI & BŁASZCZYK 2011), Krakowsko-Wieluńska Upland – Sławniów near Pilica (LIS 1988), Lubelska Upland – Janów Lubelski (BEDNARCZYK & GĘBICKI 1998).

Typical habitats in Poland include moderately wet to temporarily flooded, often eutrophic sites – osier scrub of the order *Salicetalia*, stream ash-alder wood of *Carici remotae-Fraxinetum*, sedge swamp of the class *Phragmitetea*, ruderal vegetation of the order *Onopordetalia acanthi*. The food plant is *Phalaris arundinacea* L. (NICKEL 2003).

### Concluding remarks

The paper provides the first information on planthoppers and leafhoppers of the Przedborski Landscape Park. The number of 101 recorded species is comparable with the results of short-term investigations carried out by other authors in diversified vegetation in the vicinity of Janów Lubelski (117 species recorded by BEDNARCZYK & GĘBICKI 1998), the Biebrza Valley (129 species recorded by GĘBICKI et al. 1982) or the Ojców National Park (154 species collected by SZWEDO 1992). The number of species discovered within the area of the Przedborski Landscape Park constitutes one fifth of the overall number of species known from Poland, but a multi-season study would undoubtedly reveal a much higher number of taxa. Moreover, additional methods of collecting such as pitfall traps and water traps should be employed. Finally, the investigations should cover other regions of the park, including the “Piskorzaniec” and “Oleszno” Nature Reserves.

Chorological analysis indicates that wide-ranging elements form the major group in the area under discussion: Euro-Siberian (28.77%), European (19.18%) and Trans-Palaeartic (19.18%). Species with a narrow distribution are less numerous: Ponto-Caspian (4.79%), Mediterranean (4.11%), North European (2.74%), Siberian (2.05%), South European (1.37%) and West European (1.37%).

Regarding the trophic structure, it can be seen that 1<sup>st</sup> degree oligophagous and 1<sup>st</sup> degree monophagous species share the highest percentage ratios (34.00 and 25.00%, respectively). This may suggest the stability of the investigated ecosystems, as it was discovered by NOVOTNÝ (1994) that polyphagous species are associated mainly with ephemeral habitats, unlike food specialists, which prefer more stable ecosystems.

With regard to the number of annual generations, bivoltine species are dominant in meadows, sandy and xerothermic grasslands and ruderal vegetation (from 52.00 to 64.00%) whereas monovoltine ones prevail in woodland communities (from 60.00 to 67.00%). As far as the overwintering stage is concerned, forms hibernating as eggs dominate in all the types of vegetation investigated (from 62.00 to 75.00%).

Most species were recorded only in one type of vegetation; only ubiquitous species such as *Javesella pellucida*, *Aphrodes bicincta*, *Psammotettix confinis* and *Turrutus socialis* revealed broader habitat preferences. The first locality of *Zygina lunaris* in central Europe and additional findings of *Eurybregma nigrolineata*, *Balcanocerus larvatus*, *Eupteryx adspersa*, *Zygina schneideri*, *Metalimnus steini*, *Diplocolenus bohemani* and *Erzaleus metrius* are also of significant importance.

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