Electronic Journal of Polish Agricultural Universities is the very first Polish scientific journal published exclusively on the Internet, founded on January 1, 1998 by the following agricultural universities and higher schools of agriculture: University of Technology and Agriculture of Bydgoszcz, Agricultural University of Cracow, Agricultural University of Lublin, Agricultural University of Poznan, Higher School of Agriculture and Teacher Training Siedlce, Agricultural University of Szczecin, and Agricultural University of Wroclaw.

ELECTRONIC JOURNAL OF POLISH AGRICULTURAL UNIVERSITIES

2006
Volume 9
Issue 1
Topic
BIOLOGY

NOWAKOWSKA K. , HALAREWICZ A. 2006. *PRUNUS SEROTINA* (EHRH) – NEW FOOD RESOURCE FOR POLYPHAGOUS LEPIDOPTERA **Electronic Journal of Polish Agricultural Universities**, Biology, Volume 9, Issue 1.
Available Online http://www.ejpau.media.pl/volume9/issue1/art-13.html

PRUNUS SEROTINA (EHRH) – NEW FOOD RESOURCE FOR POLYPHAGOUS LEPIDOPTERA

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ABSTRACT

Observations carried out in south-western Poland revealed that *Prunus serotina* (Ehrh), invasive plant species new to Poland, became a suitable food source for 10 polyphagous lepidopteran species, including one protected species: scarce swallowtail, *Iphiclides podalirius* L.

Key words: Lepidoptera, scarce swallowtail, *Iphiclides podalirius, Prunus serotina*, Poland.

INTRODUCTION

Choosing a plant as a food source by contemporary insect populations should be viewed from an evolutionary perspective, and any existing interactions between plants and herbivore insects – considered as dynamic, constantly evolving relations [6]. Such relations can be found either for partners of plant-herbivore systems that are associated for a long time, or for the situations when a particular insect or a plant species appear in a habitat that is entirely new for them. Most often new plant species become adopted as a food resource primarily by non-specialized insect herbivores. This paper shows species range of lepidopterans native to Poland, which accepted *Prunus serotina* (Ehrh.) (Rosaceae), the alien species from North America [10] as a host plant for their larvae. Interestingly, one of the species feeding on the neophyte plant is scarce swallowtail, *Iphiclides podalirius* (L.) (Papilionidae) [5,11,8]. In many countries, including Poland, *I. podalirius* is a protected species [4]. It shows patchy distribution in Poland, and is most often found on sun-exposed mountain slopes of limestone bedrock. North range of that species is at 51°N [3]. Its larvae usually feed on hawthorn (*Crataegus sp.*), sometimes on mountain-ash (*Sorbus aucuparia* (L.)), on blackthorn (*Prunus spinosa* (L.)) [7], as well as on other native species of the genus *Prunus* [12,5].

STUDY AREA AND METHODS

The main observations were carried out since the 3rd decade of April till the 2nd decade of August 2003 in the vicinity of Lubin, SW Poland (square BE of ATPOL net). Two plants of *Prunus serotina* were observed, growing within two different ecological contexts:

1. as a single-standing plant within an open area (*Plantaginetea majoris* association), at a distance of 800m from the forest edge (site 1, further called "open"),

2. as a component of forest community, where the undergrowth layer covered more than 50% of the forest floor and was dominated by *P. serotina* (*Leucobryo-Pinetum* association)(site 2, further called "forest").

In order to determine species composition of Lepidoptera on *P. serotina* at the two sites, the plants growing there were thoroughly inspected at each observation date, up to the height of 2m above ground level and within the entire depth of their crowns at that height.

Separately, in the years of 2000, 2001 and 2003, several occasional observations were made on the infestation of *P. serotina* by *Iphiclides podalirius* (L.)(Papilionidae). These observations were conducted within Przemkowski Landscape Reserve and they concerned plants of black cherry growing as bushes rather than trees, it is not higher than 0.5m.

RESULTS AND DISCUSSION

Density and species composition of Lepidoptera infesting black cherry varied across the observed sites (Tab. 1). On the plant at the open site 31 caterpillars were found over the observation period, and they were larvae of 3 species. The site was dominated by *Lycia hirtaria* (Cl.) (Geometridae) (Tab. 1, Fig. 1), which develops one generation a year and feeds on many decideous plant species. Other plants in the vicinity of that black cherry tree were silver birch (*Betula pendula* (Roth)), common pear (*Pyrus communis* (L,)) and common oak *(Quercus robur* (L)). *L. hirtaria* occured on *Prunus serotina* at its greatest density at the beginning of May. It was feeding on black cherry till the end of August and its larvae were found on the plant on 12 out of 13 observation dates. Larvae of two other species, *Acronicta rumicis* (L.) (Noctuidae), and *Malacosoma neustria* (L.) (Lasiocampidae), were recorded at that site as single specimens.

Table 1. Species composition of Lepidoptera on *Prunus serotina* in two investigated habitats in 2003

Plantaginetea majoris association – "open" side													
Species	26 IV	1 V	10 V	16 V	23 V	1 VI	16 V	23 V	4 VI	16 VI	26 VI	8 VII	17 VII
Lycia hirtaria (Cl).		6	4	3	2	1	2	1	1	2	4	1	1
Acronictae rumicis (L.)							2						
Malacosoma neustria (L.)						1							
Number of species	0	1	1	1	1	2	2	1	1	1	1	1	1
Number of specimens	0	6	4	3	2	2	4	1	1	2	4	1	1
Leucobryo-Pinetum association – "forest													
Species	26 IV	1 V	10 V	16 V	23 V	1 VI	16 V	23 V	4 VI	16 VI	26 VI	8 VII	17 VII
Euproctis similis (Fuessly)	1	3	15	3	4	1		1	2	1	3		2
Hemithea aestivaria (Hbn.)		2	1	1									
Orgyia antiqua (L.)				2	1	6	1	1	2	5	1		1
Erannis defoliaria (Cl.)		3	2	4	1		1		1				
Diloba caerulocephala (L.)		5	7	3	5	2		3					
Lomographa bimaculata (F.)						1		1	2	1			
Number of species	1	4	4	5	4	4	2	4	4	3	2	0	2
Number of specimens	1	13	25	13	11	10	2	6	7	7	4	0	3

At the forest site Lepidoptera were clearly more abundant; as 102 caterpillars were observed over the same period of time. Six species were recorded feeding there on *P. serotina*, and none of them was one of the 3 species found at the site 1 (open) (Table 1). The dominating species were *Euproctis similis* (Fuessly) (Fig. 2), *Diloba caerulocephala* (L.) (Noctuidae) (Figs 5, 6), and *Orgyia antiqua* (L.) (Lymantriidae) (Figs 3, 4). *E. similis* was recorded at greatest numbers and most often of all the 6 observed species. *Erannis defoliaria* (Cl.)(Geometridae) also occured for most of the observation period, but it was less abundant. Host plants of the larvae of these 4 Lepidoptera species are many tree and shrub species, in particular oak (*Quercus* sp.), willow (*Salix* sp.), poplar (*Populus* sp.) and linden (*Tilia* sp.), as well as hazel (*Corylus avellana* L.), hawthorn (*Crataegus* sp.) and fruit trees [7]. Caterpillars of *Hemithea aestivaria* (Hbn.) and *Lomographa bimaculata* (F.) (Geometridae) were recorded sporadically.

Fig. 1. ***Lycia hirtaria*** **(Cl.) – larva**

Fig. 2. ***Euproctis similis*** **(Fuessly) – imago**

Fig. 3. ***Orgyia antiqua*** **(L.) – larva**

Fig. 4. ***Orgyia antiqua*** **(L.) – imago**

Fig. 5. ***Diloba caerulocephala*** **(L.) – larva**

Fig. 6. *Diloba caerulocephala* (L.) – imago

The observed variation in species diversity of *Lepidoptera* between the two monitored plants of *P. serotina* may result from their different location and habitat size. Altough, when adopting here the theory of island biogeography [9] both sites can be seen as "islands" in their surrounding habitat, the black cherry tree growing alone represents smaller habitat, than a dense canopy formed by many *Prunus* plants, as the one at the forest site. Habitat size can alter biodiversity in biocenoses [1]. Consequently, the "immigration rate" for the single, isolated tree is lower and it supports fewer immigrating species than single trees growing as parts to a larger system.

Observations of *Prunus serotina* within Przemkowski Landscape Reserve in 2000, 2001 and 2003 confirmed feeding of *Iphiclides podalirius* (L.) caterpillars on the plant, which is there more abundant than any other potential food resource. Still, it deserves attention that there were some convenient habitat conditions, other than just *P. serotina,* that allowed colonization and developing of the new trophic relation. These are namely the presence of sun-exposed turfs in which *I. podalirius* larvae can pupate, and the supply of nectar for imagines by elder *Sambucus nigra* (L.), common liliac *Syringa vulgaris* (L.) and blackthorn (*Prunus spinosa* (L.)). Although in these circumstances the neophyte permitted survival of the rare buterfly, the plant`s role in recovering of the *I. podalirius* population should not be overestimated – this herbivore has much broader scope of potential host plants. On the other hand, most likely reason for the poor condition of its population is the technology and the extent of turf management in the surroundings of host plants, as well as catching by amateur entomologists [2].

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