

MOTHS (Lepidoptera: Heterocera) OF KOPAČKI RIT NATURE PARK - RESULTS OF PRELIMINARY RESEARCH

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The aim of this study, which took place in Kopački rit Nature Park in Eastern Croatia from May 2008 to May 2009, was to create a list of species and to highlight both rare and typical moths.

A UV-light was employed in a conventional Wilkinson trap to sample moths. Four traps were operated during the night twice a month on average. During the research, over 3000 moths were collected, and 201 species in 17 families were identified. Two moth families; Owlet moths (*Noctuidae*), with a total of 73 species and Geometer moths (*Geometridae*) with 56 species were the most diverse families. Within the collected material 6 rare wetland species were determined: *Phragmataecia castaneae* (Hübner, 1790), *Thalera fimbrialis* (Scopoli, 1763), *Colobochyla salicalis* (Denis & Schiffermüller, 1775), *Nonagria typhae* (Thunberg, 1784), *Hemistola chrysoprasaria* (Espero, 1794), and *Idaea muricata* (Hufnagel, 1767).

Moths, Kopački rit, wetland species

G. VIGNJEVIĆ, Ž. ZAHIROVIĆ, N. TURIĆ i E. MERDIĆ: Noćni leptiri (Lepidoptera: Heterocera) Parka prirode Kopački rit – rezultati preliminarnog istraživanja. Entomol. Croat. 2010., Vol. 14., Num. 3-4: 17-32.

Ovo istraživanje napravljeno je na području Parka prirode Kopački rit (sjeveroistočna Hrvatska) radi izrade popisa vrsta te utvrđivanja rijetkih i karakterističnih močvarnih vrsta noćnih leptira ovog područja. Istraživanje je obavljeno od svibnja 2008. do svibnja 2009. godine. Za prikupljanje noćnih leptira korištena je Wilkinsonova klopka s UV-svjetlom kao atraktantom. Četiri klopke radile su preko noći prosječno dva puta mjesečno. Tijekom istraživanja sakupljeno je preko 3 000 noćnih leptira, a određena je 201 vrsta raspoređenih u 17 porodica. Dvije porodice noćnih leptira ističu se po svojoj brojnosti i raznolikosti, i to su: sovice (*Noctuidae*) s 73 vrste i grbice

(*Geometridae*) s 56 vrsta. Unutar prikupljenih noćnih leptira zabilježeno je 6 rijetkih i karakterističnih močvarnih vrsta: *Phragmataecia castaneae* (Hübner, 1790), *Thalera fimbrialis* (Scopoli, 1763), *Colobochyla salicalis* (Denis & Schiffermüller, 1775), *Nonagria typhae* (Thunberg, 1784), *Hemistola chrysoprasaria* (Espero, 1794) i *Idaea muricata* (Hufnagel, 1767).

Noćni leptiri, Kopački rit, močvarne vrste

Introduction

The fauna and the ecology of birds in Kopački rit are well known (Mikuska, 1979) and the fauna of other vertebrates has been relatively well treated (Mikuska, 1979) but the insect fauna is still fairly unknown. Research into insects had been carried out unsystematically and sporadically until the project Entomofauna of Kopački rit was started a decade ago. Thus the more up-to-date papers refer to the fauna and ecology of mosquitoes, (Merdić, 1993; Merdić & Lovaković, 1999; Sudarić Bogojević et al., 2007), butterflies (Krčmar et al., 1996; Krčmar, 2002), horse flies (Krčmar, 2004; Krčmar et al. 2006; Krčmar & Merdić, 2007), dragonflies (Bogdanović et al., 2002), sawflies (Perović et al., 2006) and aquatic insects (Merdić et al., 2005; Turić et al., 2008). The knowledge of moth (Lepidoptera, Heterocera) distribution in Croatia is uneven with respect to its geographical coverage (Kučinić, 1998). The first data related to the moths of eastern Croatia were published in the early 20th century, when around 700 species of moths were determined for the continental part of Croatia (Koča, 1900, 1901, 1925). For the above mentioned area of Kopački rit, 60 species of moths were found (Szent-Iványi, 1944). Later moth research was mostly oriented to pest species (Kovačević & Franjević – Oštrc, 1978, Senseović, 1983). These were the last published data that pertained specifically to this area. However, data on moths in the Podravina region were of great value since this area has very similar ecological conditions to some parts of Kopački rit (Kranjčev, 1985, 2009). Kopački rit is an unusually well conserved floodplain area of lowland rivers in which the main characteristic is its periodical inundation. In a habitat that is so variable because of the effects of the water that diverse types of vegetation are to be encountered. In their natural state, wetlands are complex biotopes. The mixture of trees, shrubs, tall forbs, herbaceous plants, reeds and wet meadow plants make up their typical appearance and character. Thanks to their high

diversity, these sites provide habitats for a large variety of butterflies and moths that are remarkable in terms of quantity as well as diversity (www.hellenot.org). Moths are an important part of ecosystems and can provide valuable information to researchers due to the following reasons: high species richness in forests, high numbers of individuals, several species are known as pest insects, or on the other hand are rare or endangered (Heiermann & Fuldner, 2006). This research was primarily done to create a baseline inventory of the moths of Kopački rit Nature Park.

Materials and Methods

The study took place from May 2008 until May 2009. For moth collecting, Wilkinson traps were employed, with 15W ultraviolet lamps inside as attractants. The collecting of samples was performed twice a month on average. The weather has a significant effect on moth flight behavior and light-trap efficiency, so moths were sampled only on nights when there was no precipitation and ambient moonlight was in the low half to new moon phases (Summerville et al., 2003). Four traps, each on different site, operated from dusk until the morning, at which time moths were extracted from traps. To avoid disruption of the UV light by seedlings and shrubs in the understory, traps were positioned at approximately 1.5 m above the ground (Summerville & Crist, 2002). Kopački rit is a flooded area of the Danube in the northeast Croatia, at the confluence of the Drava into the Danube (Mihaljević et al., 1999). It is one of the largest fluvial plains in Europe. As a result of regular flooding and the specific microrelief in this plain, different types of floodplain forests and damp meadows grow here, with various wetland and aquatic vegetation. Considering the large diversity of habitats in the explored area, traps were set in different habitats for the purpose of getting more complete insight into the moth fauna. Selected sites belong to following plant communities: oak forest (*Carpino betuli - Quercetum roboris*), ash forest (*Leucoio - Fraxinetum angustifolia*), white willow forest (*Galio-Salicetum*) and reed community (*Scirpo - Phragmitetum*) (Topić, 1989). These plant communities are also dominant in the researched area. However, the traps were also set in transitions of communities that represent the edge of the forest and meadows and the edge of forest and reeds. For identification of moth species the following literature was used: Ponec (1982), Nowacki (1998), Slamka (1997), Fajčik (2003),

Leraut (2006), Manley (2008), Kranjčev (2009), Waring & Townsend (2006) and certain professional websites listed at the end of the literature section which provided valuable information about individual species. Over 3000 specimens were collected approximately 1000 of which were mounted and stored in the entomological collection of Department of Biology.

Results

The research resulted in the identification of 201 moth species within 17 families (Table 1).

Table 1. The diversity of species in certain moth families collected in Kopački rit Nature Park.

Tablica 1. Raznolikost vrsta noćnih leptira pripadnika pojedinih porodica sakupljenih u Parku prirode Kopački rit.

Family	Number of species
<i>Noctuidae</i>	73
<i>Geometridae</i>	56
<i>Crambidae</i>	15
<i>Notodontidae</i>	11
<i>Arctiidae</i>	9
<i>Drepanidae</i>	6
<i>Sphingidae</i>	6
<i>Lasiocampidae</i>	6
<i>Lymantriidae</i>	4
<i>Pyralidae</i>	4
<i>Cossidae</i>	3
<i>Saturniidae</i>	2
<i>Pterophoridae</i>	2
<i>Limacodidae</i>	1
<i>Hepialidae</i>	1
<i>Nolidae</i>	1
<i>Yponomeutidae</i>	1
total	201

During this research, the most common and most diverse were Owlet moths (*Noctuidae*), with a total of 73 species. Slightly fewer species of Geometer moths (*Geometridae*), 56 in all, were collected. Numbers of species in other families were much fewer, although several families contained 9-15 species: *Crambidae* (15), *Notodontidae* (11), *Arctiidae* (9). All other families were represented by 6 or less species (Table 1). A full list of the species within the families found in this study is in Table 2. Within species collected in Kopački rit Nature Park there are several typical wetland and rare species: *Phragmataecia castaneae* (Hübner, 1790) – a typical wetland species with a very local distribution. It inhabits reed-beds, where the larvae feed internally in the stems of reed (ukmoths.org.uk). In the area of Kopački rit Nature Park a numerous and stable population was registered, especially in the reed community and on the edge of poplar and white willow forests and reeds. Although adults of this species usually fly in June and July, in Kopački rit Nature Park they have prolonged the period of flight - from May to August.

Table 2. List of species of moths sampled in Kopački rit Nature Park.

Tablica 2. Popis vrsta noćnih leptira sakupljenih u Parku prirode Kopački rit.

Fam. NOCTUIDAE

Abrostola sp.

Acontia trabealis (Scopoli, 1763)

Acrionicta rumicis (Linnaeus, 1758)

Actinotia polyodon (Clerck, 1759)

Aedia leucomelas (Linnaeus, 1758)

Agrochola litura (Linnaeus, 1758)

Agrochola circellaris (Hufnagel, 1766)

Allophyes oxyacanthae (Linnaeus, 1758)

Amphipyra tragopoginis (Clerck, 1759)

Amphipyra berbera svenssoni (Rungs, 1949)

Amphipyra livida (Denis & Schiffermüller, 1775)

Amphipyra pyramidea (Linnaeus, 1758)

Apamea polyodon (Linnaeus, 1761)

Autographa gamma (Linnaeus, 1758)

Axylia putris (Linnaeus, 1761)

Brachionycha nubeculosa (Esper, 1785)

Table 2. Nastavak

Tablica 2. Continued

Calyptra thalictri (Borkhausen, 1790)
Catocala nupta (Linnaeus, 1767)
Catocala sponsa (Linnaeus, 1767)
Charanyca trigrammica (Hufnagel, 1766)
Chortodes elymi (Treitschke, 1825)
Colobochyla salicalis (Denis & Schiffermüller, 1775)
Colocasia coryli (Linnaeus, 1758)
Conistra ligula (Esper, 1791)
Conistra rubiginosa (Scopoli, 1763)
Cosmia pyralina (Denis & Schiffermüller, 1775)
Craniophora ligustri (Denis & Schiffermüller, 1775)
Deltote pygarga (Hufnagel, 1766)
Diachrysia chrysitis (Linnaeus, 1758)
Diachrysia tutti (Kostrowicki, 1961)
Dysgonia algira (Linnaeus, 1767)
Elaphria venustula (Hübner, 1790)
Eucarta amethystina (Hübner, 1803)
Euplexia lucipara (Linnaeus, 1758)
Eupsilia transversa (Hufnagel, 1766)
Hadena rivularis (Fabricius, 1775)
Hoplodrina ambigua (Denis & Schiffermüller, 1775)
Hypena rostralis (Linnaeus, 1761)
Lacanobia oleracea (Linnaeus, 1758)
Lacanobia w-latinum (Hufnagel, 1766)
Laspeyria flexula (Denis & Schiffermüller, 1775)
Leucania obsoleta (Hübner, 1803)
Lithophane ornitopus (Hufnagel, 1766)
Lygephila craccae (Denis & Schiffermüller, 1775)
Lygephila pastinum (Treitschke, 1826)
Mamestra brassicae (Linnaeus, 1758)
Moma alpium (Osbeck, 1778)
Mythimna ferrago (Fabricius, 1787)
Mythimna pallens (Linnaeus, 1758)
Mythimna turca (Linnaeus, 1761)

Table 2. Nastavak

Tablica 2. Continued

Noctua fimbriata (Schreber, 1759)
Noctua janthina (Borkhausen, 1792)
Noctua pronuba (Linnaeus, 1758)
Nonagra typhae (Thunberg, 1784)
Ochropleura plecta (Linnaeus, 1761)
Orthosia cerasi (Fabricius, 1775)
Orthosia populeti (Fabricius, 1781)
Orthosia incerta (Hufnagel, 1766)
Orthosia gothica (Linnaeus, 1758)
Peridroma saucia (Hübner, [1808])
Perigrapha munda (Denis & Schiffermüller, 1775)
Phlogophora meticulosa (Linnaeus, 1758)
Phytometra viridaria (Clerck, 1759)
Polia nebulosa (Hufnagel, 1766)
Pseudeustrotia candidula (Denis & Schiffermüller, 1775)
Scoliopteryx libatrix (Linnaeus, 1758)
Sideridis rivularis (Fabricius, 1775)
Thalpophila matura (Hufnagel, 1766)
Tiliacea aurago (Denis & Schiffermüller, 1775)
Trachea atriplicis (Linnaeus, 1758)
Valeria oleagina (Denis & Schiffermüller, 1775)
Xanthia icteritia (Hufnagel, 1766)
Zaclognatha tarsipennalis (Treitschke, 1825)

Fam. GEOMETRIDAE

Agriopsis aurantiaria (Hübner, 1799)
Agriopsis leucophaearia (Denis & Schiffermüller, 1775)
Agriopsis marginaria (Fabricius, 1776)
Alsophila aescularia (Denis & Schiffermüller, 1775)
Angerona prunaria (Linnaeus, 1758)
Apeira syringaria (Linnaeus, 1758)
Apocheima hispidaria (Denis & Schiffermüller, 1775)
Ascotis selenaria (Denis & Schiffermüller, 1775)
Biston strataria (Hufnagel, 1767)
Cabera exanthemata (Scopoli, 1763)

Table 2. Nastavak

Tablica 2. Continued

Colostygia pectinataria (Knock, 1781)
Colotois pennaria (Linnaeus, 1761)
Comibaena bajularia (Denis & Schiffermüller, 1775)
Cosmorhoe ocellata (Linnaeus, 1758)
Costaconvexa polygrammata (Borkhausen, 1794)
Crocallis elinguaris (Linnaeus, 1758)
Cyclophora punctaria (Linnaeus, 1758)
Ecliptopera silaceata (Denis & Schiffermüller, 1775)
Ectropis crepuscularia (Denis & Schiffermüller, 1775)
Ennomos alniaria (Linnaeus, 1758)
Ennomos autumnaria (Werneburg, 1859)
Ennomos fuscantaria (Haworth, 1809),
Epione repandaria (Hufnagel, 1767)
Epirrhoe alternata (Müller, 1764)
Epirrita christyi (Allen, 1906)
Epirrita dilutata (Denis & Schiffermüller, 1775)
Erannis defoliaria (Clerck, 1759)
Gandaritis pyraliata (Denis & Schiffermüller, 1775)
Hemistola chrysoprasaria (Esper, 1794)
Hemithea aestivaria (Hübner, 1799)
Horisme radicularia (La Harpe, 1855)
Horisme tersata (Denis & Schiffermüller, 1775),
Horisme vitalbata (Denis & Schiffermüller, 1775),
Hypomecis punctinalis (Scopoli, 1763)
Hypomecis roboraria (Denis & Schiffermüller, 1775)
Idaea aversata (Linnaeus, 1758)
Idaea degeneraria (Hübner, 1799)
Idaea muricata (Hufnagel, 1767)
Idaea straminata (Borkhausen, 1794)
Lomaspidis marginata (Linnaeus, 1758)
Lycia hirtaria (Clerck, 1759)
Macaria alternata (Denis & Schiffermüller, 1775)
Operophtera brumata (Linnaeus, 1758)
Operophtera sp.

Table 2. Nastavak

Tablica 2. Continued

Peribatodes rhomboidaria (Denis & Schiffermüller, 1775)

Perizoma lugdunaria (Herrich-Schäffer, 1855)

Phigalia pilosaria (Denis & Schiffermüller, 1775)

Rhodometra sacraria (Linnaeus, 1767)

Selenia dentaria (Fabricius, 1775)

Selenia lunularia (Hübner, 1788)

Selenia tetralunaria (Hufnagel, 1767)

Thalera fimbrialis (Scopoli, 1763)

Theria rupicaprararia (Denis & Schiffermüller, 1775)

Timandra comae (Schmidt, 1931)

Fam. NOTODONTIDAE

Clostera anastomosis (Linnaeus, 1758)

Clostera curtula (Linnaeus, 1758)

Clostera pigra (Hufnagel, 1766)

Furcula furcula (Clerck, 1759)

Notodonta ziczac (Linnaeus, 1758)

Pheosia tremula (Clerck, 1759)

Ptilodon capucina (Linnaeus, 1758)

Ptilodon cucullina (Denis & Schiffermüller, 1775)

Pterostoma palpinum (Clerck, 1759)

Ptilophora plumigera (Denis & Schiffermüller, 1775)

Stauropus fagi (Linnaeus, 1758)

Fam. SATURNIIDAE

Antheraea yamamai (Guérin-Méneville, 1861)

Saturnia pyri (Denis & Schiffermüller, 1775)

Fam. LASCIOCAMPIDAE

Euthrix potatoria (Linnaeus, 1758)

Lasiocampa quercus (Linnaeus, 1758)

Gastropacha populifolia (Denis & Schiffermüller, 1775)

Gastropacha quercifolia (Linnaeus, 1758)

Odonestis pruni (Linnaeus, 1758)

Poecilocampa populi (Linnaeus, 1758)

Table 2. Nastavak

Tablica 2. Continued

Fam. SPHINGIDAE

Agrius convolvuli (Linnaeus, 1758)
Deilephila porcellus (Linnaeus, 1758)
Laothoe populi (Linnaeus, 1758)
Mimas tiliae (Linnaeus, 1758)
Smerinthus ocellatus (Linnaeus, 1758)
Sphinx ligustri (Linnaeus, 1758)

Fam. ARCTIIDAE

Diacrisia sannio (Linnaeus, 1758)
Diaphora mendica (Clerck, 1759)
Eilema lurideola (Zincken, 1817)
Lithosia quadra (Linnaeus, 1758)
Mitochondria miniata (Forster, 1771)
Pelosia muscerda (Hufnagel, 1766)
Phragmatobia fuliginosa (Linnaeus, 1758)
Spilosoma lutea (Hufnagel, 1766)
Spilosoma menthastri (Esper, 1786)

Fam. DREPANIDAE

Cilix glaucata (Scopoli, 1763)
Habrosyne pyritoides (Hufnagel, 1766)
Tethea ocularis (Linnaeus, 1767)
Thyatira batis (Linnaeus, 1758)
Watsonalla binaria (Hufnagel, 1766)
Watsonalla uncinula (Borkhausen, 1790)

Fam. LYMANTRIIDAE

Arctornis l-nigrum (Müller, 1764)
Calliteara pudibunda (Linnaeus, 1758)
Euproctis similis (Fuessly, 1775)
Orgyia antiqua (Linnaeus, 1758)

Fam. COSSIDAE

Cossus cossus (Linnaeus, 1758)
Phragmataecia castaneae (Hübner, 1790)
Zeuzera pyrina (Linnaeus, 1761)

Table 2. Nastavak

Tablica 2. Continued

Fam. LIMACODIDAE

Apoda limacodes (Hufnagel, 1766)

Fam. HEPIALIDAE

Triodia sylvina (Linnaeus, 1761)

Fam. NOLIDAE

Meganola albula (Denis & Schiffermüller, 1775)

Fam. CRAMBIDAE

Anania verbascalis (Denis & Schiffermüller, 1775)

Calamotropha paludella (Hübner, 1824)

Chilo phragmitella (Hübner, 1805)

Elophila nymphaeata (Linnaeus, 1758)

Eurrhyncha hortulata (Linnaeus, 1758)

Evergestis extimalis (Scopoli, 1763)

Evergestis pallidata (Hufnagel, 1767)

Nascia ciliata (Hübner, 1796)

Ostrinia nubilalis (Hübner, 1796)

Paratalanta hyalinalis (Hübner, 1796)

Pleuroptya ruralis (Scopoli, 1763)

Pyrausta aurata (Scopoli, 1763)

Sitochroa palealis (Denis & Schiffermüller, 1775)

Sitochroa verticalis (Linnaeus, 1758)

Udea ferrugalis (Hübner, 1796)

Fam. PYRALIDAE

Dioryctria simplicella (Heinemann, 1863)

Endotricha flammealis (Denis & Schiffermüller, 1775)

Oncocera semirubella (Scopoli, 1763)

Sciota adelphella (Fischer von Röslerstam, 1836)

Fam. YPONOMEUTIDAE

Yponomeuta padella (Linnaeus, 1758)

Fam. PTEROPHORIDAE

Pterophorus pentadactyla (Linnaeus, 1758)

Emmelina monodactyla (Linnaeus, 1758)

Thalera fimbrialis (Scopoli, 1763) – a species of a characteristic emerald color, is in some European countries on the Red List (www.lepidoptera.pl). It flies in July and August, and the larvae feed mostly on *Achillea millefolium* (ukmoths.org.uk). In this research only one specimen was sampled on July 27th, on the edge of dry meadow and oak forest. *Colobochyla salicalis* (Denis & Schiffermüller, 1775) - a rare wetland species, in the UK is now extinct (ukmoths.org.uk). The larvae feed on the young shoots and leaves of *Populus tremula* and *Salix caprea*. June and July is the main flight period for adults, but in Kopački rit Nature Park one specimen was collected during May in the oak forest. *Nonagria typhae* (Thunberg, 1784), a species typical of wet meadows and wetlands is endangered due to habitat disappearance. It occupies a range of damp or marshy habitats, but is sometimes found wandering away from these areas. The larvae feed on the stems of *Typha latifolia* and *T. angustifolia* (ukmoths.org.uk). In this research only one specimen was sampled in late October in reeds. *Hemistola chrysoprasaria* (Espero, 1794) - an extremely locally distributed species and endangered in some countries in Europe. It inhabits woodland edges and hedgerows where its foodplant grows - *Clematis vitalba* (ukmoths.org.uk). In Kopački rit Nature Park several specimens were registered in May and June on the edge of forest and dry meadow. *Idaea muricata* (Hufnagel, 1767) is a vividly colored species that likes moist habitats and is rare and locally distributed. The adults fly from dusk onwards during June and July, and can sometimes be found on the wing at sunrise. The larvae feed on *Potentilla palustris*, *Polygonum sp.* or *Galium sp.* and overwinter in this stage (www.lepidoptera.pl). In Kopački rit Nature Park two specimens were found; one in May and one in August. As adults of this species usually fly in June and July it is possible that in Kopački rit Nature Park this species has prolonged the period of flying adults or maybe has two generations.

Discussion

It is assumed that in Croatia about 3000 species of moths can be found (Kučinić & Plavac, 2009). In long term research in the Podravina area more than 800 species of Macrolepidoptera were found, out of which about 700 species were moths (Kranjčev 1985).

Because of the similarities, especially in the composition of vegetation between the Podravina area and area of Nature Park Kopački rit, the number

of species could be expected to be similar. The family *Noctuidae* seems to be the largest moth family in the lowland parts of Croatia, where 289 species were determined. *Geometridae* are the second most diverse family with 244 species (Kranjčev, 1985). So far, in Kopački rit Nature Park 73 species of *Noctuidae* and 56 species of *Geometridae* were collected. However, the assumption is that there are many more species in Kopački rit Nature Park belonging to these two families. It is necessary to emphasize that the collection of moths in this study was conducted only with UV light as attractant. Advantage of the UV-light is its easy and simple usage, but this method can only partly determine the composition of the community because it is able to collect phototoxic species only (Summerville et al., 2003). Since most moth species respond actively to ultraviolet light, this method can be used to reflect the moth community to a certain extent (Ping & Houhun, 2006), i.e. comparison of habitats (Heiermann & Földner, 2006) or determining the degree of pollution (Ward et al. 1974). But in order truly to reflect the moth community in wetlands, more methods should be applied in future studies (Ping & Houhun, 2006). Also, the temporal variability of moth abundance through long-term period should be considered (Spitzer & Jaroš, 2008). In this research the species composition varied across different habitats, and some habitat margins, i.e. forest edges, proved to be taxonomically more specific than the center of the habitat, similar to bog margins (Bezděk et al., 2006). Vegetation is essential for moths (Ping & Houhun, 2006) and the moth community in Kopački rit Nature Park is highly adapted to vegetation composition and to certain conditions within a particular habitat. The fact that certain moth species are directly related to specific habitats and the vegetation needs to be further examined.

Due to disappearance of their habitat more and more moth species are becoming endangered (Spitzer et al., 1997) and many of them found refuge in what is left of the wetland areas that once were common along watercourses (www.hellenot.org). This is one of the reasons why these areas are so important - they represent the "oases" of biodiversity of flora and fauna.

The most species of moths and butterflies, because of its sensitivity, can be used as indicator species for the registration of changes in the environment. Such indicator moth species are: *Poeliocampa populi*, *Drepana curvatula*, *Earias clorana*, and some species of *Geometridae* – *Ennominae* (www.hellenot.org).

Particularly good indicators for the assessment of biodiversity are the families *Arctiidae* and *Notodontidae* (Summerville et al., 2004), and some authors even propose them as a valuable “umbrella” species (New, 1997).

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