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The Noctuoidea of the Świętokrzyski National Park (Poland) (Lepidoptera: Erebidae, Nolidae, Noctuidae)

J. Nowacki & R. Wąsala

Abstract

This paper presents the results of a long-term study (2008-2020) of the Noctuoidea (Erebidae, Nolidae, Noctuidae) inhabiting the various ecosystems in the Świętokrzyski National Park (ŚNP) (South Poland). A total of 273 Noctuoidea species were recorded, i.e. 54% of all the Noctuoidea ever recorded in Poland; 127 of them were recorded for the first time in the study area. These results show unequivocally that the ŚNP plays a major role in the preservation of Noctuoidea biodiversity in both Poland and Europe as a whole. A good number of stenotopic species occur here, which are rare and often endangered in both Poland and central Europe, for example: *S. costaestrigalis* (Stephens, 1834), *S. taenialis* (Hübner, [1809]), *C. electa* (Vieweg, 1790), *N. cristatula* (Hübner, 1793), *N. degenerana* (Hübner, [1799]), *L. c-aureum* (Knoch, 1781), *A. asclepiadis* ([Denis & Schiffermüller], 1775), *S. scrophulariae* ([Denis & Schiffermüller], 1775), *A. perflua* (Fabricius, 1787), *H. respersa* ([Denis & Schiffermüller], 1775), *A. furvula* (Hübner, [1808]), *P. scita* (Hübner, 1790), *I. contusa* (Freyer, 1849), *A. pulmonaris* (Esper, 1790), *D. convergens* ([Denis & Schiffermüller], 1775), *A. syriaca* Osthelder, 1933, *E. ochroleuca* ([Denis & Schiffermüller], 1775), *X. graminea* (Graeser, 1889), *H. ultima* Holst, 1965, *H. cavernosa* (Eversmann, 1842), *P. biren* (Goeze, 1781), *O. opima* (Hübner, [1809]), *N. interjecta* Hübner, [1803], and *A. bigramma* (Esper, 1790).
KEY WORDS: Lepidoptera, Noctuoidea, Nolidae, Erebidae, Noctuidae, Świętokrzyskie Mountains, Świętokrzyski National Park, fauna, Poland.

Los Noctuoidea del Parque Nacional de Świętokrzyski (Polonia) (Lepidoptera: Erebidae, Nolidae, Noctuidae)

Resumen

Este trabajo presenta el resultado de un largo estudio (2008-2020) de los Noctuoidea (Erebidae, Nolidae, Noctuidae) habitando en los varios ecosistemas del Parque Nacional de Świętokrzyski (ŚNP) (Sur de Polonia). Fueron registradas un total de 273 especies de Noctuoidea, i.e. 54% de todos los Noctuoidea registrados en Polonia; 127 de ellas fueron registradas por primera vez para este área de estudio. Estos resultados muestran, rotundamente, que el ŚNP, tiene un papel muy importante en la conservación de la Biodiversidad de los Noctuoidea tanto para Polonia como para Europa. Un buen número de especies estenotópicas se encuentran aquí, las cuales son raras o están en peligro de extinción en ambos Polonia y Europa central, por ejemplo: *S. costaestrigalis* (Stephens, 1834), *S. taenialis* (Hübner, [1809]), *C. electa* (Vieweg, 1790), *N. cristatula* (Hübner, 1793), *N. degenerana* (Hübner, [1799]), *L. c-aureum* (Knoch, 1781), *A. asclepiadis* ([Denis & Schiffermüller], 1775), *S. scrophulariae* ([Denis & Schiffermüller], 1775), *A. perflua* (Fabricius, 1787), *H. respersa* ([Denis & Schiffermüller], 1775), *A. furvula* (Hübner, [1808]), *P. scita* (Hübner, 1790), *I. contusa* (Freyer, 1849), *A. pulmonaris* (Esper, 1790), *D. convergens* ([Denis & Schiffermüller], 1775), *A. syriaca* Osthelder, 1933, *E. ochroleuca* ([Denis & Schiffermüller], 1775), *X. graminea* (Graeser, 1889), *H. ultima* Holst, 1965, *H. cavernosa* (Eversmann, 1842), *P. biren* (Goeze, 1781), *O. opima* (Hübner, [1809]), *N. interjecta* Hübner, [1803] y *A. bigramma* (Esper, 1790).

PALABRAS CLAVE: Lepidoptera, Noctuoidea, Nolidae, Erebidae, Noctuidae, Montañas Świętokrzyskie, Parque Nacional de Świętokrzyski, fauna, Polonia.

Introduction

The Lepidoptera have always been the most frequently studied order of insects. Nonetheless, knowledge of the distribution of Noctuoidea in Poland remains incomplete. Particularly unsatisfactory is the fact that some parts of Poland have been frequently and very well researched in this respect, whereas others have been badly neglected. Moreover, a great many records are outdated and require confirmation (BUSZKO & NOWACKI, 2017).

The last twenty years of the 20th century witnessed an upsurge in research addressing the distribution of Noctuoidea in Poland, work that yielded a great many regional papers devoted exclusively to this superfamily. This applies in particular to parts of eastern Poland, where the noctuid fauna has been well researched: the Biebrza Marshes, the Augustów Forest, the Białowieża Primeval Forest, central Podlasie, Polesie, Roztocze and the Sandomierz Forest, Wielkopolska, the belt of sand dunes along the Baltic Sea, and Lower Silesia together with the Sudetes Mountains (BUSZKO & NOWACKI, 2017; NOWACKI & BUSZKO, 2019; NOWACKI & WĄSALA, 2018). Even though faunistic studies of Poland's butterflies and moths have been going on for nearly 200 years, the Świętokrzyskie (Holy Cross) Mountains are one of the less well studied regions as far as noctuid moths are concerned (BUSZKO & NOWACKI, 2017). The noctuids of this region have been studied only in small areas and at different times, and no report covering the whole region has ever been compiled. The earliest information about noctuids in this region appeared in pre-war publications on the whole of Poland's Lepidoptera (BIEŻANKO, 1923; ROMANISZYN & SCHILLE, 1929), but it is restricted mostly to the city of Kielce and its immediate surroundings. The situation in the second half of the 20th century was not much better, with just a few papers being published. ŚLIWIŃSKI *et al.* (1991) compiled a list of 147 noctuid species from different localities in the Świętokrzyski National Park, and NOWACKI & NOWACKA (2012) mention a few nationwide rare species. The beginning of the 21th century saw an upturn in the intensity of research into the distribution of noctuids in this national park. Much of the fieldwork was carried out by students for their diplomas under the authors' supervision.

The Świętokrzyski National Park (ŚNP) more or less coincides in area with the isolated range of low-altitude mountains known as the Świętokrzyskie (Holy Cross) Mountains. These harbour a great many rather unique natural woodland ecosystems, which are inhabited by stenotopic species of plants and animals. In view of the ever-declining biodiversity across the whole of Europe, but also the increasing awareness that action to counteract these adverse trends needs to be taken, it is crucial to fill gaps in our knowledge regarding the distributions and ecological requirements of noctuid moths.

This paper is based on the hypothesis that the natural ecosystems of the ŚNP, the least human-transformed part of the Świętokrzyskie Mountains, are an important refuge of woodland noctuids characteristic of central Europe. To test this hypothesis, we carried out faunistic-ecological field studies in 2008-2020 in order to establish the structures of the noctuid assemblages inhabiting the ecosystems of the ŚNP.

Study area

The ŚNP covers the highest part of the low Świętokrzyskie Mountains, the northernmost range of mountains in central Europe, which lie in the south-eastern part of central Poland. According to the physio-geographical classification of Poland, this area lies in the Polish Uplands province, the Małopolska Upland sub-province, the Kielce Upland macroregion and the Świętokrzyskie Mountains mesoregion (KONDRACKI, 1998). The ŚNP has a surface area of ca 7700 ha (Fig. 1).

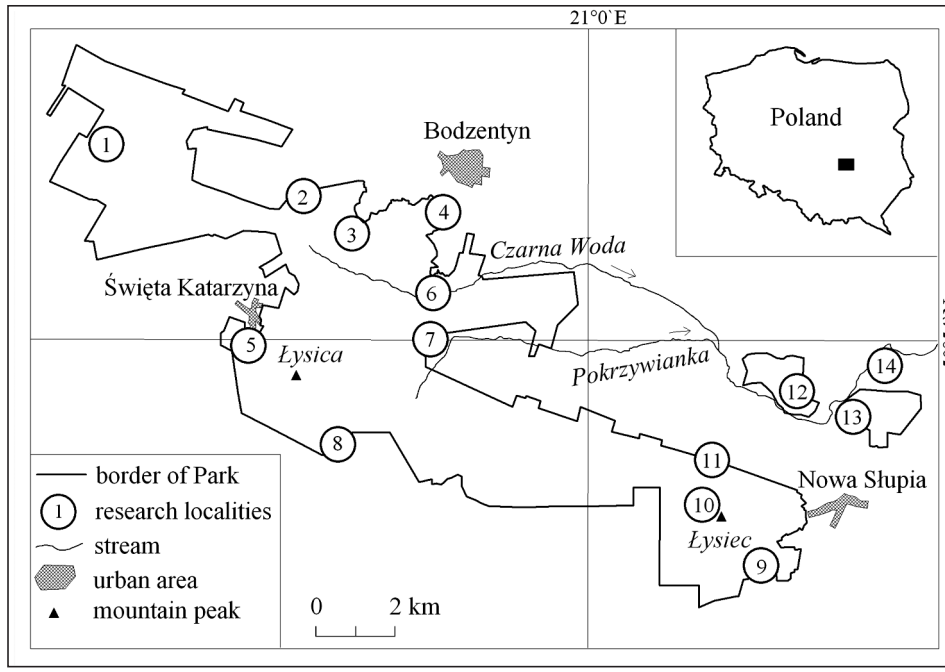

Fig. 1.– Map of the Świętokrzyski National Park showing its location in Poland and the positions of the study localities (numbering as in the text).

These mountains are among the oldest in Europe, which were uplifted during the Caledonian orogeny and subsequently modified during the Variscan and Alpine orogenies. The Łysogóra and Klonów Ranges, the principal morphological component of the ŚNP, are built largely of Cambrian sedimentary rocks, principally quartzite sandstones. These ranges acquire their present-day appearance during the Pleistocene glaciations, particularly at the time when these mountains were situated in the foreland of the icesheet. The periglacial climate caused the intensive weathering of exposed Palaeozoic and Mesozoic rocks, which gave rise to the "gołoborze" scree slopes typical of the ŚNP, formed from quartzite sandstones (Fig. 2). The Łysogóra Range varies in altitude from 225 to 612 m a.s.l., a height difference of nearly 400 m (WRÓBLEWSKI, 2000; KOWALCZEWSKI & KOWALSKI, 2000).

A number of small rivers and streams drain the latitudinal Łysogóra and Klonów Ranges in the ŚNP, all of which lie in the catchment area of the River Vistula (Wisła), e.g. the Belnianka, Kakonianka, Czarna Woda, Lubrzanka, Pokrzywianka and Psarka (KUPCZYK *et al.,* 2000).

The climate of the Świętokrzyskie Mountains differs distinctly from that of the surrounding regions. The higher-lying areas, particularly the Łysogóra Range, have a microclimate approximating that of the lower ranges in the Carpathians. Temperatures very evidently fall and precipitation likewise increases with altitude in this range. The mean annual temperature on the Łysiec (also known as the Łysa Góra ("Bald Mountain" - alt. 594 m a.s.l.) is 5.8ºC, whereby the lowest mean temperature is recorded in January (-4.6ºC) and the highest in July (16ºC). The total annual precipitation in the highest parts of the Łysogóra Range is ca 800-850 mm, and the snow cover persists on average for 102 days in the year (OLSZEWSKI *et al.,* 2000).

This geological, climatic and hydrological diversity of the ŚNP has given rise to a unique mosaic of montane, upland and lowland forest ecosystems, along with a few non-forest ones, covering a relatively small area. The boundary between the upland and montane forests lies at a height of 350 m a.s.l. on the northern slopes and at 450 m a.s.l. on the southern slopes. The montane forests consist of fir and beech, while oak-hornbeam and mixed coniferous forests are common in the upland zone. Generally speaking, one can classify the plant associations occurring in the study area in accordance with their habitat requirements. The various communities are identified and classified in accordance with DANIELEWICZ (2000) and MATUSZKIEWICZ (1982).
Starting with the wettest habitats, these are:

- Aquatic plants, mainly of the class Potamogetonetea. These are rare, being found mainly in a few small ponds and oxbows.
- Emergent vegetation of the class Phragmitetea, occurring mainly around the edges of water bodies, primarily in the marshy river valleys. The plants most commonly forming such communities are sedges *Carex* spp., reeds *Phragmites* spp., bulrush (common reedmace) *Typha latifolia* L., often with yellow iris *Iris pseudacorus* L., branched bur-reed *Sparganium erectum* L. and *Phalaris arundinacea* L.
- Fens and transition bogs of the class Scheuchzerio-Caricetea as well as moist sedge meadows growing in depressions in dry valleys and in the valleys of some rivers.
- Meadows, semi-natural in character, because they came about and are maintained as a result of human activities. They form small enclaves in the woodlands, utilized as hay meadows or pastureland, particularly in the river valleys (Fig. 3).
- Scree slope communities, characteristic of the Łysogóra Range, supporting pioneer assemblages of mosses and lichens (Fig. 2).
- Willow and alder woodland/scrub of the class Alnetea-Glutinosae, growing on wet, periodically inundated, peaty soils, principally in the river valleys.
- Coniferous forests, various forms of which occur depending on the mountain range, height above sea level, slope exposure, as well as habitat fertility and moisture content. The main types include fir forest (dominant in the ŚNP) with dominant upland mixed fir forest (Fig. 4); various forms of mixed pine-oak forest, depending on the mountain range, sometimes with admixtures of other tree species (fir, larch, spruce, beech); moist coniferous forest; dry coniferous forest; patches of boggy coniferous forest.
- Broad-leaved woodlands, also covering a considerable part of the ŚNP, and occurring in different forms, depending on altitude, slope exposure and habitat type: lower montane zone forests, dominated by the submontane form of the fertile Carpathian beech association (Fig. 5); at lower altitudes, oak-hornbeam forests with admixtures of other tree species (Fig. 6). Also worth mentioning are the very small areas of alluvial forest associations, patches of which grow in the river valleys.
- Xerothermic swards on steep slopes and rocky cliffs with a south-westerly exposure, found on the Skarpa Zapusty scarp slope (Fig. 7).
- Nitrophilous crop communities of the classes Secalietea and Chenopodietea and ruderal communities of the classes Artemisietea, Plantaginetea and Epilobietea angustifolii, patches of which grow around human habitations, on roadsides and in forest clearings.

The research material was obtained in 14 different localities (Fig. 1):

1. Obwód Klonów (50º56’44” N; 20º49’38” E); the southern slope of the Klonów Range; woodland ecosystems: Carpathian beech association, oak-hornbeam forest, moist pine forest.
2. Gajówka Kąty (50º56’2” N; 20º53’51” E); the north-western slope of Mount Psarska Góra; woodland ecosystems: upland mixed fir forest, oak-hornbeam forest, boggy coniferous forest; also, emergent vegetation and moist meadow ecosystems.
3. Podgórze (50º55’32” N; 20º55’3” E); the western slope of Mount Miejska Góra; woodland

ecosystems: dominant upland mixed fir forest, also oak-hornbeam forest; meadow ecosystems abound along the forest margins.

4. Miejska Góra (50º55'48" N; 20º57'17" E); the eastern slope of Mount Miejska Góra; woodland ecosystems: dominant upland mixed fir forest, also oak-hornbeam forest; meadow ecosystems and ruderal communities abound along the forest margins.
5. Święta Katarzyna (50º54'1" N; 20º52'39" E); the western slope of the Łysogóra Range; woodland ecosystems: Carpathian beech association, upland mixed fir forest, patches of oak-hornbeam forest.
6. Dolina Czarnej Wody (50º54'34" N; 20º56'41" E); the valley of the River Czarna Woda; moist meadows in woodland glades; small patches of fen and emergent vegetation surrounded by woodland ecosystems: mixed coniferous forest, alluvial forest, oak-hornbeam forest.
7. Dąbrowa (50º54'5" N; 20º56'34" E); the western slope of the Łysogóra Range; woodland ecosystems: Carpathian beech association, upland mixed fir forest, patches of oak-hornbeam forest; near the valley of the River Pokrzywianka, with moist meadows and fens surrounded by woodland ecosystems: mixed coniferous forest, alluvial forest, alder swamp.
8. Kakonin (50º52'27" N; 20º54'42" E); the southern slope of the Łysogóra Range; woodland ecosystems: Carpathian beech association, upland mixed fir forest, oak-hornbeam forest.
9. Trzcianka (50º50'52" N; 21º3'44" E); the southern slope of the Łysogóra Range; woodland ecosystems: Carpathian beech association, upland mixed fir forest, oak-hornbeam forest.
10. Święty Krzyż (50º51'37" N; 21º3'2" N); the ridge of the Łysogóra Range near the Łysiec mountain; woodland ecosystems: Carpathian beech association, upland mixed fir forest; also, sycamore and Świętokrzyskie rowan forest, which grows along the edges of the scree slopes (gołoborze).
11. Hucisko (50º52'27" N; 21º2'39" E); the northern slope of the Łysogóra Range; woodland ecosystems: Carpathian beech association, upland mixed fir forest, oak-hornbeam forest; meadow ecosystems and ruderal communities abound along the forest margins.
12. Las Serwis (50º53'19" N; 21º4'33" E); north of the Pokrzywianka valley; woodland ecosystems with dominant mixed coniferous forest and oak-hornbeam forest; meadow ecosystems and ruderal communities abound along the forest margins.
13. Chełmowa Góra (50º52'59" N; 21º5'28" E); the south-western slope of Mount Chełmowa Góra; woodland ecosystems with dominant mixed coniferous forest and oak-hornbeam forest; near the Pokrzywianka valley, where there are numerous meadow and emergent vegetation ecosystems.
14. Skarpa Zapusty (50º53'42" N; 21º6'3" E); north of Mount Chełmowa Góra, on a steep, rocky slope in the Pokrzywianka valley with a south-westerly exposure; ecosystems: xerothermic sward and scrub; situated in the vicinity of the river valley, covered by meadow and willow scrub ecosystems.

Research methods

The fieldwork took place from 2008 to 2020. Because of the diversity of the habitats at the different localities, noctuids were caught using a variety of techniques, though mostly with light traps. The moths were attracted to a 250 W mercury vapour lamp fitted to light traps or installed in front of a white screen upon which the moths settled. The light traps were deployed throughout the flight season in a particular habitat, but in different localities in different years. Discrete all-night samples were obtained in the light traps from the beginning of April until the end of October at an average rate of three trapping sessions per ten-day period. In addition, some of the research material was acquired using portable light traps equipped with Philips 8W UV blacklights, which were deployed each night in many different ecosystems. Wine-ropes were also used. A small amount of material was obtained by catching moths or collecting caterpillars on sight during the daytime.

In this way the numbers of species and of individuals, as well as their flight periods, could be established for each locality. Valuable species, i.e. rare and endangered in Poland, as well as species characteristic of the particular ecosystems, were designated. On this basis the natural value of the different ecosystems in the ŚNP could be established.

Results

This study in the ŚNP yielded a total of 261 species of noctuid moths from the families Erebidae, Nolidae and Noctuidae. Table 1 (appendix) lists them in the same systematic order as in NOWACKI & BUSZKO (2019). For each species the table shows the locality(ies) where it was found, its abundance and flight period. If we include a further 12 species that ŚLIWIŃSKI *et al.* (1991) recorded in this area (Table 2), but which we failed to find during our fieldwork, the total number of species of Noctuoidea recorded in the ŚNP comes to 273.

Table 2.– Species of noctuid moths (Lepidoptera, Noctuoidea: Noctuidae) recorded in the Świętokrzyski National Park by ŚLIWIŃSKI *et al.* (1991) but not confirmed during the present study (2008-2020).

Species	Locality		Flight period
	Łysogóra Range	Mount Chełmowa Góra	
Acronicta tridens ([Denis & Schiffermüller], 1775)		x	VII
Protoschinia scutosa ([Denis & Schiffermüller], 1775)		x	VIII
Mniotype adusta (Esper, 1790)	x		VI
Calamia tridens (Hufnagel, 1766)		x	VIII
Nonagria typhae (Thunberg, 1784)	x	x	VIII-X
Globia algae (Esper, 1789)	x		VII
Pachetra sagittigera (Hufnagel, 1766)		x	VII
Eugraphe sigma ([Denis & Schiffermüller], 1775)		x	VII-VIII
Actebia praecox (Linnaeus, 1758)		x	VIII
Euxoa nigricans (Linnaeus, 1761)		x	VIII
Agrotis clavis (Hufnagel, 1766)		x	VII
Agrotis cinerea ([Denis & Schiffermüller], 1775)	x		VI

Faunistic analysis

During this study, 127 noctuid moth species were recorded for the first time in the ŚNP. The noctuids recorded in the Park's diverse ecosystems include species that are faunistically valuable in both Poland and Europe, mostly stenotopic ones that in Poland are rare or very localized. A total of 24 such species were found in the ŚNP, i.e. 9% of the total: *S. costaestrigalis* (Stephens, 1834), *S. taenialis* (Hübner, [1809]), *C. electa* (Vieweg, 1790), *N. cristatula* (Hübner, 1793), *N. degenerana* (Hübner, [1799]), *L. c-aureum* (Knoch, 1781), *A. asclepiadis* ([Denis & Schiffermüller], 1775), *S. scrophulariae* ([Denis & Schiffermüller], 1775), *A. perflua* (Fabricius, 1787), *H. respersa* ([Denis & Schiffermüller], 1775), *A. furvula* (Hübner, [1808]), *P. scita* (Hübner, 1790), *I. contusa* (Freyer, 1849), *A. pulmonaris* (Esper, 1790), *D. convergens* ([Denis & Schiffermüller], 1775), *A. syriaca* Osthelder, 1933, *E. ochroleuca* ([Denis & Schiffermüller], 1775), *X. graminea* (Graeser, 1889), *H. ultima* Holst, 1965, *H. cavernosa* (Eversmann, 1842), *P. biren* (Goeze, 1781), *O. opima* (Hübner, [1809]), *N. interjecta* Hübner, [1803], *A. bigramma* (Esper, 1790).The details of most of them are now given:

Schrankia taenialis (Hübner, [1809])

Święty Krzyż, 8-VII-2010, 1 ex., among Świętokrzyskie rowans at the edge of a scree slope (at light).

A Eurasiatic species, occurring locally in central Europe (FIBIGER *et al.,* 2010). Very rare in Poland; recorded at single localities only in Pomerania and eastern Poland: the Lublin region, Mazovia and Podkarpacie (BUSZKO & NOWACKI, 2017).

Catocala electa (Vieweg, 1790)

Podgórze, 22-VIII-2020, 2 exx., 21-IX-2020, 1 ex.; Skarpa Zapusty, 21-VIII-2020, 2 exx., 23-IX-2020, 1 ex., by the River Pokrzywianka (wine rope) and mixed forest (at light).

A Eurasiatic species, occurring locally in central Europe (NOWACKI, 1998). Contemporary records from Poland are very few, from single localities mainly in the eastern part of the country: Podlasie, the Lublin region, Mazovia and Podkarpacie (BUSZKO & NOWACKI, 2017).

Nola cristatula (Hübner, 1793)

Chełmowa Góra, 17-VII-2008, 1 ex.; Miejska Góra, 7-VII-2013, 1 ex., mixed forest (at light).

A Eurasiatic species, occurring locally in central Europe (FIBIGER *et al.,* 2009). Very rare in Poland, with records from just a few localities. Recent records only from Polesie and Podlasie (NOWACKI & WASILUK, 2004), the Pieniny Mts., the Lublin region and Podkarpacie (BUSZKO & NOWACKI, 2017).

Nycteola degenerana (Hübner, [1799])

Dąbrowa, 26-IV-2012, 3 exx.; Obwód Klonów, 25-VII-2020, 1 ex., mixed forest (at light).

A Eurasiatic species, occurring locally in central Europe (FIBIGER *et al.,* 2009). Very rare in Poland, found at just a few localities. Recent records only from the Lublin region, Podkarpacie and Małopolska (BUSZKO & NOWACKI, 2017).

Lamprotes c-aureum (Knoch, 1781),

Dąbrowa, 27-VII-2008, 1 ex.; Obwód Klonów, 5-VII-2016, 1 ex., mixed coniferous forest (at light).

A Eurasiatic species, occurring locally in central Europe (NOWACKI, 1998). Very rare in Poland, with just a handful of records from single localities. In recent years the number of known localities has fallen sharply; its current distribution in Poland appears to be restricted to the eastern and southern parts of the country: Biebrza Marshes (FRĄCKIEL & NOWACKI, 2010), Podlasie (NOWACKI & WASILUK, 2004), Polesie (NOWACKI & HOŁOWIŃSKI, 1999), Masurian Lake District, Podkarpacie and Opole Silesia (BUSZKO & NOWACKI, 2017).

Amphipyra perflua (Fabricius, 1787)

Obwód Klonów, 21-VII-2020, 1 ex., moist mixed woodland (at light).

A Eurasiatic species, occurring locally in central Europe (FIBIGER & HACKER, 2007). Recorded in Poland at single localities; usually very rare; associated with natural woodland ecosystems (NOWACKI & BUSZKO, 2019).

Athetis furvula (Hübner, [1808])

Skarpa Zapusty, 22-VII-2020, 7 exx.; Święty Krzyż, 24-VII-2010, 1 ex., xerothermic swards (at light).

A Palaearctic species, occurring locally in central Europe south of the Alps, Sudetens and Carpathians (FIBIGER & HACKER, 2007). Earlier records from Poland from just two localities in the Vistula valley near Sandomierz: the "Góry Pieprzowe" nature reserve and the "Panieńska Góra" environmental set-aside area (NOWACKI *et al.,* 2001). The Polish localities are disjunct, north of the species' contiguous range (NOWACKI, 1998).

Phlogophora scita (Hübner, 1790)

Gajówka Kąty, 30-VI-2011, 6 exx.; Święty Krzyż, 29-VI-2019, 1 ex., 2-VII-2010, 2 exx.; Trzcianka, 3 - 9-VII-2012, 4 exx., beech woodlands (at light).

A Eurasiatic species, occurring locally in central Europe, in lower-montane forest ecosystems (FIBIGER & HACKER, 2007). Recorded at single localities in southern Poland, mainly in the

mountains and in the mountain forelands from the Sudetens to the Bieszczady Mts. (NOWACKI & BUSZKO, 2019).

Ipimorpha contusa (Freyer, 1849)

Dąbrowa, 6-9-VII-2008, 3 exx., broad-leaved woodlands (at light).

A Eurasiatic species, extremely localized in east-central Europe (FIBIGER & HACKER, 2007). Associated with natural woodland ecosystems; very rare in Poland, where it is at the westernmost edge of its range. Records to date only from the Białowieża Primeval Forest (BUSZKO *et al.,* 1996), the Roztocze National Park (NOWACKI, 1992), the environs of Poznań and the Lublin Upland (SOSIŃSKI, 1993).

Dichonia convergens ([Denis & Schiffermüller], 1775)

Chełmowa Góra, 9-X-2008, 1 ex., 14-X-2019, 2 exx., oak-hornbeam woodlands (at light).

A Holo-Mediterranean species, occurring locally in central Europe (RONKAY *et al.,* 2001). Polish records to date are from single localities in an area stretching from Western Pomerania, through Wielkopolska to south-eastern Poland; usually very rare (NOWACKI & BUSZKO, 2019).

Apamea syriaca Osthelder, 1933

Chełmowa Góra, 22 - 29-VI-2008, 9 exx., 30-VI-2019, 2 exx.; Dąbrowa, 30-VI-2012, 5 exx.; Hucisko, 27-VI-2020, 15 exx.; Kakonin, 17-VI - 16-VII-2014, 3 exx.; Las Serwis, 24-VI-21-VII-2014, 5 exx.; Miejska Góra, 24-VI-12-VII-2013, 14 exx.; Obwód Klonów, 24-VI-2020, 2 exx.; Skarpa Zapusty, 27-VI-2020, 3 exx.; Święta Katarzyna, 26-30-VI-2008, 4 exx., 2-5-VII-2008, 5 exx.; Święty Krzyż, 29-VI-2009, 1 ex., 12-VI-2018, 4 exx.; Trzcianka, 13-VI-2012, 1 ex., 24-VI-2012, 1 ex., various open environments: scree slopes, xerothermic swards, dry meadows (at light).

A Holo-Mediterranean species, occurring mainly in south-central Europe (ZILLI *et al.,* 2005). First recorded in Poland in the 21st century, only at xerothermic localities in the Roztocze region (NOWACKI, 2006) and in the Nida valley near Pińczów (NOWACKI & WĄSALA, 2020). The localities in Poland are disjunct, lying as they do to the north of the species, contiguous range (ZILLI *et al.,* 2005).

Eremobia ochroleuca ([Denis & Schiffermüller], 1775)

Hucisko, 23-VII-2011, 1 ex., dry meadow (at light).

A Holo-Mediterranean species occurring mainly in south-central Europe (ZILLI *et al.,* 2005). Very rare, recorded at single localities in Poland; recent records just a few regions of the country: the Nida valley, the Lublin region, Mazovia, Pomerania, Podlasie and Wielkopolska (BUSZKO & NOWACKI, 2017; NOWACKI & WĄSALA, 2020).

Xylomoia graminea (Graeser, 1889)

Chełmowa Góra, 19-VI-2008, 1 ex., 22-VI-2008, 1 ex.; Dąbrowa, 22-VI-2008, 1 ex.; Hucisko, 7-VI-2013, 1 ex.; Las Serwis, 9-VI-2014, 1 ex., emergent vegetation and damp meadows (at light).

A Eurasiatic species, occurring very locally in east-central Europe (NOWACKI, 1998). First recorded in Europe in 1988 in the Roztocze region (south-eastern Poland) (NOWACKI, 1989). Current central European records are from disjunct localities - to date there have been none from west of the River Vistula. Thus, all the Polish records come from the east of the country: from Podlasie, through the Lublin region, Mazovia, Podkarpacie, Małopolska to Upper Silesia. It inhabits fens and transition bogs, waterlogged meadows, especially in the valleys of small rivers. The Polish populations are the westernmost and also the most numerous ones in Europe (NOWACKI & BUSZKO, 2019).

Hydraecia ultima Holst, 1965

Dąbrowa, 7-VII-2012, 3 exx.; Gajówka Kąty, 7-VIII-2011, 3 exx.; Hucisko, 23-VII-28-VIII-2013,

3exx.; Las Serwis, 24-VII-26-VIII-2014, 4 exx.; Miejska Góra, 6-VII-17-VIII-2013, 12 exx., damp meadows (at light).

A Eurasiatic species, occurring in central Europe at the western edge of its range (ZILLI *et al.,* 2005). Localized in Poland, with records from just a few widely scattered localities in the east and south of the country. It inhabits fens and transition bogs, and also damp meadows by river banks and lake shores (NOWACKI & BUSZKO, 2019).

Hyssia cavernosa (Eversmann, 1842)

Miejska Góra, 12-V-2013, 1 ex., dry meadow (at light).

A Eurasiatic species, occurring very locally in east-central Europe, where it reaches its westernmost range limit (HACKER *et al.,* 2002). This boundary straddles eastern Poland, where the species is recorded in a contiguous range from the Białowieża Primeval Forest, through the Lublin region to the Bieszczady Mts. In southern Poland, *H. cavernosa* has also been recorded locally in Małopolska and Upper Silesia (BUSZKO & NOWACKI, 2017).

Papestra biren (Goeze, 1781)

Gajówka Kąty, 12-23-VI-2011, 3 exx., mixed fir forest (at light).

A Holarctic species, occurring locally in coniferous forests in central Europe (HACKER *et al.,* 2002). The Polish records are from just a few localities, mainly in the east of the country; more frequently encountered in the mountains. Sometimes quite abundant wherever it occurs (NOWACKI & BUSZKO, 2019).

Noctua interjecta Hübner, [1803]

Chełmowa Góra, 25-VII-2019, 2 exx., 22-VII-2020, 2 exx.; Hucisko, 22-VII-2020, 3 exx.; Obwód Klonów, 21-VII-2020, 3 exx.; Skarpa Zapusty, 22-VII-2020, 2 exx.; Święty Krzyż, 23-VII-2020, 8 exx., open environments: scree slopes, dry meadows, woodland glades and clearings (at light).

An Atlantic-Mediterranean species, it occurs as the subspecies *N. interjecta caliginosa* (Schawerda, 1919) from the Iberian Peninsula to north-central Europe, and as the subspecies *N. interjecta interjecta* (Hübner, [1803]) in southern and central Europe south of the Alps, Sudetens and Carpathians. Late-20th century Polish records are of *N. interjecta caliginosa*, which was found at single localities only in the west of the country, from the Baltic Coast to Lower Silesia. The last 20 years have seen a rapid eastward expansion of *N. interjecta caliginosa* in Poland. It has been recorded at many localities in central Poland (BUSZKO & NOWACKI, 2017).

Ecological analysis

This study of the noctuid (Lepidoptera, Noctuoidea) fauna in the Świętokrzyski National Park covered 14 localities situated in the Park's different ecosystems. Our results enable an evaluation of the degree of naturalness and natural value of these ecosystems. To begin with, we assumed that the number of species found at particular localities was not a simple reflection of their biodiversity, not to mention their natural value. With this in mind, we analysed the degree of naturalness and natural value of these ecosystems on the basis of "naturally valuable" noctuid species, i.e. stenotopic species characteristic of particular ecosystems, species rare and often endangered in Poland, and species placed on the "Red list of threatened animals in Poland" (BUSZKO & NOWACKI, 2002). Species were assigned to this assemblage on the basis of the following literature: BUSZKO & NOWACKI (2017), GŁOWACIŃSKI (2002), GŁOWACIŃSKI & NOWACKI (2004), NOWACKI (1998), NOWACKI & BUSZKO (2019).

The presence of species characteristic of the different ecosystems in the ŚNP is highly relevant as regards the importance of an area as a noctuid refuge. Species typical of woodland ecosystems are of prime significance, since these habitats are dominant in the ŚNP:

- Coniferous forests, among which fir forests are common: upland mixed fir forest and pine-oak mixed

forest are dominant, occurring in various forms depending on the mountain range and altitude above sea level. The species characteristic of these ecosystems are: *C. vaccinii* (Linnaeus, 1761), *D. mendica* (Fabricius, 1777), *H. crassalis* (Fabricius, 1787), *H. rectilinea* (Esper, 1788), *L. contigua* ([Denis & Schiffermüller], 1775), *L. porphyrea* ([Denis & Schiffermüller], 1775), *O. opima* (Hübner, [1809]), *P. biren* (Goeze, 1781), *P. coenobita* (Esper, 1785), *P. flammea* ([Denis & Schiffermüller], 1775) and *S. taenialis* (Hübner, [1809]).

- Broad-leaved woodlands, also covering considerable areas of the Park, of which there are many different variants, such as lower-montane zone forests, dominated by the mountain foreland form of the fertile Carpathian beech association, and oak-hornbeam forest at lower altitudes. The species typical of such ecosystems are: *A. aceris* (Linnaeus, 1758), *A. circellaris* (Hufnagel, 1766), *A. macilenta* (Hübner, [1809]), *A. epomidion* (Haworth, 1809), *A. perflua* (Fabricius, 1787), *A. prasina* ([Denis & Schiffermüller], 1775), *A. sphinx* (Hufnagel, 1766), *B. nubeculosa* (Esper, 1785), *C. algae* (Fabricius, 1775), *C. fraxini* (Linnaeus, 1758), *C. promissa* ([Denis & Schiffermüller], 1775), *C. sponsa* (Linnaeus, 1767), *C. coryli* (Linnaeus, 1758), *C. erythrocephala* (Scopoli, 1763), *D. convergens* ([Denis & Schiffermüller], 1775), *G. aprilina* (Linnaeus, 1758), *I. contusa* (Freyer, 1849), *L. c-aureum* (Knoch, 1781), *L. ornitopus* (Hufnagel, 1766), *L. socia* (Hufnagel, 1766), *M. alpium* (Osbeck 1778), *M. lunaris* ([Denis & Schiffermüller], 1775), *N. cuculatella* (Linnaeus, 1758), *N. degenerana* (Hübner, [1799]), *O. cruda* ([Denis & Schiffermüller], 1775), *O. miniosa* ([Denis & Schiffermüller], 1775), *O. munda* ([Denis & Schiffermüller], 1775), *O. populeti* (Fabricius, 1775), *P. prasinana* (Linnaeus, 1758), *P. scita* (Hübner, 1790), *P. tentacularia* (Linnaeus, 1758), *S. scrophulariae* (Linnaeus, 1758), *T. aurago* ([Denis & Schiffermüller], 1775), *T. citrago* (Linnaeus, 1758), and *X. ditrapezium* ([Denis & Schiffermüller], 1775).
- Willow/alder woodlands and scrub growing on wet peaty soils, periodically inundated, and the few alluvial forests, mainly in the river valleys. Characteristic of these ecosystems are the following species: *A. alni* (Linnaeus, 1767), *A. cuspis* (Hübner, [1813]), *A. lota* (Clerck, 1759), *A. pulmonaris* (Esper, 1790), *C. electa* (Vieweg, 1790), *C. rubricosa* ([Denis & Schiffermüller], 1775), *I. retusa* (Linnaeus, 1761), *L. furcifera* (Hufnagel, 1766) and *P. suspecta* (Hübner, [1817]).

In addition, there are a great many noctuid species characteristic of the non-woodland ecosystems specific to the ŚNP:

- The scree-slopes (gołoborze) typical of the Łysogóra Range, which support pioneer assemblages of mosses and lichens, and which are surrounded by the Świętokrzyski rowan association. Characteristic of these ecosystems are the following noctuids: *A. syriaca* Osthelder, 1933, *C. algae* (Fabricius, 1775), *H. respersa* ([Denis & Schiffermüller], 1775), *O. polygona* ([Denis & Schiffermüller], 1775), and *P. fuliginaria* (Linnaeus, 1761).
- Emergent vegetation, waterlogged meadows, fens and transition bogs. The typical species of these ecosystems are: *A. unanimis* (Hübner, [1813]), *C. maritima* (Tauscher, 1806), *C. sparganii* (Esper, 1790), *D. bankiana* (Fabricius, 1775), *D. uncula* (Clerck, 1759), *H. ultima* Holst, 1965, *L. geminipuncta* (Haworth, 1809), *L. obsoleta* (Hübner, [1803]), *M. cribrumalis* (Hübner, 1793), *M. straminea* (Treitschke, 1825), *P. minima* (Haworth, 1809), *R. lutosa* (Hübner, [1803]), *S. albovenosa* (Goeze, 1781), *S. buettneri* (Hering, 1858), *S. costaestrigalis* (Stephens, 1834) and *X. graminea* (Graeser, 1889).
- The xerothermic swards and scrub occurring in a small enclave on the Skarpa Zapusty scarp slope. The characteristic species here are *A. asclepiadis* ([Denis & Schiffermüller, 1775), *A. bigramma* (Esper, 1790), *A. furvula* (Hübner, [1808]), *H. respersa* (Denis & Schiffermüller, 1775), *C. fulminea* (Scopoli, 1763), *E. ochroleuca* (Denis & Schiffermüller], 1775), *H. cavernosa* (Eversmann, 1842), *H. confusa* ([Denis & Schiffermüller], 1775), *N. comes* Hübner, [1813] and *N. interposita* (Hübner, 1790).

The next part of this analysis looks at species rare in Poland, as well as those on the Red List of Threatened Animals in Poland, and those at the edges of their contiguous ranges or even beyond their contiguous ranges at disjunct localities. We found 30 "naturally valuable" noctuid species in the ŚNP: *S. costaestrigalis* (Stephens, 1834), *S. taenialis* (Hübner, [1809]), *C. electa* (Vieweg, 1790), *N.*

cristatula (Hübner, 1793), *N. degenerana* (Hübner, [1799]), *L. c-aureum* (Knoch, 1781*)*, *A. asclepiadis* ([Denis & Schiffermüller], 1775 , *A. cuspis* (Hübner, [1813]), *H. respersa* ([Denis & Schiffermüller], 1775), *A. furvula* (Hübner, [1808]), *P. scita* (Hübner, 1790), *I. contusa* (Freyer, 1849), *A. nitida* ([Denis & Schiffermüller], 1775), *C. erythrocephala* (Scopoli, 1763), *A. pulmonaris* (Esper, 1790), *D. convergens* ([Denis & Schiffermüller], 1775), *A. syriaca* Osthelder, 1933, *E. ochroleuca* ([Denis & Schiffermüller], 1775), *X. graminea* (Graeser, 1889), *H. ultima* Holst, 1965, *L. geminipuncta* (Haworth, 1809), *H. confusa* ([Denis & Schiffermüller], 1775), *H. cavernosa* (Eversmann, 1842), *P. biren* (Goeze, 1781), *M. straminea* (Treitschke, 1825), *O. miniosa* ([Denis & Schiffermüller], 1775), *O. opima* (Hübner, [1809]), *N. interposita* (Hübner, 1790), *N. interjecta* Hübner, [1803] and *A. bigramma* (Esper, 1790). This large number of naturally valuable species belonging to a single lepidopteran superfamily is testimony to the ŚNP's high degree of naturalness and the considerable natural value of its ecosystems. It should be stressed that as many as six of these 30 species are on the Red List of Threatened Animals in Poland (GŁOWACIŃSKI, 2002): *C. electa* (Vieweg, 1790), *L. c-aureum* (Knoch, 1781), *H. respersa* ([Denis & Schiffermüller], 1775), *A. furvula* (Hübner, [1808]), *I. contusa* (Freyer, 1849), and *E. ochroleuca* ([Denis & Schiffermüller], 1775). These 30 species also include some that are at the edges of or beyond their contiguous ranges, e.g. *H. respersa* ([Denis & Schiffermüller], 1775), *A. furvula* (Hübner, [1808]*)*, *P. scita* (Hübner, 1790*)*, *A. syriaca* Osthelder, 1933, *X. graminea* (Graeser, 1889), *H. cavernosa* (Eversmann, 1842), and *N. interjecta* Hübner, [1803]. At a few single localities, we also came across a few species that are extremely rare in Poland, e.g. *A. syriaca* Osthelder, 1933, *A. furvula* (Hübner, [1808]), *I. contusa* (Freyer, 1849), and *L. c-aureum* (Knoch, 1781). Finally, the large number of species characteristic of the ŚNP's woodland ecosystems testifies unequivocally to the high natural value of these areas. Another crucial aspect is that the populations in the ŚNP of many of the above-mentioned species are quite large, which is an indicator of the natural and lasting character of these ecosystems.

Summary of results

At the present time, large, natural forest complexes are unique but diminishing areas in the landscape of central Europe, including Poland. Our results show that the woodland ecosystems of the ŚNP, along with the unwooded scarp slope of the Skarpa Zapusty, are very valuable and natural to a high degree. Total of 273 species of noctuid moths has been recorded in the ŚNP, i.e. ca 55% of all the noctuids hitherto recorded in Poland. This is in fact a large number, given the Park's small area and the minimal diversity of its ecosystems, mostly woodlands, with not very diverse non-forest ecosystems covering just a small area. By comparison, many more noctuid species have been recorded in other, far more extensive and ecologically much more diverse areas in eastern Poland, with a longer history of research, for example: Biebrza Marshes - 299 species (FRĄCKIEL & NOWACKI, 2010), Augustów Forest - 323 (NOWACKI & RUDNY, 1992), Sobibor Forests in Polish Polesie - 344 (NOWACKI, HOŁOWIŃSKI, 1999, 2002, 2009, 2010, 2020; NOWACKI *et al.,* 2001; NOWACKI & PAŁKA, 2016), central Podlasie - 319 (NOWACKI & WASILUK, 2004), Białowieża Primeval Forest - 352 (BUSZKO *et al.,* 1996).

Analysis of the material acquired has enabled the natural value of the ŚNP's various ecosystems to be assessed on the basis of the noctuid assemblages inhabiting them. The species composition of Noctuoidea in the woodland ecosystems, which are dominant in the Park, is worth examining. Qualitative analysis indicates that these areas harbour the largest numbers of species regarded as naturally valuable: 14 of the 30 species of Noctuidae in this category inhabit these woodlands. They are mostly stenotopic species restricted to particular ecosystems, usually natural ones.

The xerothermophilous noctuids inhabiting the few, small, open ecosystems in the ŚNP with xerothermic sward vegetation are also worth a mention. Although there are only ten such species, making up just 3,7% of the overall noctuid assemblage of the ŚNP, they are a faunistic component making a valuable contribution to the biodiversity of the Park and Poland as a whole.

The fact that no similar studies were carried out earlier, particularly in the mid-20th century,

precludes any comparison of the changes that could have occurred in the Park's noctuid assemblages during the past 50 years. This aspect is critical, since the Park's lepidopteran biodiversity fell drastically during the 1970s. At that time, measures were undertaken to reduce the numbers of *Choristoneura murinana* (Hübner, [1799]), a tortricid pest of fir trees, using bacterial preparations (*Bacillus thuringiensis*) (DĄBROWSKI, 1981). These measures must have hit the ŚNP's noctuid biodiversity very hard. Looking back, those measures were decidedly wrong and irresponsible, especially as the ŚNP's Lepidoptera had practically never been studied before. It is now impossible to assess what far-reaching changes in the Park's ecosystems could have been set in motion as a result of the application of those biopreparations. Did the populations of all the species recover, or did some of them become extinct?

In contrast, evaluation of the threats to the present-day biodiversity of noctuids in the ŚNP shows that it is maintained in large measure by the naturalness of the Park's very extensive woodland ecosystems; a large proportion of the Park is thus subject to a strict conservation regime. This is the best guarantee that the natural value of the Park's ecosystems will be preserved, as demonstrated by its diversity of noctuid moths.

In the context of the preservation of the Park's biodiversity, the xerothermic sward communities on the "Skarpa Zapusty" scarp slope are deserving of particular attention. One of the most valuable species inhabiting this small ecosystem is *Athetis furvula* (Hübner, [1808]), a southern European species, which occurs locally to the south of the central European mountain ranges. It had previously been recorded in Poland at just two localities near Sandomierz: the Pieprzowe Góry and Panieńska Góra hills. This new locality on the "Skarpa Zapusty" is thus the third in Poland (NOWACKI *et al.,* 2001). Hence, it is crucial to keep this scarp free of the shoots of trees and shrubs that would otherwise engulf and shade the area, as this would stifle the development of stenotopic, xerothermophilous species of plants and animals. Nonetheless, it is important to carry out the necessary weeding and pruning at the appropriate times, in order to safeguard the development of the largest possible number of species of organisms inhabiting this protected environment. In practice, these measures should not be carried out before the end of September or the beginning of October - the later the better.

Our results show that the woodland ecosystems of the Świętokrzyski National Park, along with the xerothermic sward communities on the "Skarpa Zapusty" scarp slope, have a high degree of naturalness and are of considerable natural value. Together, they are an important refuge for European noctuid moths, of the first order as regards the conservation of biodiversity in both Poland and Europe.

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* J. N.
Department of Entomology and Environmental Protection
Poznań University of Life Sciences
Dąbrowskiego, 159
PL-60-594 Poznań
POLONIA / *POLAND*
E-mail: janusz.nowacki@up.poznan.pl
https://orcid.org/0000-0003-0221-0282

R. W.
Department of Entomology and Environmental Protection
Poznań University of Life Sciences
Dąbrowskiego, 159
PL-60-594 Poznań
POLONIA / *POLAND*
E-mail: roman.wasala@up.poznan.pl
https://orcid.org/0000-0002-7825-3273

*Autor para correspondencia / *Corresponding author*

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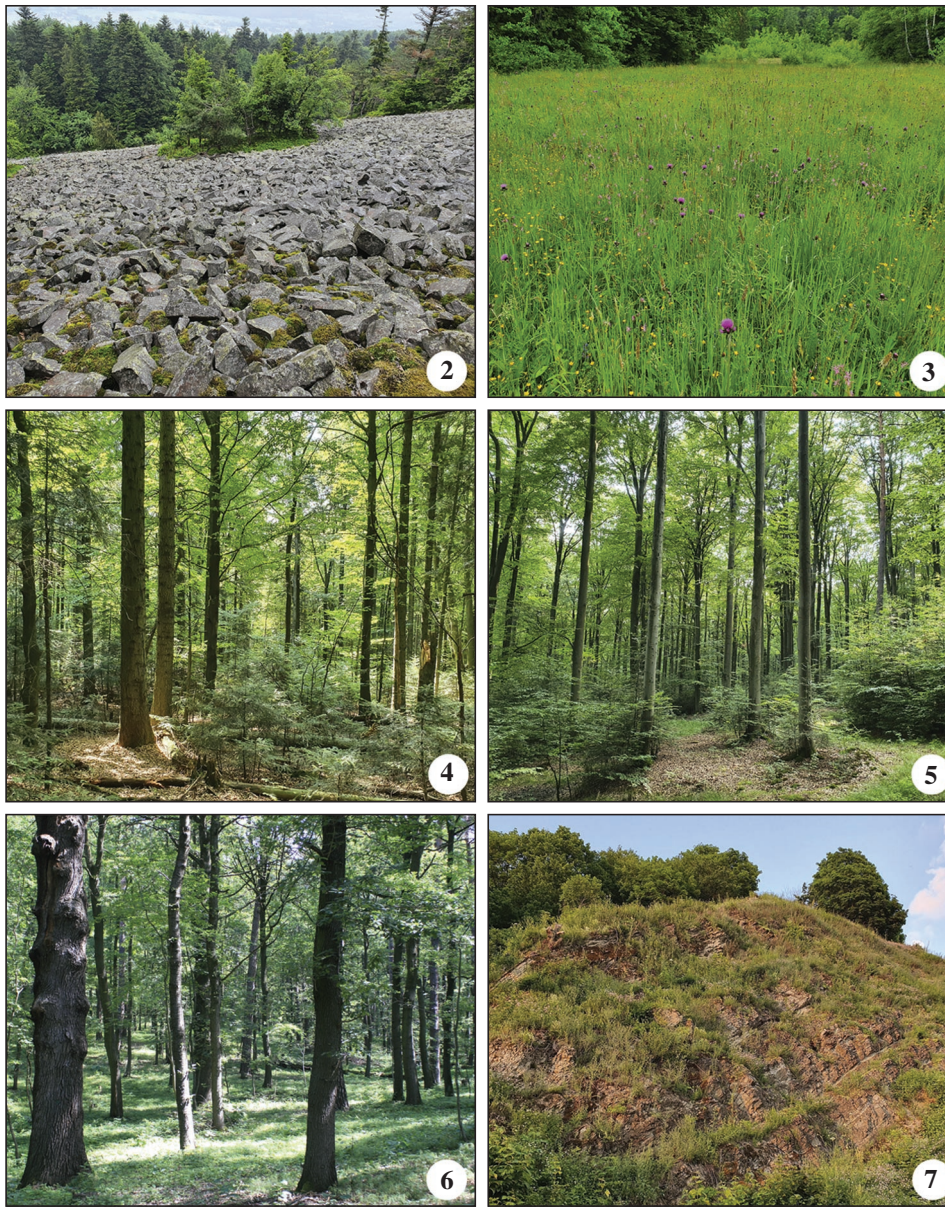

Figs 2-7.– 2. Part of the scree slope (gołoborze) on the northern side of the Łysogóra Range near its highest point (Łysiec). **3.** Part of a woodland meadow ecosystem at the Podgórze locality. **4.** Part of the upland mixed fir forest ecosystem on a slope of the Łysogóra Range. **5.** Part of the ecosystem including the mountain foreland form of the fertile Carpathian beech association on a slope of the Klonów Range. **6.** Part of the upland oak-hornbeam forest ecosystem with a varied tree stand on a slope of the Mount Chełmowa Góra. **7.** Part of the south-west facing xerothermic sward on the Skarpa Zapusty scarp slope.

Table 1.– Systematic list of noctuid species (Lepidoptera: Noctuoidea: Nolidae, Erebidae, Noctuidae) recorded at 14 localities in the Świętokrzyski National Park (Poland) in 2008-2020. * Species described in detail, ** The Roman numerals indicate months, the Arabic numerals in brackets the 10-day period in a month (1 - early, 2 - mid-, 3 - late).

Species *	Obwód Klonów	Gajówka Kąty	Podgórze	Miejska Góra	Święta Katarzyna	Dol. Czarnej Wody	Dąbrowa	Kakonin	Trzcianka	Święty Krzyż	Hucisko	Las Serwis	Chełmowa Góra	Skarpa Zapusty	TOTAL	Flight period **
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Erebidae: Herminiinae																
Paracolax tristalis (Fabricius, 1794)											1	1			2	VII(2)
Macrochilo cribrumalis (Hübner, 1793)						2	1								3	VIII (1)
Herminia tarsicrinalis (Knoch, 1782)	1	7		3				2		2	4		5	6	30	VI (1)-VII(2)
Herminia tarsipennalis (Treitschke, 1835)	6	16	3		1	2	7	4	9	9	8	2	6	2	75	VI(1)-VII(1)
Herminia grisealis ([Denis & Schiffermüller], 1775)	14	21			1	1		1	15	19	6		1	1	80	VI(1)-VIII(2)
Polypogon tentacularia (Linnaeus, 1758)					1										1	VII(1)
Pechipogo strigilata (Linnaeus, 1758)	6	8			2		7		7	1	1		18	6	56	VI(1)-VII(3)
Hypeninae																
Hypena proboscidalis (Linnaeus, 1758)	49	103	14	25	40	16	48	64	32	28	19	17	112	10	577	V(3)-VII(2), VIII(1)-X(1)
Hypena rostralis (Linnaeus, 1758)	1														1	20 VIII 2020
Hypena crassalis (Fabricius, 1787)	2	17			1		5	4	18	35	1		2		85	V(3)-VIII(1)
Rivulinae																
Rivula sericealis (Scopoli, 1763)	33	308	35	64	51	27	430	10	51	46	37	93	65	3	1253	V(3)-VII(3), VIII(1)-X(1)
Scoliopteryginae																
Scoliopteryx libatrix (Linnaeus, 1758)				2	1	1	5	5	6	4	3		1		28	VI(2)-VII(3), IX(1)-V(2)
Hypenodinae																
Schrankia costaestrigalis (Stephens, 1834)		3													3	VIII(3)-IX(1)
Schrankia taenialis (Hübner, [1809])*										1					1	VII(1)
Boletobinae																
Parascotia fuliginaria (Linnaeus, 1761)										1					1	23 VII 2020
Aventiinae																
Laspeyria flexula ([Denis & Schiffermüller], 1775)	11	21	5	3	3	3	15	4	4	10	11	1	1	1	93	VI(2)-VII(3)
Phytometrinae																
Phytometra viridaria (Clerck, 1759)				1											1	VII(1)

Colobochyla salicalis ([Denis & Schiffermüller], 1775)		16	4		6	7	8		5	7	5	2	2		62	V(3)-VI(3)
Trisateles emortualis ([Denis & Schiffermüller], 1775)	4	5			1		1		2	4	4		1		22	V(3)-VII(3)
Erebinae																
Catocala fraxini (Linnaeus 1758)	14	16	3	1	8		9	8	11	9	5	1	1	1	87	VIII(2)-X(3)
Catocala sponsa (Linnaeus, 1767)							2								2	VII(2-3)
Catocala promissa ([Denis & Schiffermüller], 1775)			1				3								4	VI(3)-VII(1)
Catocala nupta (Linnaeus, 1767)	1			1	1		1		5	3	2		3		17	VIII(1)-X(1)
Catocala elocata (Esper, 1787)					1										1	IX(1)
Catocala electa (Vieweg, 1790)*			3											3	6	VIII(3)-IX(3)
Catocala fulminea (Scopoli, 1763)				2	1		7	2	4			1	5		22	VII(2)-VIII(3)
Minucia lunaris ([Denis & Schiffermüller], 1775)					1					1					2	V(3)-VI(1)
Lygephila pastinum (Treitschke, 1826)				8			2		5		1		1		17	VI(3)-VII(2)
Euclidia mi (Clerck, 1759)			1			1								1	3	V(3)-VI(1)
Euclidia glyphica (Linnaeus, 1758)						1						2		1	4	V(3)-VI(2)
Nolidae: Nolinae																
Meganola strigula ([Denis & Schiffermüller], 1775)						1	1								2	VI(3)
Meganola albula ([Denis & Schiffermüller], 1775)	2	8		30		8	40				7	1	7		103	VII(1)-VIII(1)
Nola cuculatella (Linnaeus, 1758)	1						2								3	VI(3)-VII(3)
Nola aerugula (Hübner, 1793)	4	12		1		5	7					1	3		33	VII(1-3)
Nola cristatula (Hübner, 1793)*				1									1		2	VII(2)
Eariadinae																
Earias clorana (Linnaeus, 1761)		11		10	8		17		12	8	11	6	4		87	VI(3)-VIII(2)
Chloephorinae																
Nycteola revayana (Scopoli, 1772)	3	5				2	2	2	3	1			1		19	VI(1)-VII(2), IX(1)-IV(3)
Nycteola degenerana (Hübner, [1799])*	1						3								4	IV(3), VII(3)
Pseudoips prasinana (Linnaeus, 1758)	8	21	6		4	5	8	3	9	11	7	1	1		84	VI(1)-VII(3)
Noctuidae: Plusiinae																
Lamprotes c-aureum (Knoch, 1781)*	1						1								2	VII(1-3)
Diachrysia chrysitis (Linnaeus, 1758)	9	49	12	177	45	6	52	5	45	29	34	17	50	12	542	V(3)-VII(1), VII(3)-X(1)
Diachrysia stenochrysis (Warren, 1913)	3	27	7	33	18	3	21	4	16	17	21	4	16	10	200	V(3)-VII(1), VII(3)-X(1)
Macdunnoughia confusa (Stephens, 1850)		8		19	4		1		5	4	2		14	4	61	V(3)-VI(3), VII(2)-IX(1)
Plusia festucae (Linnaeus, 1758)		5		9		1	3		6		3	1			28	VI(2)-VIII(3)
Autographa gamma (Linnaeus, 1758)	15	52	21	75	24	12	28	4	74	54	49	8	30	9	455	V(3)-VI(2), VII(2)-IX(2)
Autographa pulchrina (Haworth, 1809)		7	1		4		3		8	3			1		27	VI(2)-VII(3)

Autographa buraetica (Staudinger, 1892)		1					2		2	1					6	VI(3)-VII(3)
Autographa bractea ([Denis & Schiffermüller], 1775)				1			1								2	VII(2)
Abrostola tripartita (Hufnagel, 1766)	1	7	2	3	14		4	4	4	2	5	1	13		60	V(2)-VI(3), VII(2)-VIII(3)
Abrostola asclepiadis ([Denis & Schiffermüller], 1775)		1		1										2	4	V(1)- VI(2), VII(2)
Abrostola triplasia (Linnaeus, 1758)	1	8	1	12	4		2	7	5	3	7	3	1		54	V(2)-VI(3), VII(1)-VIII(3)
Eustrotiinae																
Deltote pygarga (Hufnagel, 1766)	34	224	17	14	20	28	75	15	28	32	41	2	28	9	567	V(3)-VIII(1)
Deltote uncula (Clerck, 1759)		7				5	2			4					18	VI(1)-VII(3)
Deltote bankiana (Fabricius, 1775)		18		11	1	2	58		7		2	1	11	1	112	VI(1)-VII(3)
Acontia trabealis (Scopoli, 1763)			2	3			3				4		1	1	14	VI(3)-VIII(2)
Pantheinae																
Panthea coenobita (Esper, 1785)	4	6	1				1		8	9					29	VI(1)-VII(3)
Colocasia coryli (Linnaeus, 1758)	105	68	20	12	55		25	58	25	22	23	28	23	3	467	IV(1)-VI(2), VII(1)-VIII(3)
Dilobinae																
Diloba caeruleocephala (Linnaeus, 1758)	1	12		1			17	15	9	1	6	5	3		70	IX(2)-X(3)
Acronictinae																
Moma alpium (Osbeck, 1778)	3	8	3				4	4	7	5	1				35	V(2)-VI(3), VII(2)-VIII(1)
Acronicta alni (Linnaeus, 1767)		17	4		3		7		12	7	4	1			55	V(2)-VI(3)
Acronicta cuspis (Hubner, [1813])									2		1				3	VII(1-3)
Acronicta psi (Linnaeus, 1758)		9		3			3	1	11	5			1	1	34	V(2)-VI(2), VII(2)-VIII(3)
Acronicta aceris (Linnaeus, 1758)											1				1	23 VII 2020
Acronicta leporina (Linnaeus, 1758)				5			4		9	8					26	VI(1-3), VII(2)-VIII(3)
Acronicta megacephala ([Denis & Schiffermüller], 1775)	4	13	5	12	5	4	13	5	12	11	7	3	2		96	V(2)-VI(2), VII(1)-VIII(2)
Acronicta strigosa ([Denis & Schiffermüller], 1775)	1														1	VI(3)
Acronicta auricoma ([Denis & Schiffermüller], 1775)		6	1	5	1	2	1		7	4	3		1		31	V(1)-VI(2), VII(2)-VIII(2)
Acronicta rumicis (Linnaeus, 1758)	5	32	7	6	26	7	9	17	24	17	12	3	27	2	194	V(1)-VI(2), VII(1)-VIII(3)
Craniophora ligustri ([Denis & Schiffermüller], 1775)		12	6	4	4		2	2	9	5	6	2	1		53	V(2)-VI(3), VII(2)-VIII(3)
Simyra albovenosa (Goeze, 1781)				1			1				2	4			8	IV(3)-VI(2), VII(1-3)
Cuculliinae																
Cucullia fraudatrix (Eversmann, 1837)											1				1	VII(1)
Cucullia artemisiae (Hufnagel, 1766)				1											1	VII(2)
Cucullia umbratica (Linnaeus, 1758)		5		16	1	1			3	1	3				30	VI(1)-VII(3)
Cucullia chamomillae ([Denis & Schiffermüller], 1775)				1							1				2	VI(2)
Cucullia asteris ([Denis & Schiffermüller], 1775)		1		11					3		2				17	V(3)-VI(3)

Shargacucullia scrophulariae ([Denis & Schiffermüller], 1775)	1													1	2	VI(1)
Shargacucullia lychnitis (Rambur, 1833)		1													1	VI(3)
Shargacucullia verbasci (Linnaeus, 1758)	1	2			1			1							5	V(2)-VII(1)
Amphipyrinae																
Amphipyra pyramidea (Linnaeus, 1758)	3	7	1		2	3		2	8	5			1		32	VIII(2)-X(1)
Amphipyra berbera Rungs, 1949	6	5	1	1	2	5	2	1		2			1		26	VII(3)-X(2)
Amphipyra perflua (Fabricius, 1787)*	1	3					1	1	3						9	VII(2-3)
Amphipyra livida ([Denis & Schiffermüller], 1775)		1			1		2			1		1			6	VIII(2)-IX(1)
Amphipyra tragopoginis (Clerck, 1759)				4	1		5			6	2	1	1	3	23	VII(3)-X(3)
Psaphidinae																
Asteroscopus sphinx (Hufnagel, 1766)		8					16				3	1	2		30	X(1-3)
Brachionycha nubeculosa (Esper, 1785)		5					7			3					15	III(3)-IV(1)
Allophyes oxyacanthae (Linnaeus, 1758)	10	21		3		12	28	16	17	12	7	3	13	2	144	IX(2)-X(2)
Oncocnemidinae																
Calophasia lunula (Hufnagel, 1766)		1													1	VI(1)
Condicinae																
Eucarta virgo (Treitschke, 1835)		12		84			11			5	9	38	5		164	V(3)-VI(3), VII(2)-VIII(2)
Heliothinae																
Heliothis viriplaca (Hufnagel, 1766)				18								1			19	V(3)-VI(1), VII(2)-VIII(1)
Heliothis adaucta (Butler, 1878)				5											5	VII(3)-VIII(1)
Helicoverpa armigera (Hübner, [1808])				1	2					11				1	15	VIII(2)-IX(3)
Pyrrhia umbra (Hufnagel, 1766)		3		156	1				2	6	4	9	8		189	V(2)-VI(3), VII(2)-VIII(2)
Eriopinae																
Callopistria juventina (Stoll, 1782)		1	1	1				3	1	2			2		11	VII(1-3)
Bryophilinae																
Cryphia algae (Fabricius, 1775)	1				2		2	3	2	8		3		2	23	VII(2)-VIII(2)
Xyleninae																
Caradrina morpheus (Hufnagel, 1766)		9		4	2			2			1	10	6	8	42	VI(3)-VII(3)
Hoplodrina octogenaria (Goeze, 1781)	2	76	12	45	45	8	70	52	31	21	42	58	87	27	576	VI(2)-VIII(1)
Hoplodrina blanda ([Denis & Schiffermüller], 1775)		9	1	2	1	7	21	3	11	8	13	3	5	3	87	VI(2)-VII(3)
Hoplodrina respersa ([Denis & Schiffermüller], 1775)							4		3	31				3	41	VI(2)-VII(3)
Hoplodrina ambigua ([Denis & Schiffermüller], 1775)		16	4	66	7		7	9	7	21	24	31	15		207	V(3)-VI(3), VII(2)-IX(1)
Chilodes maritima (Tauscher, 1806)				6											6	VIII(1)
Athetis furvula (Hübner, [1808])*										1				7	8	VII(2-3)

Charanyca trigrammica (Hufnagel, 1766)	1	21	3	18	7		31	3	8	3	6	17	20	5	143	V(3)-VI(3)
Charanyca ferruginea (Esper, 1785)	6	16	7	4	5	14	8	9	11	7	3	9	5	5	109	VI(1)-VII(3)
Dypterygia scabriuscula (Linaeus, 1758)	2	12	4	3	5	2	12	4	9	8	7	3	5	4	80	V(3)-VI(3), VII(2)-VIII(3)
Talpophila matura (Hufnagel, 1766)		6	1				7		4	3		1		2	24	VIII(1-3)
Trachea atriplicis (Linnaeus, 1758)	3	31	11	28	8		5	19	15	11	14	9	4	2	160	V(3)-VI(3), VII(2)-VIII(3)
Euplexia lucipara (Linnaeus, 1758)	4	8	5	1	5		3	5	12	7	8	6	1	1	66	V(3)-VII(2)
Phlogophora meticulosa (Linnaeus, 1758)	2	1		2				6	9	5	4	12	4	1	46	VIII(2)-IX(2)
Phlogophora scita (Hübner, 1790)*		6							4	3					13	VI(3)-VII(2)
Hyppa rectilinea (Esper, 1788)			1							10					11	VI(1-2)
Actinotia polyodon (Clerck, 1759)		12	2	53	12		11	7	7	17	27	23	5		176	V(2)-VII(1), VII(3-VIII(3)
Elaphria venustula (Hübner, 1790)		9	3	9	4	1	4		12	1	7			1	51	VI(1)-VII(1)
Pseudeustrotia candidula ([Denis & Schiffermüller], 1775)		7	1	21			18	1	6	3	5	1	2		65	VI(1)-VII(2), VIII(1)-IX(1)
Ipimorpha retusa (Linnaeus, 1761)		6	1		2		5		3	1	2		2	2	24	VII(2)-VIII(1)
Ipimorpha subtusa ([Denis & Schiffermüller], 1775)	2	4	2	4	3		5	11	2	1	5	1			40	VII(2)-VIII(2)
Ipimorpha contusa (Freyer, 1849)*							3								3	VII(1-2)
Enargia paleacea (Esper, 1788)		5	4	2	2		7	3	3	2		1	1		30	VII(1)-VIII(1)
Cosmia pyralina ([Denis & Schiffermüller], 1775)		7	2	10	1	1	11	3	8		13	7	30		93	VI(3)-VII(3)
Cosmia trapezina (Linnaeus, 1758)	37	16	3	2	7		5	9	5	12	2		10	1	109	VI(3)-VIII(3)
Xanthia togata (Esper, 1788)	1	6		2			6	2	4	7	1	2	3	2	36	VIII(3)-IX(3)
Xanthia icteritia (Hufnagel, 1766)	1	8		15	1	1	5	3	6	5	2	12	8	2	69	VIII(3)-IX(3)
Tiliacea aurago ([Denis & Schiffermüller], 1775)	20								5	6	6		2		39	IX(1)-X(1)
Tiliacea citrago (Linnaeus, 1758)		2						1	2				1		6	IX(1-3)
Agrochola lychnidis ([Denis & Schiffermüller], 1775)		11		4	1		3		8	7	6		2		42	IX(1)-X(1)
Agrochola circellaris (Hufnagel, 1766)	3	23			4		7	6	12	14	11	5	6		91	IX(2)-X(3)
Agrochola lota (Clerck, 1759)	1	1			2		1				2		6		13	IX(2)-X(2)
Agrochola macilenta (Hübner, [1809])	4	11		1	3		5	2	7	8	4		7		52	IX(1)-X(3)
Agrochola nitida ([Denis & Schiffermüller], 1775)													1		1	X(1)
Agrochola helvola (Linnaeus, 1758)		8		5		5	3		5		3		2		31	IX(2)-X(3)
Agrochola litura (Linnaeus, 1758)	2	7		11	4		2	1	4	4	2	3	7	4	51	IX(2)-X(2)
Eupsilia transversa (Hufnagel, 1766)	2	23	4	3	4	3	9	5	12	9	6	3	2	4	89	IX(2)-IV(3)
Conistra vaccinii (Linnaeus, 1761)	5	34	7	37	53	7	82	42	31	21	11		25		355	IX(1)-V(1)
Conistra ligula (Esper, 1791)					1		2		2		1		3		9	IX(2)-IV(2)
Conistra rubiginosa (Scopoli, 1763)									3	1					4	X(1-2)
Conistra rubiginea ([Denis & Schiffermüller], 1775)		2			1		3	5	1	2	5				19	IV(2)-V(1)

Conistra erythrocephala ([Denis & Schiffermüller], 1775)							1						1		2	IV(1)-V(1)
Brachylomia viminalis (Fabricius, 1776)	13	5	2	2	4	4	17	3	7	8		1	1		67	VII(1)-VIII(1)
Lithophane socia (Hufnagel, 1766)	1	2	1		1	1	2		1	2					11	IX(3)-IV(2)
Lithophane ornitopus (Hufnagel, 1766)	1			1		1	6			3	2				14	IX(3)-IV(3)
Lithophane furcifera (Hufnagel, 1766)	1	4					1		2				2		10	IX(3)- IV(3)
Xylena exsoleta (Linnaeus, 1758)				1											1	IV(1)
Atypha pulmonaris (Esper, 1790)	1														1	VI(3)
Parastichtis suspecta (Hübner, [1817])		1			1		3							1	6	VII(2)-VIII(2)
Apterogenum ypsillon ([Denis & Schiffermüller], 1775)				2			2					1	1		6	VII(2-3)
Griposia aprilina (Linnaeus, 1758)		2		1			2			1					6	IX(3)-X(1)
Dichonia convergens ([Denis & Schiffermüller], 1775)*													3		3	IX(3)-X(2)
Mniotype satura ([Denis & Schiffermüller], 1775)	5	6	2			5	5	4	3	4	3	1	9	2	49	IX(1)-X(1)
Apamea monoglypha (Hufnagel, 1766)	5	13		26	22	2	7	7	6	12	36	6	2		144	VI(3)-VIII(1)
Apamea syriaca Osthelder, 1933*	2			14	9		5	3	2	5	15	5	11	3	74	VI(2)-VII(2)
Apamea lithoxylaea ([Denis & Schiffermüller], 1775)				1								1			2	VII(1)
Apamea crenata (Hufnagel, 1766)	2	7	1	2	12	1	9	3	2	2			4		45	V(3)-VII(1)
Apamea epomidion (Haworth, 1809)			1						1		1				3	VI(3)-VII(2)
Apamea lateritia (Hufnagel, 1766)										2					2	VII(2)
Apamea remissa (Hübner, [1809])		2		8	1		2		3	1	5	1	1		24	VI(1)-VII(3)
Apamea unanimis (Hübner, 1813)				1	2						1				4	VI(2-3)
Apamea anceps ([Denis & Schiffermüller], 1775)				4	1		2				2				9	VI(1-3)
Apamea sordens (Hufnagel, 1766)	3	7	2	29	25	2	4	8	4	12		2	5		103	V(3)-VII(1)
Apamea scolopacina (Esper, 1788)	1	31	7			1	5	3		2	3		1		54	VII(1-2)
Lateroligia ophiogramma (Esper, 1794)	1	25	3	7	1		3					1			41	VII(1-3)
Oligia strigilis (Linnaeus, 1758)	1	17	7	81	31	7	23	10	35	27	42	6	38	13	338	VI(1)-VII(3)
Oligia latruncula ([Denis & Schiffermüller], 1775)	10	43	7	228	131	14	76	14	52	32	71	12	83	12	785	VI(1)-VII(3)
Oligia versicolor (Borkhausen, 1792)	1	2	1	16	5	3	4	8	9	8	1	4	7	3	72	VI(1)-VII(3)
Oligia fasciuncula (Haworth, 1809)		1													1	VI(3)
Mesoligia furuncula ([Denis & Schiffermüller], 1775)				12	3		5	1		2		9	6	4	42	VII(2)-VIII(3)
Mesapamea secalis (Linnaeus, 1758)	7	15		11	18	1	3	3	8	19	17	11	7	3	123	VII(1)-VIII(3)
Mesapamea secalella Remm, 1983	4	2		2	7		2		4	9	5		2	1	38	VII(1)-VIII(3)
Eremobia ochroleuca ([Denis & Schiffermüller], 1775)*											1				1	VII(3)
Xylomoia graminea (Graeser, 1889)*							1				1	1	2		5	VI(1-3)
Luperina testacea ([Denis & Schiffermüller], 1775)		1		1					1					3	6	VIII(2)-IX(1)

Amphipoea oculea (Linnaeus, 1761)		3	1	12	1		3	5	5	2	7	6	2		47	VII(1)-VIII(3)
Amphipoea fucosa (Freyer, 1830)		8		34	1		4	5	7	5	28	10	7	2	111	VII(1)-IX(1)
Hydraecia micacea (Esper, 1789)		11	2	17	4		18		9		9	2	14		86	VII(2)-IX(1)
Hydraecia ultima Holst, 1965*		3		12			3				3	4			25	VII(2)-VIII(3)
Gortyna flavago ([Denis & Schiffermüller], 1775)		2	2			2	6					1	1		14	VIII(2)-IX(2)
Helotropha leucostigma (Hübner, [1808])		4										1			5	VII(3)-VIII(3)
Rhizedra lutosa (Hübner, [1803])							3				1				4	IX(2)-X(3)
Capsula sparganii (Esper, 1790)		1													1	VIII(3)
Lenisa geminipuncta (Haworth, 1809)							2					1			3	VIII(1)
Sedina buettneri (Hering, 1858)							1						1		2	X(1-2)
Photedes minima (Haworth, 1809)					1	1	62		2		1	1	4		72	VI(1)-VII(3)
Photedes fluxa (Hübner, [1809])		7		3	4		16	4	4		2	3	2		45	VIII(3)-IX(3)
Denticucullus pygmina (Haworth, 1809)		3	1	1	1	1	24	2	1			5			39	VIII(2)-IX(3)
Hadeninae																
Anarta trifolii (Hufnagel, 1766)		17		12	1	3		3	12	7	31			1	87	V(3)-VI(3), VII(2)-IX(2)
Lacanobia w-latinum (Hufnagel, 1766)	1	14	5	3	6		3	4	7	4	5	5	9		66	V(3)-VII(1), VII(3)-VIII(3)
Lacanobia splendens (Hübner, [1808])	2	4			1	2	5	1						2	17	VI(3)-VII(3)
Lacanobia oleracea (Linnaeus, 1758)		7	3	11	5	1	9	1	5	7	15	8	2	4	78	V(3)-VI(3), VII(2)-IX(3)
Lacanobia thalassina (Hufnagel, 1766)	69	14	1	53	92	12	41	41	8	24	37	52	62	15	521	V(3)-VII(1), VII(3)-IX(3)
Lacanobia contigua ([Denis & Schiffermüller], 1775)	7	5	3	72	5	5	3	14	7	9	6	31	19	21	207	V(2)-VII(2)
Lacanobia suasa ([Denis & Schiffermüller], 1775)	1	9	2	14	3		3	3	12	6	11	4	8		76	V(3)-VI(3), VII(3)-VIII(3)
Hada plebeja (Linnaeus, 1761)	1	31	9	37	23	3	53	32	23	27	32	54	22	1	348	V(2)-VII(1), VII(3)-IX(2)
Hecatera bicolorata (Hufnagel, 1766)				3						1					4	V(3), VII(3)-VIII(1)
Hadena confusa (Hufnagel, 1766)												2			2	VII(3)
Hadena capsincola ([Denis & Schiffermüller], 1775)	1	4	1	20					1	3	2	1	3		36	VI(1)-VII(1), VII(3)-VIII(3)
Hyssia cavernosa (Eversmann, 1842)*				1											1	V(2)
Sideridis rivularis (Fabricius, 1775)	4	3	1	2	2	3	5		3	5	3	1	6		38	VI(1-3), VII(2)-VIII(2)
Sideridis turbida (Esper, 1790)							3	1							4	VII(3)-VIII(1)
Melanchra persicariae (Linnaeus, 1761)	1	6	2	15	3	3	2	2	5	8	21	1	2		71	VI(1)-VII(3)
Ceramica pisi (Linnaeus, 1758)		2		6	5		7		3	5		3	4		35	VI(1-3), VIII(1-3)
Mamestra brassicae (Linnaeus, 1758)	2		1	1	2		3		2	10	10		1		32	VI(1-3), VIII(2)-IX(1)
Papestra biren (Goeze, 1781)*		3													3	VI(2-3)
Polia bombycina (Hufnagel, 1766)		2		9	1						6	2			20	VI(3)-VII(2)
Polia nebulosa (Hufnagel, 1766)	4	4		3	15		3	3	2	5	7		2	2	50	VI(1)-VII(2)

Mythimna turca (Linnaeus, 1758)		2	1	4		2	3		3		7				22	VI(2)-VII(2)
Mythimna conigera ([Denis & Schiffermüller], 1775)		11	2	52	3	5	7	1	7	9	18	52	9	4	180	VI(2)-VII(3)
Mythimna ferrago (Fabricius, 1787)	3	8	2	61	7		4	6	3	6	4	24	10		138	VI(2)-VII(3)
Mythimna albipuncta ([Denis & Schiffermüller], 1775)	3	21	4	43	14	4	9	19	11	12	38	81	42	29	330	V(2)-VII(1), VII(3)-X(2)
Mythimna vitellina (Hübner, [1808])								1		1					2	VIII(2)-IX(2)
Mythimna pudorina ([Denis & Schiffermüller], 1775)		6		32		11	51		2		17	73	4	1	197	VI(1)-VII(3)
Mythimna straminea (Treitschke, 1825)						2	2		1						5	VI(3)-VII(1)
Mythimna impura (Hübner, [1808])	1	12	3	4	7	14	62		7		9	28	5	1	153	VI(1)-VII(2), VII(3)-IX(2)
Mythimna pallens (Linnaeus, 1758)		17	6	126	5	4	15	4	16	21	23	21	16	41	315	VI(1)-VII(2), VIII(1)-IX(3)
Mythimna l-album (Linnaeus, 1767)			3	16	2	5	3	3		1		4	2	2	41	VI(1)-VII(2), VIII(1)-IX(3)
Leucania obsoleta (Hübner, [1803])		3		1					2	6					12	VI(2)-VII(3)
Leucania comma (Linnaeus, 1761)		2		3	1						1	1			8	VI(3)-VII(2)
Orthosia incerta (Hufnagel, 1766)	4	51	12	28	37	7	95	3	121	62	32	6	128	6	592	IV(1)-V(2)
Orthosia gothica (Linnaeus, 1758)	17	146	17	39	48	11	120	63	142	78	47	9	166	17	920	IV(1)-V(2)
Orthosia cruda ([Denis & Schiffermüller], 1775)		27	5	36	1	1	3	1	5	2	4	5	8		98	IV(1)-V(2)
Orthosia miniosa ([Denis & Schiffermüller], 1775)				1							1				2	IV(3)-V(1)
Orthosia opima (Hübner, [1809])						1									1	IV(1)
Orthosia populeti (Fabricius, 1775)		173	21	122	4		437	23	242	29	49	29			1129	IV(1)-V(1)
Orthosia cerasi (Fabricius, 1775)	7	21	5	2	16	4	240	11	207	54	31	1	5	7	611	IV(1)-V(1)
Orthosia gracilis ([Denis & Schiffermüller], 1775)		4		6	1		3		3	1	2	1	1		22	IV(1)-V(1)
Orthosia munda ([Denis & Schiffermüller], 1775)	2	5	2				2	1	2	3		1			18	IV(1)-V(1)
Panolis flammea ([Denis & Schiffermüller], 1775)		42	7	2	7	3	72	47	7	18		6	7		218	IV(1)-V(3)
Egira conspicillaris (Linnaeus, 1758)				4	4		5	2	12		4		9		40	IV(1)-V(3)
Cerapteryx graminis (Linnaeus, 1758)		6	5	1		2	17	5	3	1	6	1			47	VII(2)-VIII(3)
Tholera cespitis ([Denis & Schiffermüller], 1775)		1										1			2	VIII(3)
Tholera decimalis (Poda, 1761)		1		3				3	2	1	2	3	1		16	VIII(2)-IX(1)
Noctuinae																
Axylia putris (Linnaeus, 1761)		91	15	109	17		5	11	16	9	41	12	26	25	377	V(3)-VII(1), VII(3)-IX(1)
Ochropleura plecta (Linnaeus, 1761)	12	106	17	152	97	21	64	24	42	23	64	68	68	33	791	V(3)-VI(3), VII(2)-VIII(2)
Diarsia mendica (Fabricius, 1775)	40	7	3		8	5	2	5		2	4				76	VI(1)-VII(3)
Diarsia brunnea ([Denis & Schiffermüller], 1775)	12	5	4	2	3	6	7	23	9	13	21	4	2	1	112	VI(1)-VII(3)
Diarsia rubi (Vieweg, 1790)	1	8		5	8		19	1		4	12	7	1		66	V(2)-VI(3), VII(2)-VIII(3)
Noctua pronuba Linnaeus, 1758	172	52	62	23	121	12	52	24	34	291	188	35	161	126	1353	VI(1)-IX(3)
Noctua orbona (Hufnagel, 1766)										1	1		1		3	VI(3)-IX(3)

Noctua interposita (Hübner, 1790)	4	7		4	3	2	3	1	4	7	7	3	2	1	48	VI(3)-IX(2)
Noctua comes Hübner, [1813]	15	1								8	3	3	1	5	36	VI(3)-IX(3)
Noctua fimbriata (Schreber, 1759)	15		4	14	7	4	6	3	16	33	54	5	23	14	198	VII(1)-IX(1)
Noctua janthina ([Denis & Schiffermüller], 1775)	5	16		1	14	3	7	1	12	11	39	4	18	1	132	VII(1)-IX(3)
Noctua janthe (Borkhausen, 1792)	2	8			16	1	5	1	6	1	12	1	7	4	64	VII(2)-IX(2)
Noctua interjecta Hübner, 1803*	3									8	3		4	2	20	VII(3)-VIII(3)
Lycophotia porphyrea ([Denis & Schiffermüller], 1775)		2	2				1		3	4			2		14	VII(3)
Opigena polygona ([Denis & Schiffermüller], 1775)										17	6		1	1	25	VII(1)-IX(2)
Graphiphora augur (Fabricius, 1775)	1	1					1								3	VI(3)-VII(1)
Xestia c-nigrum (Linnaeus, 1758)	45	74	35	321	163	5	92	127	124	276	354	263	167	251	2297	V(3)-VI(3), VII(1)-X(2)
Xestia ditrapezium ([Denis & Schiffermüller], 1775)		21	3	43	4	3	18	2	15	12	7	4	13	8	153	VI(3)-VIII(1)
Xestia triangulum (Hufnagel, 1766)	4	17	2	6	18	3	7	21	3	4	4		19	4	112	VI(3)-VII(3)
Xestia baja ([Denis & Schiffermüller], 1775)	6	8	1	25	13	2	58	8	6	9	9	19	8	8	180	VII(3)-IX(1)
Xestia stigmatica (Hübner, [1813])	9				1				1	2			1	1	15	VII(3)-VIII(3)
Xestia sexstrigata (Haworth, 1809)		11	5	12	3		92	1	13	17	14	74	3	1	246	VIII(1)-IX(2)
Xestia xanthographa ([Denis & Schiffermüller], 1775)	1	19	9	21	7		38	2	17	26	23	41	26	13	243	VIII(2)-IX(2)
Cerastis rubricosa ([Denis & Schiffermüller], 1775)		7	3	9	4	2	24	2	7		6	14	2		80	IV(2)-V(1)
Cerastis leucographa ([Denis & Schiffermüller], 1775)		4					6	1	5	2		1			19	IV(2)-V(1)
Naenia typica (Linnaeus, 1758)						1							1		2	VII(3)
Anaplectoides prasina ([Denis & Schiffermüller], 1775)	1	11	5		4		5		4	5	3		1		39	VI(3)-VII(3)
Euxoa tritici (Linnaeus, 1761)									3						3	VIII(2)
Agrotis bigramma (Esper, 1790)				1											1	VIII(2)
Agrotis ipsilon (Hufnagel, 1766)	1	1	2	1			2		9	7	3		1		27	IV(1)-VI(3), VII(3)-X(2)
Agrotis exclamationis (Linaeus, 1758)	3	41	17	111	38	12	22	12	35	12	49	53	41	34	480	V(3)-VII(3)
Agrotis segetum ([Denis & Schiffermüller], 1775)		8	6	18	3		7	2	17	16	25	11	4	2	119	V(3)-VI(3), VII(3)-X(1)
Agrotis vestigialis (Hufnagel, 1766)		1													1	23 VIII 2020
Total number of species	112	175	107	157	141	92	182	120	160	162	157	132	156	93	261	
Total number of individuals	1010	3122	624	3474	1722	458	3578	1143	2301	2169	2332	1715	2148	918	26714	