Range dynamics of noctuid moths

(Lepidoptera: Noctuoidea:
Erebidae, Euteliidae, Nolidae, Noctuidae)

in north-western Poland

Roman Wąsala

POLISH ENTOMOLOGICAL SOCIETY
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ABSTRACT: This monograph summarizes current knowledge and the results of a long-term study of noctuid moths (Lepidoptera, Noctuoidea: Erebidae, Euteliidae, Nolidae, Noctuidae) in north-western Poland. Fieldwork carried out between 2005-2020 yielded research material in the form of 340 species (67% of the overall noctuid moth fauna of Poland). If we include all the other species recorded in this region since the inception of lepidopterological studies there, we reach a grand total of 376 species (74%) of noctuid moths from the families Erebidae, Euteliidae, Nolidae and Noctuidae.

Seventy of these species are faunistically valuable both in Poland and Europe as a whole. They are rare or very local in Poland, usually stenotopes, often on the verge of extinction in Poland and central Europe. They include the following: *Catocala pacta, Catephia alchymista, Polychrysia moneta, Lamprotes c-aureum, Autographa mandarina, Syngrapha interrogationis, Acronicta menyanthidis, Cucullia lactucae, Cucullia campanulae, Shargacucullia lanceolata, Xylocampa areola, Heliothis ononis, Bryophila ereptricula, Bryophila raptricula, Mormo maura, Lithophane semibrunnea, Lithophane lamda, Dichonia convergens, Dryobotodes eremita, Polymixis polymita, Polymixis flavicincta, Apamea oblonga, Pabulatrix pabulatricula, Eremobia ochroleuca, Archanara neurica, Protarchanara brevilinea, Photedes extrema, Coenobia rufa, Coranarta cordigera, Hadena albimacula, Hadena filigrana, Mythimna litoralis, Diarsia dahlii, Paradiarsia punicea, Eugnorisma glareosa, Xestia agathina, Coenophila subrosea* and *Agrotis ripae.*

The Noctuoidea in north-western Poland are subject to changes characteristic of natural ecosystems. Some of these changes are regressive in that 36 species with historical localities in this region were not found again during the present study. They include: *Catocala pacta, Catephia alchymista, Eutelia adulatrix, Polychrysia moneta, Lamprotes c-aureum, Plusidia cheiranthi, Autographa mandarina, Bryophila ereptricula, Mormo maura, Lithophane semibrunnea, L. lamda, L. consocia, Polymixis polymita, P. flavicincta, Pabulatrix pabulatricula, Coranarta cordigera, Lacanobia aliena, Mythimna litoralis* and *Paradiarsia punicea.*

In contrast, certain progressive changes have become apparent during the last 100 years. This is because some species have expanded their ranges. Eighteen such species were found for the first time in this region, namely, *Nycteola asiatica, Diachrysia stenochrysis, Autographa buraetica, Abrostola asclepiadis, Eucarta virgo, Helicoverpa armigera, Cryphia fraudatricula, Atethmia centrago, Aporophyla nigra, Dichonia convergens, Apamea syriaca, Archanara neurica, Protarchanara brevilinea, Coenobia rufa, Noctua interposita, Xestia agathina, Euxoa vitta* and *Agrotis puta.*

INTRODUCTION

Insects are the most numerous group of organisms the Earth. The changes taking place in their diverse assemblages, both in abundance and species compositions, always affect the ecosystems in which they live. But it is sometimes hard to tell whether these influences are positive or negative. Moreover, insects play a major part in very many processes, such as plant pollination and nutrient cycling, and they are also a source of food for organisms living at higher trophic levels (Mattson & Addy 1975, Morse 1971, Ollerton et al. 2011, Öckinger & Smith 2007, Yang & Gratton 2014).

The greatest threat to insect biodiversity is its dramatic decline. As a result, up to 40% of all insects could become extinct within the next few decades (Hallmann et al. 2017, Lister & Garcia 2018, Sánchez-Bayo & Wyckhuys 2019). In terrestrial ecosystems, the insect orders most susceptible to this regress include the Lepidoptera, Hymenoptera and Coleoptera. Affected are not only stenotopic species, i.e. those that occupy highly specific ecological niches, but also eurytopic ones, i.e. those with a broad range of tolerance. At the same time, the abundances of ecologically plastic species, which are taking over habitats abandoned by stenotopes, are on the increase. Butterflies and moths are no exception. It has been estimated that the number of grassland butterfly species forming populations in Europe fell by one half between 1990-2011. In the Netherlands, their numbers dropped by some 80% in a mere 127 years (1890 – 2017) (van Strien et al. 2019, van Swaay et al. 2016). The trends for moths appear to be similar (Conrad et al. 2002, 2006, Fox 2013, Fox et al. 2014; Groenendijk & Ellis 2011).

Climate change, the loss of habitats, their fragmentation and the deterioration in their quality, along with evolutional-genetic phenomena affecting the tolerance ranges of species, are perceived as the principal causes of the decline in lepidopteran biodiversity. They are bringing about changes in the geographic ranges of these insects, a dynamic process subject to long-term fluctuations (Benton et al. 2002, Conrad et al. 2002, Fox et al. 2014, Nilsson et al. 2008).

Since the mid-19th century, attempts have been made to develop a zoogeographic regionalization for the Palearctic. Initially, they were based on distributions and taxonomic relationships within a wide range of vertebrate families. Many different versions appeared. One of the first was by Wallace (1876), who published a map of the world divided into terrestrial zoogeographic regions. It covered the Palearctic within borders roughly corresponding to the presently accepted ones. Since that time, our knowledge in this respect has expanded greatly,

both for vertebrates and invertebrates. But even though invertebrates make up by far the greater part of overall animal diversity, it is the vertebrates that remain the basic group for examining biogeographic hypotheses that demonstrate a coherent zoogeographic regionalization at the global scale (Holt et al. 2013).

The Lepidoptera have also provided a foundation for designing a zoogeographic regionalization of the Palearctic (Beck et al. 2006, Covell 1984, Heppner 1998, Hrubý 1964, Kostrowicki 1965ab, 1969, Kryzhanovskij 2002, Sohn et al. 2013, Varga 1995, Yakovlev 2015). Unfortunately, however, the effects of those attempts differed widely, as they were not based on a uniform set of criteria. Different authors frequently attributed the same species to different zoogeographic elements. At fault here were the poor recognition of the overall ranges of local faunas, difficulties with identifying species and the confusion of geographic elements with genetic ones. All these difficulties likewise apply to noctuid moths, which have been the subject of multifarious zoogeographic analyses (Adamczewski 1992, Boursin 1964, Covell 1984, Dufay 1962, 1975, Fibiger 1990, 1993, 1997, Fibiger & Hacker 2007, Fibiger et al. 2009, 2010, Goater et al. 2003, Hacker 1989, Hacker et al. 2002, Hrubý 1964, Mikkola et al. 1991, Lafontaine & Wood 1988, Nowacki 1994, 1998, Ronkay & Ronkay 1994, 1995, Ronkay et al. 2001, Varga 2010, Witt & Ronkay 2012, Zilli et al. 2005).

A major problem in zoogeographic research pertaining to the Palearctic is the lack of fixed range boundaries of particular species. One factor responsible for this is their considerable abilities to disperse. An objective zoogeographic regionalization can only be based on reliable knowledge of the range boundaries of the species concerned. Once we know the details of these ranges, we can attempt to explain the origins and translocations of local fauna. Regional faunistic studies (species inventories) carried out using comparable quantitative methods are essential for the proper interpretation of ranges and their large-scale dynamics. The data thus obtained constitute a basis for analysing the spatial differentiation of a region's fauna and for establishing its origin and the directions in which it is changing (Buszko 1990, Gaston 2003, Kostrowicki 1953, 1965ab, 1969).

The state of knowledge of many systematic groups of lepidopterans, noctuid moths (Noctuoidea) among them, remains uneven. Particularly concerning in this respect is the great disproportion in the distribution of areas where faunistic studies of butterflies and moths in Poland have been concentrated, not to mention the fact that much information is outdated and requires confirmation.

In the first half of the 20th century, the best researched regions (provinces) of present-day Poland as regards noctuid moths were Western Pomerania and Lower Silesia (Meyer et al. 1924, 1925, Meyer & Urbahn 1929, 1933, Urbahn & Urbahn 1939, Raebel 1931, Wolf 1935-1944). Their distributions in other parts of the country during that period were summarized by Romaniszyn & Schille (1929). After the Second World War, faunistic studies focused on a few larger and smaller

areas of Poland and usually embraced the whole order of Lepidoptera. At that time the noctuids of southern Poland were well researched. The following areas have been covered in detail: the Pieniny Mts (Błeszyński et al. 1965, Nowacki & Wąsala 2008ab), the Bieszczady Mts and the Przemyśl Foothills (Bielewicz 1973, 1984, Nowacki et al. 1993), the Karkonosze Mts (Chrzanowski & Demski 2000, Nowacki 1998, Nowacki & Wąsala 2021a), the Tatra Mts and the Gubałówka Hill (Batkowski et al. 1972, Buszko et al. 2000), Kraków and its surroundings (Razowski & Palik 1969) and the Nida valley (Kostrowicki 1953, Nowacki & Wąsala 2020). Apart from southern Poland, other areas with well-researched noctuid faunas are those around Toruń (Buszko 1991) and Chełmno (Prüffer & Sołtys 1974), and to a lesser extent the Łódź Upland (Śliwiński & Marciniak 1991) and Warsaw with its surroundings (Winiarska 1992, 2002).

Recent years have witnessed an upsurge in research on the distribution of Noctuoidea in Poland. This has given rise to many regional accounts focusing solely on this superfamily. The noctuid moths of the following areas of eastern Poland have been especially well studied: the Biebrza marshes (Frąckiel & Nowacki 2010), the Augustów Forest (Nowacki & Rudny 1992, Nowacki 1993c, Nowacki 2006a), the Białowieża Primeval Forest (Buszko et al. 1996), central Podlasie (Nowacki & Wasiluk 2004, 2010), Polesie (Nowacki & Hołowiński 1999, 2002, 2010, 2015, 2020, Nowacki et al. 2001) and the Roztocze region (Nowacki 1992). The Sandomierz Forest (Nowacki & Pałka 2015) and Wielkopolska (Nowacki & Wąsala 2018) have also been well covered. At the same time, papers have been published summarizing the current state of research into Noctuoidea in Poland (Nowacki 1994, Nowacki & Wąsala 2017). Recent, concentrated efforts of Polish lepidopterists have yielded first records for Poland of many species of butterflies and moths, including noctuids. During this time, 30 new species have been added to the national checklist of noctuid moths. The latest national checklist of lepidopterans in Poland (Buszko & Nowacki 2017) lists 506 noctuid moth species, although the occurrence of 41 of these after 1960 could not be confirmed. In 2021, one more new species was added – *Acontia candefacta* (Hübner, [1831]) (Hołowiński & Mazur 2021) – bringing the total number of noctuid moths to have been recorded in Poland to 507.

The current state of knowledge of noctuid moths in Poland can thus be regarded as satisfactory and more species new to Poland are unlikely to be found in the foreseeable future. Nonetheless, the degree to which different regions have been studied is uneven: some areas in western and central Poland, for example, have never been covered at all, or else the checklists from those areas require updating. In addition, many studies hitherto undertaken were incidental with regard to both the choice of habitats and the methodology.

Likewise fragmentary is the information available on the range dynamics of noctuid moths in central Europe. This is due mainly to the insufficient

intensity of faunistic surveys, which cover this part of the continent unevenly, and particularly to the very small number of quantitative surveys, which could provide indicators as to the directions of the changes occurring in local faunas. This applies in equal measure to north-western Poland, which boasts numerous, nationally unique habitat types that often govern the occurrence of distinctive plant species and animals living here at the edge of their ranges. Even though faunistic surveys of butterflies and moths have been carried out in Poland (within the present-day borders) for nearly 200 years, the north-west of the country has been studied unevenly and at different intervals of time. The first information we have of the noctuid moths inhabiting this region are in monographs relating to Western Pomerania (Meyer et al. 1924, 1925, Meyer & Urbahn 1929, 1933, Urbahn & Urbahn 1939). Chappuis (1942, 1944) also provides a few noctuid species from the nature reserve at Bielinek on the Oder. Subsequently, information on the subfamilies Noctuinae and Hadeninae, obtained in the Szczecin region between 1958-1962, was published by Węgorek (1966) and Studziński (1979). Towards the end of the 20th century, some more information appeared on the subject of noctuids, including three monographs dealing with these moths in the Bukowa Forest near Szczecin (Nowacki 1993a), the Bielinek on the Oder nature reserve (Nowacki 1993b) and the belt of dunes along the Baltic coast (Nowacki 1994). In addition, single records of nationally rare species are given in Nowacki (1990, 1991b), Blaik (2010), Wąsala (2016) and Wąsala and Matuszewski (2017). Studies of the distributions of Noctuoidea in Poland began to intensify at the turn of the 20th century. They led to the discovery of three noctuid moth species new to Poland in the province of Western Pomerania, namely, *Xylocampa areola* (Esp.) (Nowacki 1990), *Agrotis puta* (Hbn.) (Wąsala & Maciąg 2011) and *Protarchanara brevilinea* Fenn. (Nowacki & Wąsala 2015).

On the one hand, biodiversity decline is intensifying throughout Europe, but on the other, awareness is increasing of the importance of entomology and of the need to counteract these detrimental trends. It is therefore crucial to expand knowledge of the habitat, ecological and biotic requirements of an area's lepidopteran fauna and to specify precisely the current ranges of the numerically dominant species groups. To be sure, one such group is the superfamily Noctuoidea.

The research hypothesis underlying this paper assumes that between the inception of lepidopterological studies in north-western Poland and the present day, significant changes have occurred in the species composition and distributions of the noctuid moth fauna of this region.

In order to test this hypothesis, the following research tasks were undertaken:
– to produce an updated checklist of noctuid moths in north-western Poland;
– to establish the ranges of particular species within the study area.

For this analysis to provide a reliable picture of the changes taking place in the noctuid moth fauna of north-western Poland, the results of the current study had to be compared with historical data, derived mainly from the monograph by Urbahn & Urbahn (1939). The present monograph summarizes knowledge and the results of a long-term study of noctuid moths (Lepidoptera: Noctuoidea) in this part of the country.

STUDY AREA

This study of noctuid moths took place in north-western Poland, specifically in the western part of the province of Western Pomerania, the northern part of Lubuskie province and the western edge of Wielkopolska province (Fig. 1). The permanent research localities were situated mainly along the Baltic coast

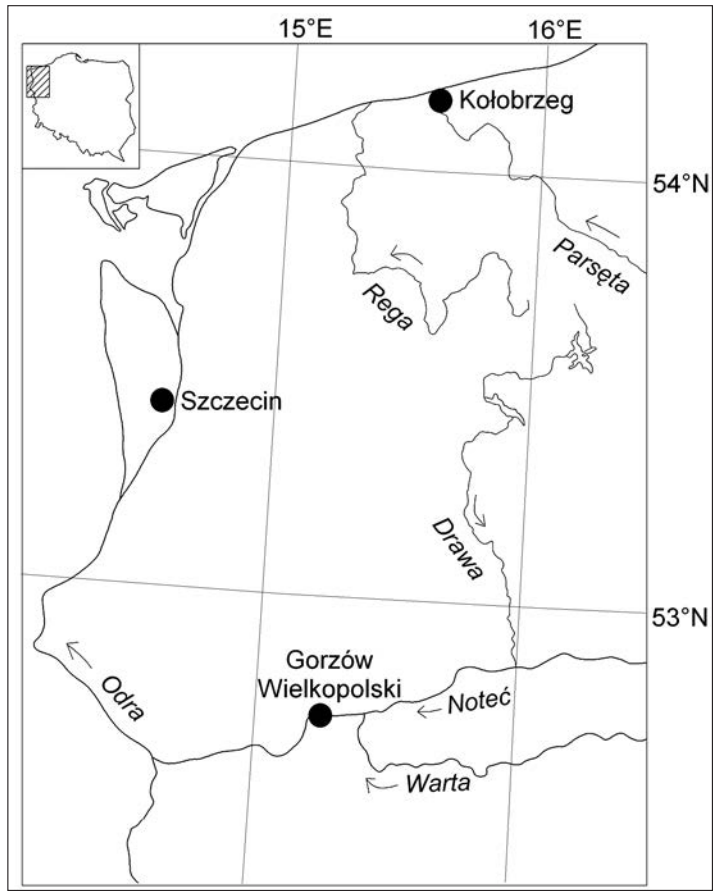

Fig. 1. The study area on a map of Poland.

and in the valleys of larger rivers, like the Odra, Warta and Rega. These are natural wildlife corridors facilitating the dispersal and movement of species from a great many systematic groups, both plants and animals. It is a highly diverse region and according to the physiographic regionalization of Poland by KONDRACKI (2002), it lies in the Central European Lowland Province and includes the following physiographic units:

Region: Southern Baltic Coast

Macroregion: Szczecin Coast
- Mesoregions:
  - 313.21 Uznam and Wolin
  - 313.22 Trzebiatów Coast
  - 313.23 Wkrze (German: Uecker) Plain (Police Plain)
  - 313.24 Lower Odra Valley
  - 313.25 Goleniów Plain
  - 313.26 Szczecin Uplands
  - 313.27 Bukowe Hills
  - 313.28 Wełtyń Plain
  - 313.31 Pyrzyce-Stargard Plain
  - 313.32 Nowogard Plain
  - 313.33 Gryfice Plain

Macroregion: West Pomeranian Lake District
- Mesoregions:
  - 314.41 Myślibórz Lake District
  - 314.42 Choszczno Lake District
  - 314.43 Ińsko Lake District
  - 314.44 Łobez Upland
  - 314.45 Drawsko Lake District

Macroregion: South Pomeranian Lake District
- Mesoregions:
  - 314.61 Gorzów Plain
  - 314.62 Dobiegniew Lake District
  - 314.63 Drawsko Plain

Macroregion: Toruń-Eberswald Ice Marginal Valley (Urstromtal)
- Mesoregions:
  - 315.32 Freienwald Basin
  - 315.33 Gorzów Basin

The natural border of the study area in the north is the Baltic Sea, while in the west it is mostly bounded by the River Odra. To the south, the boundary of

the study area, running roughly along the line of the River Warta, abuts on the Łagów Lake District (314.42) and the Wielkopolska Lake District (315.51). The eastern boundary is the most complex one, running approximately along longitude 16°E on a line joining Kołobrzeg, Drawsko Pomorskie, Krzyż Wielkopolski and Międzychód. The localities at its extremities are Świnoujście in the north-west, Kostrzyn nad Odrą in the south-west, Międzychód in the south-east and Kołobrzeg in the north-east. According to the UTM (Universal Transverse Mercator) grid, the system on which invertebrate recording in Europe is based (Mroczkowski 1976), the study area lies within the large squares VV, WV, VU, WU, WA and its borders are delineated by smaller 10 x 10 km squares.

The study area is highly diverse. Maritime and continental climate influences intermingle there, and local factors further modify weather phenomena. The moraine embankment that extends diagonally from the south-west to the north-east clearly separates the magnitudes of insolation, temperature, precipitation and wind speed on either side of it. In the northern and western part, the amplitudes of annual, seasonal and diurnal air temperatures are small, humidity and windiness are high, summers are cooler and winters short and mild, and levels of precipitation are fairly high. With increasing distance from the sea and farther to the east, temperatures are higher in summer but lower in winter, diurnal temperature amplitudes are considerable, winter lasts longer and snow cover is more persistent. The proximity of the Baltic Sea and the Szczecin Lagoon locally modify the various meteorological factors. The mean annual air temperature in the study area varies from 7.0 to 8.5°C, the annual precipitation from 490 to 770 mm. The prevailing winds blow from the west and south-west (Woś 1999).

The Pleistocene glaciations exerted the greatest influence on the formation of contemporary plant communities in the study area. During the interglacials, the vegetation cover returned once the ice-sheet had receded. But as plants subsequently began to extend their ranges in Europe in response to the changing climate, their northward movement was blocked by the continent's latitudinal mountain ranges, as a result of which many were unable to survive (Stankowski 1978, Środoń 1972). The contemporary plant cover of Poland was formed after the last Baltic glaciation, which began to recede 12 000 years BP. During the next 2 000 years, the landscape, relieved of the ice sheet, was dominated by tundra, and in time by open birch and birch-pine forests. Over 9 000 years BP, elm, common hazel, black alder and ash began to spread, and ca 8 000 years BP lime and oak tree made their appearance. During the Atlantic period, multi-species deciduous forests spread. At the same time, human influences on the plant cover began to make themselves felt: cultivated plants and their accompanying herbaceous vegetation and also meadow plants were becoming ever larger constituents of the flora. This was the upshot of the Neolithic revolution.

Photo 1. Emergent vegetation communities near Kostrzyn („Ujście Warty" National Park).

Photo 2. Reedbeds at Gryfino in the Odra Valley.

Photo 3. Part of a transition bog near the Wolin National Park.

Photo 4. Meadow communities near Słońsk in the Warta valley.

Photo 5. Corynephorus sward in the „Porzecze” Nature-Landscape Park.

Photo 6. Grey dune at Mrzeżyno.

Photo 7. Psammophilous sward in the „Wrzosowiska Cedyńskie im. inż. Wiesława Czyżewskiego" nature reserve.

Photo 8. White dune at Mrzeżyno.

Photo 9. Alder swamp at the Raduń locality.

Photo 10. Crowberry-pine forest at Mrzeżyno.

Photo 11. Acidophilous oak forest near Kaleńsko.

Photo 12. Pomeranian beech forest at Międzyzdroje.

Later transformations of the plant cover were due both to the changing climate and the ever more intensive activities of humans (Środoń 1972).

The varied geology, climate and hydrology of this area have contributed to the formation of diverse ecosystems with characteristic pant communities. In north-western Poland they were identified and classified after Matuszkiewicz (2017). Starting with the wettest habitats, they are:

- communities of aquatic vegetation, mainly from the class *POTAMETEA*, occurring in lakes, ponds, rivers and oxbows;
- emergent vegetation communities from the class *PHRAGMITETEA*, occurring mainly around the edges and in shallow waters of lakes and oxbows, in open, waterlogged habitats and among alder scrub and woodland in river valleys (Photos 1, 2);
- fen and transition bog communities from the class *SCHEUCHZERIO-CARICETEA* and damp *Carex* meadows, which have formed in moraine depressions, silted-up lakes and river valleys (Photo 3);
- communities of flower-rich meadows with a large proportion of herbaceous vegetation from the class *MOLINIO-ARRHENATHERETEA*, periodically mown or used as pasture, on a mineral substrate, particularly in river valleys (Photo 4);
- psammophilous sward communities from the class *KOELERIO GLAUCAE-CORYNEPHORETEA CANESCENTIS* and open heathlands from the class *NARDO-CALLUNETEA*, common on insolated, sandy dunes (Photos 5-7);
- communities from the class *AMMOPHILETEA* growing on coastal white dunes (Photo 8);
- ecotone communities from the class *TRIFOLIO-GERANIETEA SANGUINEI*, taking the form of xerothermic scrub and swards;
- communities of willow woodland and scrub of the class *SALICETEA PURPUREAE* and alder woodland and scrub of the class *ALNETEA GLUTINOSAE*, with large proportions of willow and alder, common on periodically inundated, damp peaty soils, especially in river valleys (Photo 9);
- coniferous forest communities of the class *VACCINIO-PICEETEA*, of which there are various types depending on the humidity and fertility of the habitat. These are mainly dry pine forest, moist pine forest and mixed pine forest, marshy pine forest and coastal crowberry pine forest (Photo 10);
- broad-leaved woodland communities of the class *QUERCO-FAGETEA*, principally of beech, oak-hornbeam, oak, or mixed woodlands, as well as the highly distinctive riparian woodland communities in the river valleys (Photos 11-12);
- nitrophilous communities of crops of the classes *SECALIETEA* and *CHENOPODIETEA*, and also waste ground communities of the classes *ARTEMISIETEA, PLANTAGINETEA MAJORIS* and *EPILOBIETEA ANGUSTIFOLII*, patches of which are found around human habitations, roadsides and felled areas in woodlands.

Research material was obtained at 30 localities, mainly along river valleys and the Baltic coast (Fig. 2). Starting from the most north-westerly one, they are:

1. Świnoujście VV56 (53°54'58.53"N, 14°18'37.12"E) – in the eastern part of the town; a coastal dune surrounded mainly by coniferous forest communities; farther away, a damp birch wood, patches of alder swamp and waste ground communities.
2. Karsibór VV56 (53°51'1.37"N, 14°18'9.24"E) – in the southern part of Świnoujście on Karsibór island, next to the Karsibór forester's lodge; in the immediate vicinity, waste ground communities, moist depressions in the ground supporting various species of terrestrial and aquatic plants; farther away, coniferous forest communities merging into mixed woodlands of various types; honeysuckle *Lonicera periclymenum* L. common along woodland paths and on fences in better illuminated areas.
3. Międzyzdroje VV67 (53°56'50.08"N, 14°28'31.98"E) – in the eastern part of the town, at the edge of the Wolin National Park; a coastal cliff surrounded mostly by the Pomeranian beech forest association (*Galio odorati-Fagetum*).
4. Międzywodzie VV88 (54°0'46.17"N, 14°42'8.13"E) – east of the village; coastal dune surrounded mostly by coniferous woodland communities; farther away, damp meadows, patches of alder swamp and waste ground communities.
5. Łukęcin VV98 (54°2'44.42"N, 14°53'22.82"E) – east of the village; a coastal dune supporting moist coniferous forest, often with honeysuckle *Lonicera periclymenum* L. in better insolated spots; meadow communities beyond the forest.
6. Pobierowo VV98 (54°2'54.55"N, 14°55'12.18"E) – west of the village; a coastal dune supporting moist coniferous forest, often with honeysuckle *Lonicera periclymenum* L. in places; farther away, meadow and waste ground communities.
7. Mrzeżyno WA10 (54°7'57.76"N; 15°16'18.26"E) – west of the mouth of the River Rega; a coastal dune surrounded by coastal crowberry pine forest *Empetro nigri-Pinetum* (Photo 10), which merges into various types of deciduous woodland, from alder swamps through riparian forest to mixed forest with a large proportion of beech; farther away, waste ground, meadow and emergent vegetation communities in the Rega valley.
8. Kołobrzeg WA30 (54°10'41.77"N; 15°32'5.65"E) – the western part of the town; a coastal dune surrounded mainly by coniferous forest communities; farther away, wet meadows, patches of alder swamp and waste ground communities.
9. Mszczuje VV54 (53°40'21.95"N, 14°20'46.09"E) – a woodland hamlet lying in the northern part of an extensive cleared area: meadows with varying levels of moisture surrounded by coniferous forest habitats; ca 800 m to the south, a transition bog with characteristic vegetation, such as cranberry *Vaccinium oxycoccos* L. and bog bilberry *Vaccinium uliginosum* L.

10. Myślibórz Wielki VV54 (53°38’45.27”N, 14°17’50.77”E) – southern shore of Lake Myśliborskie Małe, surrounded mainly by alder swamps merging into mixed and coniferous woodland habitats; farther away, waste ground and meadow environments.
11. Zalesie VV53 (53°34’18.80”N, 14°22’27.01”E) – adjacent to the Trzebież forest district office, at the edge of the “Świdwie” nature reserve; the marshland, fens and reedbeds in the vicinity of this building.
12. Raduń VV73 (53°35’23.52”N, 14°36’59.72”E) – on the site of the no longer existing village of Raduń (German: Schwabach); on the adjacent higher ground, wild former waste ground communities, patches of predominantly oak woodland; farther away, an alder swamp, meadows and reedbeds with varying levels of moisture.

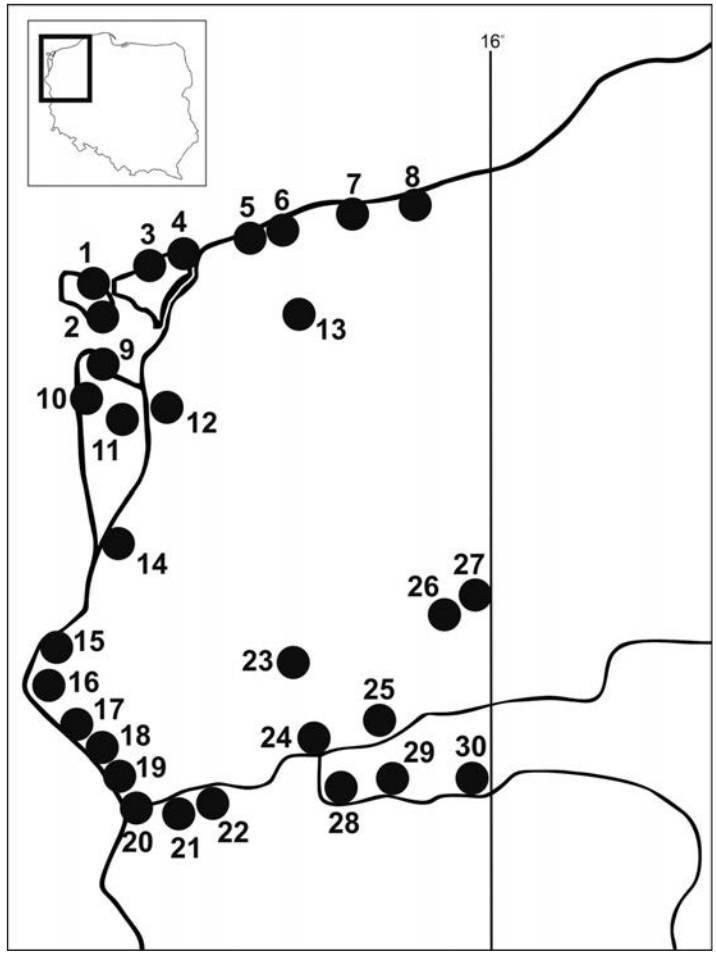

Fig. 2. The study area showing the localities where the fieldwork took place in 2005-2020.

13. Kołomąć WV06 (53°51’48.85”N, 15°6’50.34”E) – close to the Kołomąć forester’s lodge, ca 150 m east of Lake Kołomąckie, which is surrounded by a belt of reeds and alder swamps; nearby, mixed coniferous woodland; farther away, patches of Pomeranian beech forest.
14. Gryfino VV69 (53°15’15.45”N, 14°26’33.66”E) – the so-called Międzyodrze on the bank of the western Odra near the border bridge; a long, narrow “island” between two branches of the river (the western and eastern Odra) criss-crossed by rivulets, channels and oxbows, near which there are patches of alder swamp and riparian willow woodland; the “dry land” supports grey willow and osier scrub, along with extensive beds of sedge, sweet-grass and reeds.
15. Bielinek VU46 (52°55’32.12”N, 14°10’15.87”E) – the “Bielinek” nature reserve: forest-steppe associations with the only locality in Poland of pubescent oak (*Quercus pubescens* Willd.) as well as xerothermic and forest associations that are very rare in Poland.
16. Wrzosowiska Cedyńskie VU45 (52°51’14.93”N, 14°10’10.62”E) – the “Wrzosowiska Cedyńskie im. inż. Wiesława Czyżewskiego” nature reserve: the predominant habitats are heathland, xerothermic and psammophilous swards, surrounded by coniferous woodland communities, with meadows and crop fields farther away.
17. Czelin VU54 (52°44’22.13”N, 14°22’49.90”E) – the northern part of the village, with predominantly anthropogenic vegetation, i.e. gardens, orchards and crop fields; at a distance of ca 250 m, a steep scarp slope dropping to the River Odra, supporting thermophilous scrub and sward; at its foot, patches of alder swamp and a *Convolvuletalia sepium* R.Tx. 1950 community with hedge bindweed (*Calystegia sepium* (L.)) forms a narrow ecotone belt between the emergent vegetation and willow scrub.
18. Porzecze VU63 (52°40’43.39”N, 14°27’59.57”E) – the “Porzecze” nature-landscape reserve; meadows, marshes, oxbows, water bodies; dunes and wooded areas on the Odra floodplain.
19. Kaleńsko VU63 (52°38’25.53”N, 14°32’29.16”E) – in the northern part of the village, near the Kaleńsko forester’s lodge; anthropogenic and waste ground vegetation; in the vicinity, mainly coniferous woodland habitats; farther away, the Odra floodplain with fields and meadows.
20. Kostrzyn VU72 (52°34’6.20”N, 14°39’9.74”E) – near the buildings of the „Ujście Warty” National Park’s administration; a mosaic of meadows, pastures, beds of sedges and reeds; farther away, willow scrub and secondary riparian woodland forming along the Warta.
21. Słońsk VU82 (52°35’6.02”N, 14°49’17.62”E) – north of the village, near the Słońsk pumping station; criss-crossed by channels and oxbows; in the vicinity, a mosaic of meadows and pastureland, as well as sedge and reed beds;

farther away, willow scrub, riparian woodland communities, and single, very large willows and poplar trees.

22. Oksza VU93 (52°37'54.77"N, 14°55'52.76"E) – 80 m south of the River Warta; anthropogenic and waste ground vegetation predominant; farther away, a mosaic of meadows, pastureland and crop fields.
23. Moczydło WU16 (52°54'47.12"N, 15°16'38.03"E) – near the Moczydło forester's lodge, in the north-western part of a large clearing in the Barlinek Forest; near the buildings, anthropogenic and waste ground habitats, also a sandy sward; farther away, mixed forest with a large admixture of oak, and patches of alder swamp.
24. Santok WU24 (52°44'10.03"N, 15°23'56.52"E) – in the centre of the village on a high scarp slope ca 130 m from the River Warta; thermophilous scrub and sward; at the foot of the scarp, anthropogenic and waste ground habitats, also meadows, pastureland and crop fields.
25. Stare Kurowo WU45 (52°51'21.19"N, 15°39'38.99"E) – in the centre of the village; mainly anthropogenic and waste ground habitats, merging into thermophilous sandy sward; farther away, mixed forest, meadows, pastureland and crop fields.
26. Sówka WU69 (53° 9'40.84"N, 15°54'37.67"E) – close to the forester's lodge, on the River Korytnica; mainly patches of riparian alder woodland and coniferous forest habitats.
27. Nowa Korytnica WU69 (53°12'29.21"N, 15°58'14.26"E) – by the forester's lodge, where the River Korytnica enters Lake Nowa Korytnica; emergent vegetation, alder swamp and riparian woodland communities on the lake shore; farther away, coniferous forest communities.
28. Zawarcie WU32 (52°37'2.61"N, 15°30'34.34"E) – on the River Warta, near the Zawarcie forester's lodge, ca 2 km north of Skwierzyna; riparian and meadow vegetation surrounded by mixed forest, which merges into alder swamp in places; farther away, moist coniferous forest.
29. Krobielewko WU53 (52°38'33.06", 15°44'46.47"E) – on the River Warta, near the Krobielewko forester's lodge, ca 1300 m east of the village of Krobielewko; riparian and meadow vegetation surrounded mainly by moist coniferous forest.
30. Międzychód WU62 (52°36'28.29"N, 15°52'39.73"E) – outside the town on the high, northern bank of the River Warta; between the locality and the Warta, meadows with varying levels of moisture and temporary water bodies; in the vicinity, waste ground vegetation merging into mixed woodland.

MATERIAL AND METHODS

Elucidating the changes in the noctuid moth fauna of this region was a complicated task. The first stage involved a meticulous analysis of every available literature source of data, from the earliest to the latest. These publications were: Blaik 2010, Chappuis 1942, 1944, Meyer et al. 1924, 1925, Meyer & Urbahn 1929, 1933, Nowacki 1990, 1991a, 1993a, 1993b, 1994, Nowacki & Wąsala 2015, Romaniszyn & Schille 1929, Studziński 1979, Urbahn & Urbahn 1939, Wąsala 2016, Wąsala & Maciąg 2011, Wąsala & Matuszewski 2017, Węgorek 1966.

The next step was to examine all the accessible entomological collections containing voucher specimens of noctuid moths from north-western Poland. All the information relating to the localities where the species were collected was entered into a purpose-built database. The following collections were analysed: the so-called "Szczecin collection", housed at the Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw; the collection of the Institute of Animal Systematics and Evolution, Polish Academy of Sciences, Kraków; the collection of Krzysztof Demski, housed at the Department of Forest Entomology, Poznań University of Life Sciences; and the collection of Janusz Sosiński, housed in the History Collections of the Adam Mickiewicz University in Poznań. I also examined the private collections of Łukasz Matuszewski and Robert Słodzinka.

The fieldwork from 2005 to 2020 yielded research material in the form of imagines of noctuid moths (Lepidoptera: Noctuoidea: Erebidae, Noctuidae, Nolidae). In addition, observations of the autecology of certain species were made.

The moths were obtained mainly by trapping them at light in diverse environments. For this purpose, 250 W mercury vapour lamps were used, powered by mains electricity or a portable generator. In each season, trapping took place from March until November by attracting the moths to either an illuminated white screen in the author's presence or using a remote light trap. The latter were deployed in particular environments for the duration of the research season, but in different localities in different years. Discrete all-night samples were obtained in the light traps from March to November with an average frequency of three trapping sessions per ten-day period. In the last ten years of the research, portable light traps equipped with Philips TL 6W/08 blacklights were deployed each night in many different ecosystems. Moths were also caught on wine ropes, prepared by soaking thick strings in a mixture of fruit juice and wine, and hung on the branches of trees and shrubs in the various plant communities, well away from ambient light sources. In addition, moths were taken while they were feeding in the evenings on flowers, and a small number of day-flying moths were netted on sight. All the research material has been deposited in the author's Noctuoidea collection. Species were identified mainly according to their external morphology; for species where this approach does not yield unequivocal results, a genitalia examination was

undertaken. A small part of the material was identified on the basis of molecular DNA. The species' identifications were based on the NOCTUIDAE EUROPAEAE series of monographs, published between 1990-2012, and the works by NOWACKI (1998) and NOWACKI & BUSZKO (2019).

The range changes of a particular species were analysed on the basis of data from the localities in different periods of time. First mentioned are the localities from pre-1945 literature and collections (before 1945). These are followed by localities from the literature and collections pertaining to the 1945-2000 period (1945-2000). Lastly, there are the localities stated in the literature published after the year 2000, as well as those from the present my own fieldwork and various entomological collections (after 2000).

The localities involved in this work are as follows (name, UTM code):

1. Localities from literature data and entomological collections up to 1945 (before 1945):
   Bielinek VU46 (URBAHN & URBAHN 1939, CHAPPUIS 1942, 1944), Bartoszewo VV63, Czarnogłowy VV95, Czepino VV60, Daleszewo VV60, Dobieszczyn VV53, Dobra VV52, Dolice WU19, Drawsko Pomorskie WV53, Dziwnów VV88, Goleniów VV83, Grębowo VV97, Grędziec VU99, Gryfino VV60, Grzepnica VV62, Gunice VV63, Jedliny VV73, Raduń VV73, Kołbacz VV80, Kołbaskowo VV60, Kopice VV75, Lesięcin WV33, Leśno Górne VV62, Linki VV52, Lubieszyn VV52, Ładzin VV77, Łobez WV44, Maszewo WV02, Międzyzdroje VV67, Moczyły VV60, Mrzeżyno WV19, Pęzino WV11, Police VV73, Puszcza Bukowa VV70, Pyrzyce VU98, Radziszewo VV60, Redło WV03, Reptowo VV91, Resko WV25, Rosowo WV12, Stargard WV00, Stepnica VV74, Strachocin WV00, Swobnica VU77, Szczecin VV61, VV62, VV63, VV71, VV72, VV72, VV81, Siedlice VV63, Szczawno VU69, Święta VV73, Świnoujście VV57, Tanowo VV63, Trzebież VV64, Warnowo VV77, Widuchowa VU58, Wisełka VV77, Wysoka Kamieńska VV86 (MEYER et al. 1924, 1925, MEYER & URBAHN 1929, 1933, URBAHN & URBAHN 1939).

2. Localities from literature data and entomological collections between 1946 and 2000 (1945-2000):
   Szczecin VV62, VV63 (WĘGOREK 1966, STUDZIŃSKI 1979), Bielinek VU46 (NOWACKI 1993b), Cedynia VU45, Mrzeżyno WA10, Puszcza Bukowa VV70, VV80, VV81 (NOWACKI 1993a), Świnoujście VV57, Międzyzdroje VV67, Międzywodzie VV78, Dziwnówek VV88, Niechorze WV09, Mrzeżyno WA10, Kołobrzeg WA30 (NOWACKI 1994).

3. Localities from literature data published after 2000, from my own studies and entomological collections (after 2000):
   Bielinek VU46 (BLAIK 2010, WĄSALA & MACIĄG, 2011), Karsibór VV56 (WĄSALA 2016), Karsibór VV56 (NOWACKI & WĄSALA 2015), Bielinek VU46, Czelin VU54, Dąbroszyn VU82, Dźwirzyno WA20, Raduń VV73, Drawsko Military Training

Area WV52, Mielenko Drawskie WV52, Gryfino VV60, Kaleńsko VU63, Kołomąć WV06, Kostrzyn VU72, Krobielewko WU43, Łukęcin VV98, Międzychód WU62, Międzyzdroje VV67, Międzywodzie VV78, Moczydło W16, Mrzeżyno WA10, Mszczuje VV54, Myślibórz Wielki VV54, Nowa Korytnica WU69, Oksza VU93, Pobierowo VV98, Santok WU24, Słońsk VU82, Stare Kurowo WU45, Sówka WU69, Świnoujście VV57, Troszyn VU74, Zalesie VV53, Zawarcie WU33, Ziemsko WV42, Wiejkowski Las VV86, Witnica VU93, Wrzosowiska Cedyńskie VU45.

The information relating to the localities at which the various species were recorded has been incorporated in the species review, which forms the basis for the quantitative and qualitative analysis for the three different periods.

When referring to the historical data in the species list, I have sometimes used the term "widely distributed". This has emerged from the way in which species distributions were described in historical publications, especially in URBAHN & URBAHN (1939), where in the case of common species the authors did not state any specific trapping localities but used general terms, such as *durch ganz Pommern* = throughout Pomerania, *in vielen Gebieten gefunden* = found in many areas, *vielfach angeführt* = recorded many times, etc.

Next, I present a quantitative analysis, which is based on relative abundance, i.e. the numbers of particular species caught between 2005-2022 using all the trapping methods. It is well to bear in mind that a whole series of variables affect the numbers of moths caught during a particular trapping session, e.g. meteorological factors, the varying effectiveness of light traps and wine ropes in attracting moths. Nonetheless, the quantitative relationships between populations active during the same phenological period are upheld, so that despite the factors modifying the numbers of moths caught, the abundances of their populations are comparable. This abundance is very important when interpreting the range structures of particular species, in particular stenotopic species and populations living at the edges of their ranges. For species trapped during the study period, the flight period of imagines is given for all species, regardless of how they were caught (the Roman numeral indicates the month and the Arabic numeral the ten-day period of the month, e.g. early June, mid-June, late June). This enables meaningful comparisons with the flight periods of these species in other parts of Poland and Europe. "Distribution" indicates the overall range of occurrence of a species in the study area and refers briefly to its occurrence elsewhere in Poland. The geographic distribution in Poland as a whole is discussed mainly with reference to two reviews (NOWACKI & BUSZKO 2019, NOWACKI & WĄSALA 2017).

The analysis of noctuid moths in the study area in north-western Poland also required a perusal of the faunistic literature covering the whole of Poland, and in some cases neighbouring countries or even the whole of Europe. Based on this analysis, I drew pairs of maps for selected species, showing where they were trapped in Poland and their ranges in Europe. The range boundaries of the particular species were

delineated on the basis of monographs describing the noctuid moth fauna of Europe (Aarvik et al. 2017, Adamczewski 1992, Beshkov 2000, Derzhinsky 2016, Fibiger 1990, 1993, 1997, Fibiger & Hacker 2007, Fibiger et al. 2009, 2010, Gelbrecht et al. 2017, Goater et al. 2003, Hacker et al. 2002, Karsholt & Nielsen 1998, Mikkola et al. 1991, Hrubý 1964, Nowacki 1994, 1998, Nowacki & Buszko 2019, Ronkay & Ronkay 1994, 1995, Ronkay et al. 2001, Ronkay et al. 2011, Savenkov et al. 1996, Sinev 2008, Skou 1991, Viidalepp 1995, Witt & Ronkay 2012, Zilli et al. 2005).

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RESULTS

The fieldwork, carried out between 2005 and 2020, yielded a total of 54 208 specimens from 340 species. If we include the species recorded earlier, the total number of noctuid moths currently known from the study area adds up to 376 species from the families Erebidae, Euteliidae, Nolidae and Noctuidae. There now follows a systematic list of species, in accordance with Nowacki & Buszko (2019), at all the localities where each one was found throughout the history of lepidopteran studies in north-western Poland. The localities are divided into the three main periods of research.

Systematic list of species

EREBIDAE
(excluding ARCTIINAE and LYMANTRIINAE)

HERMINIINAE

1. *Paracolax tristalis* (Fabricius, 1794)

Localities:
- before 1945: Jedliny, Międzyzdroje, Police, Puszcza Bukowa, Szczecin,
- 1945-2000: Bielinek, Międzyzdroje, Puszcza Bukowa,
- after 2000: Czelin, Kaleńsko, Karsibór, Krobielewko, Międzychód, Międzyzdroje, Moczydło;

Abundance and flight period: 240 exx., VI(1) – IX(2)
Distribution: recorded at scattered localities throughout the study area and at many others elsewhere in Poland.

2. *Macrochilo cribrumalis* (Hübner, 1793)

Localities:
- before 1945: Drawsko Pomorskie, Reptowo, Resko, Szczecin, Świnoujście,
- after 2000: Gryfino, Karsibór, Międzychód, Zawarcie;

Abundance and flight period: 6 exx., VI(2) – VII(2)
Distribution: recorded at scattered localities throughout the study area; also at many other sites in Poland.

3. *Herminia tarsicrinalis* (Knoch, 1782)

Localities:
- before 1945: Drawsko Pomorskie, Jedliny, Międzyzdroje, Reptowo, Resko, Rosowo, Szczecin, Świnoujście,
- 1945-2000: Bielinek, Międzywodzie, Puszcza Bukowa, Świnoujście,
- after 2000: Bielinek, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Porzecze, Słońsk, Wiejkowski Las;

Abundance and flight period: 43 exx., VI(1) – VII(2)
Distribution: recorded at scattered localities throughout the study area; also known from many other sites in different parts of Poland.

4. *Herminia tarsipennalis* Treitschke, 1835

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Kaleńsko, Karsibór, Kołomąć, Międzyzdroje, Moczydło, Mrzeżyno,

– after 2000: Puszcza Bukowa, Świnoujście, Wiejkowski Las, Zawarcie;
Abundance and flight period: 73 exx., VI(2) – VIII(2)
Distribution: recorded at scattered localities throughout the study area; also at many other sites in various parts of Poland.

5. *Herminia grisealis* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzyzdroje, Puszcza Bukowa, Świnoujście,
– after 2000: Mielenko Drawskie, Kaleńsko, Karsibór, Kołomąć, Moczydło, Mrzeżyno, Wiejkowski Las, Zawarcie;
Abundance and flight period: 24 exx., VI(1) – VIII(3)
Distribution: recorded at scattered localities throughout the study area and at many others all over Poland.

6. *Zanclognatha lunalis* (Scopoli, 1763)

Localities:
– before 1945: Międzyzdroje, Puszcza Bukowa, Szczecin, Świnoujście,
– 1945-2000: Puszcza Bukowa,
– after 2000: Karsibór;
Abundance and flight period: 3 exx., VI(3)
Distribution: recorded at only a few localities in the north-western part of the study area; otherwise very local in southern and western Poland.

7. *Polypogon tentacularia* (Linnaeus, 1758)

Localities:
– before 1945: Szczecin,
– after 2000: Kaleńsko, Karsibór, Nowa Korytnica;
Abundance and flight period: 18 exx., VI(3) – VII(2)
Distribution: recorded at four scattered localities in the study area, but also at many sites in other parts of Poland.

8. *Pechipogo strigilata* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Międzywodzie, Puszcza Bukowa,
– after 2000: Kaleńsko, Karsibór, Krobielewko, Międzychód, Moczydło, Santok;
Abundance and flight period: 127 exx., V(3) – VII(3)
Distribution: recorded at scattered localities throughout the study area and at many others in Poland.

HYPENINAE

9. *Hypena proboscidalis* (Linnaeus, 1758)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
- after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kołomąć, Kostrzyn, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Porzecze, Słońsk, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 1275 exx., V(1) – X(1)
Distribution: uniform across the entire study area; found at a great many other localities in Poland.

10. *Hypena rostralis* (Linnaeus, 1758)

Localities:
- before 1945: widely distributed,
- after 2000: Bielinek, Czelin, Kostrzyn, Mrzeżyno, Stare Kurowo, Wiejkowski Las;

Abundance and flight period: 6 exx., IV(3) – X(1)
Distribution: recorded at scattered localities throughout the study area, also at many other sites in Poland.

11. *Hypena crassalis* (Fabricius, 1787)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Międzyzdroje, Mrzeżyno, Puszcza Bukowa,
- after 2000: Bielinek, Kaleńsko, Karsibór, Moczydło, Mrzeżyno, Sówka, Stare Kurowo, Wiejkowski Las;

Abundance and flight period: 22 exx., VI(1) – VII(3)
Distribution: recorded at scattered localities throughout the study area and at many other sites elsewhere in Poland.

RIVULINAE

12. *Rivula sericealis* (Scopoli, 1763)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa,
- after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kołobrzeg, Kołomąć, Kostrzyn, Krobielewko, Międzychód, Międzywodzie, Międzyzdroje, Moczydło, Mrzeżyno,

Mszczuje, Myślibórz Wielki, Nowa Korytnica, Porzecze, Raduń, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 1874 exx., V(3) – X(1)

Distribution: uniform across the entire study area; found at many other localities elsewhere in Poland.

SCOLIOPTERYGINAE

13. *Scoliopteryx libatrix* (Linnaeus, 1758)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Mrzeżyno, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kostrzyn, Łukęcin, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Nowa Korytnica, Pobierowo, Słońsk, Wiejkowski Las, Witnica, Zawarcie;

Abundance and flight period: 28 exx., VI(1) – VII(1) and VIII(2) – V(2)

Distribution: recorded at scattered localities throughout the study area, also at many others elsewhere in Poland.

HYPENODINAE

14. *Hypenodes humidalis* Doubleday, 1850

Localities:

– before 1945: Drawsko Pomorskie, Jedliny, Szczecin,
– after 2000: Karsibór, Mszczuje;

Abundance and flight period: 4 exx., VIII(1-2)

Distribution: recorded at only five localities in the study area; nonetheless, it has been found at many other sites elsewhere in Poland.

15. *Schrankia costaestrigalis* (Stephens, 1834)

Localities:

– before 1945: Drawsko Pomorskie, Jedliny, Reptowo, Szczecin,
– after 2000: Kaleńsko, Karsibór, Mielenko Drawieńskie, Myślibórz Wielki;

Abundance and flight period: 4 exx., IX(1-3)

Distribution: recorded at scattered localities throughout the study area and at a few others elsewhere in Poland.

16. *Schrankia taenialis* (Hübner, 1809)

Localities:

– before 1945: Drawsko Pomorskie, Międzyzdroje, Police, Puszcza Bukowa, Szczecin,
– after 2000: Bielinek;

Abundance and flight period: 1 ex., VIII(3)
Distribution: recorded at a few scattered localities throughout the study area and at some others in different parts of Poland.

EUBLEMMINAE

17. *Eublemma minutata* (Fabricius, 1794)

Localities:
– before 1945: widely distributed,
– 1945-2000: Świnoujście,
– after 2000: Mrzeżyno, Porzecze, Wrzosowiska Cedyńskie, Zawarcie;
Abundance and flight period: 37 exx., V(3) – VI(1) and VII(2-3)
Distribution: recorded at scattered localities throughout the study area and at many others in Poland.

BOLETOBIINAE

18. *Parascotia fuliginaria* (Linnaeus, 1761)

Localities:
– before 1945: Szczecin,
– 1945-2000: Bielinek,
– after 2000: Bielinek, Kaleńsko;
Abundance and flight period: 6 exx., V(3) – VIII(3)
Distribution: recorded at a few scattered localities in the western part of the study area; also known from many other sites elsewhere in Poland.

AVENTIINAE

19. *Laspeyria flexula* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Kaleńsko, Karsibór, Kołomąć, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Nowa Korytnica, Sówka, Wiejkowski Las, Zawarcie;
Abundance and flight period: 207 exx., V(2) – IX(3)
Distribution: recorded at scattered localities throughout the study area and at many others elsewhere in Poland.

PHYTOMETRINAE

20. *Phytometra viridaria* (Clerck, 1759)

Localities:
– before 1945: Czepino, Drawsko Pomorskie, Szczecin, Świnoujście,
– 1945-2000: Świnoujście,
– after 2000: Mrzeżyno;
Abundance and flight period: 4 exx., VII(3)
Distribution: recorded at scattered localities throughout the study area, but also at many others in various parts of Poland.

21. *Colobochyla salicalis* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Jedliny, Szczecin,
– 1945-2000: Bielinek, Międzywodzie, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Karsibór; Kaleńsko, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Zawarcie;
Abundance and flight period: 33 exx., V(2) – VII(3)
Distribution: recorded at scattered localities throughout the study area;also known from many other sites elsewhere in Poland.

22. *Trisateles emortualis* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945–2000: Bielinek, Kołobrzeg, Międzyzdroje, Puszcza Bukowa,
– after 2000: Bielinek, Kaleńsko, Karsibór, Wiejkowski Las, Zawarcie;
Abundance and flight period: 17 exx., V(3) – VIII(3)
Distribution: Recorded at scattered localities throughout the study area and at many others in Poland.

EREBINAE

23. *Catocala fraxini* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
- 1945–2000: Bielinek, Międzywodzie, Puszcza Bukowa,
– after 2000: Bielinek, Kaleńsko, Karsibór, Moczydło, Mszczuje, Myślibórz Wielki, Wiejkowski Las, Zawarcie;
Abundance and flight period: 11 exx., VIII(1) – X(1)
Distribution: recorded at scattered localities throughout the study area; also reported from many other sites in Poland.

24. *Catocala sponsa* (Linnaeus, 1767)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Puszcza Bukowa,
– after 2000: Kaleńsko, Karsibór, Kostrzyn, Międzychód, Wiejkowski Las, Zawarcie;
Abundance and flight period: 6 exx., VIII(1) – IX(2)
Distribution: recorded at scattered localities throughout the study area, also from many other sites elsewhere in Poland.

25. *Catocala promissa* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek,
– after 2000: Bielinek, Kaleńsko, Krobielewko, Mielenko Drawskie, Zalesie;
Abundance and flight period: 7 exx., VII(1) – IX(2)
Distribution: recorded at scattered localities throughout the study area, and also at many others in Poland.

26. *Catocala nupta* (Linnaeus, 1767)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzyzdroje, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Kaleńsko, Kostrzyn, Krobielewko, Międzychód, Wiejkowski Las;
Abundance and flight period: 26 exx., VII(1) – X(1)
Distribution: recorded at scattered localities throughout the study area and at many others in Poland.

27. *Catocala elocata* (Esper, 1787)

Localities:
– before 1945: Dolice, Puszcza Bukowa,
– after 2000: Kaleńsko, Porzecze, Stare Kurowo, Witnica;
Abundance and flight period: 3 exx., VI(3) – IX(1)
Distribution: recorded at only six localities in the study area; but known from many other sites throughout Poland.

28. *Catocala electa* (Vieweg, 1790)

Localities:

– before 1945: Puszcza Bukowa;

Distribution: not found during the study period. There is a historical record from one locality in the study area (Urbahn & Urbahn 1939). Elsewhere in Poland it has been recorded at a few localities in the south and east of the country.

29. *Catocala pacta* (Linnaeus, 1758)

Localities:

– before 1945: Jedliny;

Distribution: not found during the study period. There is a historical record from one locality in the study area (Urbahn & Urbahn 1939). In the late 19th - early 20th centuries it was very occasionally found at single localities in northern and eastern Poland, and as far south as Rytwiany near Staszów (Karpowicz 1928, Romaniszyn & Schille 1929). During the last 100 years it has been recorded only in the Bierbrza Marshes and the Białowieża Primeval Forest (Buszko et al. 1996, Frąckiel & Nowacki 2010).

30. *Catocala fulminea* (Scopoli, 1763)

Localities:

– before 1945: Puszcza Bukowa, Stepnica, Świnoujście, Szczecin,

– 1945-2000: Mrzeżyno,

– after 2000: Międzychód, Porzecze;

Abundance and flight period: 9 exx., VII(1) – VIII(2)

Distribution: recorded at scattered localities throughout the study area, also from many other sites elsewhere in Poland.

31. *Minucia lunaris* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: Międzyzdroje, Police, Szczecin, Świnoujście,

– 1945-2000: Kołobrzeg,

– after 2000: Drawsko Pomorskie, Międzychód, Moczydło, Kaleńsko, Karsibór, Krobielewko, Wrzosowiska Cedyńskie;

Abundance and flight period: 12 exx., V(1) – VI(1)

Distribution: recorded at scattered localities throughout the study area and at many other sites elsewhere in Poland.

32. *Catephia alchymista* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: Szczecin, Kołobrzeg;

Distribution: not found during the study period. There are two historical records from the northern part of the study area (Urbahn & Urbahn 1939). Recorded singly elsewhere in Poland.

33. *Lygephila pastinum* (Treitschke, 1826)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Kaleńsko, Karsibór, Krobielewko, Mrzeżyno, Wiejkowski Las;
Abundance and flight period: 9 exx., VI(3) – VII(3)
Distribution: recorded at scattered localities throughout the study area, but also at many others in Poland.

34. *Lygephila viciae* (Hübner, 1822)

Localities:
– before 1945: Międzyzdroje, Szczecin, Świnoujście, Wisełka,
– 1945-2000: Świnoujście,
– after 2000: Stare Kurowo, Zawarcie;
Abundance and flight period: 3 exx., VI(1–2)
Distribution: recorded at scattered localities throughout the study area; also reported from many other sites in Poland.

35. *Euclidia mi* (Clerck, 1759)

Localities:
– before 1945: widely distributed,
- 1945–2000: Bielinek, Puszcza Bukowa,
– after 2000: Czelin, Kostrzyn, Mrzeżyno, Wiejkowski Las;
Abundance and flight period: 4 exx., V(3)
Distribution: recorded at scattered localities throughout the study area; known from many other sites elsewhere in Poland.

36. *Euclidia glyphica* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Puszcza Bukowa, Bielinek,
– after 2000: Kaleńsko, Mrzeżyno;
Abundance and flight period: 13 exx.,V(1-2)
Distribution: recorded at scattered localities throughout the study area, also at many others elsewhere in Poland.

EUTELIIDAE

EUTELIINAE

37. *Eutelia adulatrix* (Hübner, 1813)

Localities:
– before 1945: Szczecin;

Distribution: not found during the study period. There is a historical record from one locality based on three caterpillars found in 1917 from which one imago was reared (Urbahn & Urbahn 1939). This species has a Ponto–Mediterranean range, hence its appearance so far away from its normal range limits must have been connected with the caterpillars' host plant. Never recorded anywhere else in Poland (Nowacki & Wąsala 2017).

NOLIDAE

NOLINAE

38. *Meganola strigula* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Drawsko Pomorskie, Międzyzdroje, Puszcza Bukowa, Reptowo, Siedlice, Szczecin, Tanowo, Trzebież, Wisełka, Wysoka Kamieńska,
– 1945-2000: Bielinek, Puszcza Bukowa,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Międzywodzie, Międzyzdroje, Mrzeżyno, Porzecze;

Abundance and flight period: 19 exx., IV(3) – VI(2)

Distribution: recorded at scattered localities throughout the study area; also at many other sites elsewhere in Poland.

39. *Meganola albula* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Dziwnów, Puszcza Bukowa, Szczecin,
– 1945–2000: Bielinek,
– after 2000: Czelin, Kaleńsko, Karsibór, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Oksza, Słońsk, Stare Kurowo, Zawarcie;

Abundance and flight period: 71 exx., V(1) – VIII(1)

Distribution: recorded at scattered localities throughout the study area, but also at many others in Poland.

40. *Nola cuculatella* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– after 2000: Bielinek, Gryfino, Karsibór, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Stare Kurowo, Zawarcie;

Abundance and flight period: 26 exx., VI(2) – VIII(3)

Distribution: recorded at scattered localities throughout the study area and at many others elsewhere in Poland.

41. *Nola confusalis* (Herrich-Schäffer, 1847)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek,
– after 2000: Bielinek, Kaleńsko, Karsibór, Zawarcie;

Abundance and flight period: 72 exx., IV(3) – VI(1)

Distribution: recorded at scattered localities throughout the study area, and at many other sites elsewhere in Poland.

42. *Nola aerugula* (Hübner, 1793)

Localities:
– before 1945: Jedliny, Mrzeżyno, Reptowo, Szczecin,
– 1945-2000: Międzywodzie, Międzyzdroje,
– after 2000: Krobielewko, Międzychód, Mrzeżyno;

Abundance and flight period: 6 exx., VI(3) – VIII(1)

Distribution: recorded at scattered localities throughout the study area, but also at many others in Poland.

EARIADINAE

43. *Earias clorana* (Linnaeus, 1761)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Międzychód, Międzyzdroje, Moczydło, Mrzeżyno, Myślibórz Wielki, Nowa Korytnica, Słońsk, Sówka, Zalesie, Zawarcie;

Abundance and flight period: 56 exx., V(2) – VIII(3)

Distribution: uniform across the entire study area; also found at many localities in other parts of Poland.

44. *Earias vernana* (Fabricius, 1787)

Localities:
– before 1945: Dziwnów, Stargard, Stepnica, Szczecin, Świnoujście,
– 1945-2000: Świnoujście,
– after 2000: Krobielewko, Porzecze;
Abundance and flight period: 4 exx., V(3) – VII(2)
Distribution: recorded at scattered localities throughout the study area. A local species in Poland, recorded at just a small number of localities.

CHLOEPHORINAE

45. *Nycteola revayana* (Scopoli, 1772)

Localities:
– before 1945: Bartoszewo, Kołbacz, Leśno Górne, Międzyzdroje, Police, Szczecin,
– 1945-2000: Bielinek,
– after 2000: Bielinek, Gryfino, Kaleńsko, Zawarcie;
Abundance and flight period: 9 exx., IV(3) and VI(3) – VII(3)
Distribution: recorded at scattered localities throughout the study area and at many other sites elsewhere in Poland.

46. *Nycteola degenerana* (Hübner, 1799)

Localities:
– before 1945: Międzyzdroje;
Distribution: not found during the study period. There is just one historical record from the study area (Urbahn & Urbahn 1939), but elsewhere in Poland it has been found at many localities.

47. *Nycteola asiatica* (Krulikovsky, 1904)

Localities:
– after 2000: Gryfino, Kaleńsko;
Abundance and flight period: 13 exx., VIII(3) – IV(3) and VI(2-3)
Distribution: found for the first time in the study area at two scattered localities. Elsewhere in Poland, it has been recorded at a small number of sites.

48. *Bena bicolorana* (Fuessly, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Międzyzdroje,
– after 2000: Moczydło, Mrzeżyno, Sówka, Troszyn, Zawarcie;
Abundance and flight period: 11 exx., V(2) – VII(3)
Distribution: recorded at scattered localities throughout the study area; also at many other sites all over Poland.

49. *Pseudoips prasinana* (Linnaeus, 1758)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Moczydło, Mrzeżyno, Sówka, Troszyn, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 47 exx., V(1) – VII(3)

Distribution: recorded at scattered localities throughout the study area; also known from many other sites in Poland.

NOCTUIDAE

PLUSIINAE

50. *Polychrysia moneta* (Fabricius, 1787)

Localities:

– before 1945: widely distributed,
– 1945-2000: Puszcza Bukowa;

Distribution: during the study period this species was not recorded, but it has been found at a few localities in other parts of Poland.

51. *Lamprotes c-aureum* (Knoch, 1781)

Localities:

– before 1945: Szczecin, Jedliny, Raduń;

Distribution: not found during the study period, but there are three historical records from the study area (Urbahn & Urbahn 1939). Very rare in Poland, it has been recorded at just a few localities. In recent years the number of known sites has fallen dramatically, and its distribution in Poland is now restricted to the eastern and southern parts of the country: the Biebrza Marshes, Podlasie, Polesie, the Mazurian Lake District, Podkarpacie and the Opole region of Silesia (Nowacki & Wąsala 2021a).

52. *Plusidia cheiranthi* (Tauscher, 1809)

Localities:

– before 1945: Tanowo;

Distribution: not found during the study period, but there is one historical record from the study area (Urbahn & Urbahn 1939). The species is very local, with historical records from Pomerania (Speiser 1903), Warsaw and the surrounding area (Romaniszyn & Schille 1929), the Nida valley (Kostrowicki 1953), the Sandomierz

area (Karpowicz 1928) and Zawiercie (Masłowski & Masłowski 1928). The most recent record comes from the Augustów Forest (Nowacki & Rudny 1992); it has not been recorded in the Białowieża Primeval Forest (Buszko et al. 1996).

53. *Diachrysia chrysitis* (Linnaeus, 1758)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Świnoujście,
- after 2000: Bielinek, Czelin, Dźwirzyno, Kaleńsko, Karsibór, Kołomąć, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Pobierowo, Santok, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie, Ziemsko;

Abundance and flight period: 752 exx., V(2) – IX(2)
Distribution: uniform across the entire study area and recorded at many localities elsewhere in Poland.

54. *Diachrysia stenochrysis* (Warren, 1913)

Localities:
- after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kołomąć, Kostrzyn, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Słońsk, Stare Kurowo, Zalesie, Zawarcie;

Abundance and flight period: 300 exx., V(2) – IX(2)
Distribution: recorded for the first time in the study area, across which its distribution is uniform; known from many localities in other parts of Poland.

55. *Macdunnoughia confusa* (Stephens, 1850)

Localities:
- 1945-2000: Bielinek, Międzywodzie, Świnoujście,
- after 2000: Bielinek, Czelin, Drawsko Military Training Area, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Oksza, Porzecze, Puszcza Bukowa, Słońsk, Stare Kurowo, Troszyn, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 194 exx., IV(3) – X(1)
Distribution: uniform across the entire study area; recorded at many localities in all regions of Poland.

56. *Plusia festucae* (Linnaeus, 1758)

Localities:
- before 1945: widely distributed,

– 1945-2000: Bielinek, Kołobrzeg, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Słońsk, Zalesie, Zawarcie;

Abundance and flight period: 80 exx., VI(1) – IX(2)

Distribution: uniform across the entire study area; recorded at many localities elsewhere in Poland.

57. *Plusia putnami* (Grote, 1873)

Localities:

– 1945-2000: Kołobrzeg, Międzywodzie,
– after 2000: Gryfino, Międzychód, Mrzeżyno, Słońsk, Troszyn;

Abundance and flight period: 6 exx., VII(1) – VIII(1)

Distribution: recorded at scattered localities throughout the study area and at a few others elsewhere in Poland.

58. *Autographa gamma* (Linnaeus, 1758)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kołomąć, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Porzecze, Słońsk, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 455 exx., V(2) – X(2)

Distribution: uniform across the entire study area; recorded at a great many localities all over Poland.

59. *Autographa mandarina* (Freyer, 1845)

Localities:

– 1945-2000: Kołobrzeg;

Distribution: not found during the study period, but there is one historical record from the study area (Nowacki 1993c). Elsewhere in Poland, there are records from scattered localities on the Baltic coast (Nowacki 1994) and the Borecka Forest (Buszko 1987), the Augustów Forest, the Roztocze region and the Biebrza National Park (Nowacki & Rudny 1992; Frąckiel & Nowacki 2010).

60. *Autographa pulchrina* (Haworth, 1809)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Puszcza Bukowa, Świnoujście,

– after 2000: Bielinek, Kaleńsko, Karsibór, Kołomąć, Mielenko Drawskie, Międzywodzie, Moczydło, Mrzeżyno, Puszcza Bukowa, Wiejkowski Las, Ziemsko;

Abundance and flight period: 14 exx., VI(2) – VII(1)

Distribution: uniform across the entire study area; recorded at many localities elsewhere in Poland.

61. *Autographa buraetica* (Staudinger, 1892)

Localities:

– after 2000: Dźwirzyno, Mielenko Drawskie, Mrzeżyno;

Abundance and flight period: 3 exx., VII(1-2)

Distribution: found for the first time at three localities in the study area. Elsewhere in Poland, there are records from the Baltic coast (Nowacki 1994), the Borecka Forest (Buszko 1987), the Augustów Forest, the Roztocze region and the Biebrza National Park (Nowacki & Rudny 1992; Frąckiel & Nowacki 2010) and also the Świętokrzyskie Mts (Nowacki & Wąsala 2021b).

62. *Autographa jota* (Linnaeus, 1758)

Localities:

– before 1945: Międzyzdroje, Szczecin,

– 1945-2000: Międzywodzie, Niechorze, Świnoujście,

– after 2000: Kaleńsko, Kołomąć, Międzywodzie, Wiejkowski Las;

Abundance and flight period: 4 exx., VI(3) – VII(1)

Distribution: recorded at scattered localities throughout the study area. Very local in Poland, with records from a small number of sites across the whole country.

63. *Autographa bractea* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: Świnoujście;

Distribution: not recorded during the study period, but there is one historical record from the study area (Urbahn & Urbahn 1939). Very local across the whole of Poland. There are sedentary populations in the south of the country (Nowacki 2019).

64. *Syngrapha interrogationis* (Linnaeus, 1758)

Localities:

– before 1945: Jedliny, Międzyzdroje, Redło, Siedlice, Stepnica, Szczecin, Świnoujście, Tanowo, Trzebież,

– after 2000: Mielenko Drawskie;

Abundance and flight period: 1 ex., VIII(1)

Distribution: this species used to be found at historical localities in the north-western part of the study area (Urbahn & Urbahn 1939). In Poland it is local, with records from a small number of sites scattered across the country.

65. *Abrostola tripartita* (Hufnagel, 1766)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzyzdroje, Puszcza Bukowa,
– after 2000: Bielinek, Czelin, Kaleńsko, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Porzecze, Słońsk, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 101 exx., V(2) – IX(1)

Distribution: uniform across the entire study area; recorded at many localities elsewhere in Poland.

66. *Abrostola asclepiadis* (Denis & Schiffermüller, 1775)

Localities:

– after 2000: Bielinek, Drawsko Military Training Area, Kaleńsko, Karsibór, Międzywodzie, Mrzeżyno, Wrzosowiska Cedyńskie;

Abundance and flight period: 50 exx., V(2) – VIII(2)

Distribution: the species is known from a small number of historical localities lying beyond the present–day borders of Poland (Urbahn & Urbahn 1939). It was trapped for the first time at a few localities scattered across the whole study area. Recorded at many sites in other parts of Poland.

67. *Abrostola triplasia* (Linnaeus, 1758)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Puszcza Bukowa, Słońsk, Sówka, Wiejkowski Las, Zawarcie;

Abundance and flight period: 111 exx., V(1) – IX(3)

Distribution: uniform across the entire study area; recorded at many localities elsewhere in Poland.

EUSTROTIINAE

68. *Deltote pygarga* (Hufnagel, 1766)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Dźwirzyno, Gryfino, Kaleńsko, Karsibór, Kołobrzeg, Kołomąć, Krobielewko, Łukęcin, Mielenko Drawskie, Międzychód, Międzywodzie,

Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Oksza, Pobierowo, Porzecze, Raduń, Santok, Słońsk, Sówka, Stare Kurowo, Świnoujście, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie, Ziemsko;
Abundance and flight period: 3657 exx., V(2) – X(1)
Distribution: uniform across the entire study area; also found at many localities all over Poland.

69. *Deltote deceptoria* (Scopoli, 1763)

Localities:
- before 1945: Daleszewo, Drawsko Pomorskie, Grędziec, Grzepnica, Jedliny, Lesięcin, Lubieszyn, Łobez, Puszcza Bukowa, Redło, Resko, Rosowo, Stargard, Szczecin, Świnoujście,
- 1945-2000: Bielinek, Mrzeżyno, Puszcza Bukowa,
- after 2000: Bielinek, Gryfino, Czelin, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mszczuje, Nowa Korytnica, Porzecze, Santok, Sówka, Stare Kurowo, Troszyn, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie, Ziemsko;

Abundance and flight period: 692 exx., V(1) – VIII(2)
Distribution: uniform across the entire study area; recorded at many localities elsewhere in Poland.

70. *Deltote uncula* (Clerck, 1759)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Puszcza Bukowa,
- after 2000: Kaleńsko, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Słońsk, Zawarcie;

Abundance and flight period: 35 exx., V(2) – VIII(2)
Distribution: recorded at scattered localities throughout the study area, but also at many sites in other parts of Poland.

71. *Deltote bankiana* (Fabricius, 1775)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Mrzeżyno, Puszcza Bukowa, Świnoujście,
- after 2000: Czelin, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Santok, Słońsk, Sówka, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 809 exx., V(2) – VIII(3)

Distribution: uniform across the whole study area; also recorded at many localities elsewhere in Poland.

ACONTIINAE

72. *Acontia lucida* (Hufnagel, 1766)

Localities:
– before 1945: Szczecin;
Distribution: not recorded during this study. There is one historical locality of this species in the study area (Urbahn & Urbahn 1939). Elsewhere in Poland there are also historical localities, for example, at Poznań, Sandomierz and Warsaw (Romaniszyn & Schille 1929), Grabowiec (Kostrowicki 1953), Brzeg, Głogów, Trzebnica, Wrocław, Gorlice, Piaseczna and Szprotawa (Wolf 1935-44). Later, in the 1950s and 60s there were sporadic records from Stronno and Toruń (Prüffer & Sołtys 1974), Niedzica in the Pieniny Mts (Błeszyński et al. 1965) and Bircza in the Przemyśl Foothills (Bielewicz 1973). There is only one recent record – from central Podlasie (Nowacki & Wasiluk 2004).

73. *Acontia trabealis* (Scopoli, 1763)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Puszcza Bukowa,
– after 2000: Czelin, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Nowa Korytnica, Porzecze, Słońsk, Stare Kurowo, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;
Abundance and flight period: 221 exx., V(2) – IX(2)
Distribution: uniform across the entire study area; also found at many localities all over Poland.

AEDIINAE

74. *Aedia funesta* (Esper, 1786)

Localities:
– before 1945: Bielinek,
– 1945-2000: Bielinek,
– after 2000: Bielinek, Czelin, Kaleńsko, Słońsk;
Abundance and flight period: 11 exx., VI(3) – VII(2)
Distribution: this species was trapped at only four localities in the western part of the study area. Nationally, there are records from just a few localities in the south and west of Poland.

PANTHEINAE

75. *Panthea coenobita* (Esper, 1785)

Localities:
– before 1945: Międzyzdroje, Warnowo, Świnoujście,
– 1945-2000: Bielinek, Międzyzdroje, Mrzeżyno, Puszcza Bukowa,
– after 2000: Bielinek, Czelin, Dźwirzyno, Kaleńsko, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Nowa Korytnica, Słońsk, Sówka, Stare Kurowo, Troszyn, Wiejkowski Las;

Abundance and flight period: 48 exx., V(2) – VIII(3)
Distribution: uniform throughout the study area; commonly recorded at many localities all over Poland.

76. *Colocasia coryli* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzyzdroje, Mrzeżyno, Mszczuje, Nowa Korytnica, Porzecze, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Zawarcie;

Abundance and flight period: 243 ex., IV(3) – V(3) and VI(3) – VIII(2)
Distribution: uniform right across the study area; found at many other localities elsewhere in Poland.

DILOBINAE

77. *Diloba caeruleocephala* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Dziwnówek,
– after 2000: Kaleńsko, Mielenko Drawskie, Mrzeżyno;

Abundance and flight period: 8 exx., IX(3) – X(1)
Distribution: recorded at scattered localities throughout the study area, and also at many other localities in Poland.

ACRONICTINAE

78. *Moma alpium* (Osbeck, 1778)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Międzyzdroje, Niechorze, Puszcza Bukowa,
– after 2000: Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Kostrzyn, Troszyn, Wiejkowski Las, Zawarcie;

Abundance and flight period: 39 exx., V(3) – VIII(3)
Distribution: recorded at scattered localities throughout the study area, and at many other localities in Poland.

79. *Acronicta alni* (Linnaeus, 1767)

Localities:
– before 1945: Jedliny, Maszewo, Police, Szczecin, Świnoujście, Tanowo,
– 1945-2000: Międzywodzie,
– after 2000: Kaleńsko, Krobielewko, Międzychód, Międzywodzie, Mrzeżyno, Mszczuje, Porzecze, Ziemsko;

Abundance and flight period: 9 exx., V(3) and VII(1) – VIII(1)
Distribution: uniform across the entire study area; also recorded at many localities in other parts of Poland.

80. *Acronicta cuspis* (Hübner, 1813)

Localities:
– before 1945: Międzyzdroje, Szczecin, Świnoujście, Kołobrzeg,
– after 2000: Dźwirzyno, Mrzeżyno, Wiejkowski Las;

Abundance and flight period: 5 exx., VI(3) – VII(2)
Distribution: recorded at scattered localities throughout the study area. A local species, it has been reported from a small number of sites elsewhere in Poland.

81. *Acronicta tridens* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Drawsko Pomorskie, Jedliny, Międzyzdroje, Reptowo, Stargard, Szczecin,
– 1945-2000: Bielinek, Kołobrzeg,
– after 2000: Drawsko Military Training Area, Dźwirzyno, Kaleńsko, Krobielewko, Moczydło, Nowa Korytnica, Zawarcie;

Abundance and flight period: 9 exx., V(1) – VI(1) and VII(1) – VIII(3)
Distribution: recorded at scattered localities throughout the study area. In Poland, this species has a local distribution; it has been recorded at a small number of sites elsewhere in the country.

82. *Acronicta psi* (Linnaeus, 1758)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Niechorze, Puszcza Bukowa, Świnoujście,
- after 2000: Czelin, Kaleńsko, Mielenko Drawskie, Moczydło, Mrzeżyno, Porzecze, Troszyn, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie, Ziemsko;

Abundance and flight period: 41 exx., V(2) – VI(2) and VII(2) – VIII(2)
Distribution: recorded at scattered localities throughout the study area, and at many others elsewhere in Poland.

83. *Acronicta aceris* (Linnaeus, 1758)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Międzywodzie,
- after 2000: Czelin, Drawsko Military Training Area, Kaleńsko, Karsibór, Mielenko Drawskie, Międzychód, Mrzeżyno, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 17 exx., V(2) – VI(2) and VII(1) – IX(1)
Distribution: recorded at scattered localities throughout the study area, and at many other sites in Poland.

84. *Acronicta leporina* (Linnaeus, 1758)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Puszcza Bukowa, Świnoujście,
- after 2000: Drawsko Military Training Area, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Mrzeżyno, Wiejkowski Las, Wrzosowiska Cedyńskie, Ziemsko;

Abundance and flight period: 17 exx., V(2) – VII(1) and VII(3) – VIII(2)
Distribution: uniform across the entire study area; also found at many localities in other parts of Poland.

85. *Acronicta megacephala* (Denis & Schiffermüller, 1775)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Niechorze, Puszcza Bukowa, Świnoujście,
- after 2000: Czelin, Drawsko Military Training Area, Dźwirzyno, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Mrzeżyno, Nowa Korytnica, Oksza, Słońsk, Sówka, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie, Ziemsko;

Abundance and flight period: 82 exx., V(2) – IX(3)
Distribution: uniform across the entire study area; also reported from many other localities elsewhere in Poland.

86. *Acronicta strigosa* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Drawsko Pomorskie, Stepnica, Szczecin,
– after 2000: Kołomąć, Mielenko Drawskie, Moczydło, Mrzeżyno, Wiejkowski Las, Ziemsko;
Abundance and flight period: 8 exx., VII(1-2)
Distribution: recorded at scattered localities throughout the study area; also at many other sites in different parts of Poland.

87. *Acronicta menyanthidis* (Esper, 1789)

Localities:
– before 1945: Jedliny, Kopice, Swobnica, Szczecin, Świnoujście,
– after 2000: Mielenko Drawskie, Mszczuje;
Abundance and flight period: 3 exx., VI(1)
Distribution: recorded at scattered localities throughout the study area. Very scarce throughout Poland, this species is known mainly from the north and east of the country. Its range contracted significantly in the second half of the 20th century as a result of the degradation of its peatbog habitats. Recent records come from the Biebrza Marshes, the Polesie region, the Augustów Forest, the Białowieża Primeval Forest, the Romincka Forest, the Roztocze region, Nowa Dęba in Podkarpacie, Wielkopolska province and the Świętokrzyskie Mts (Nowacki & Wąsala 2018, 2021b).

88. *Acronicta auricoma* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Puszcza Bukowa, Świnoujście,
– after 2000: Drawsko Military Training Area, Kaleńsko, Międzychód, Moczydło, Mrzeżyno, Zawarcie, Ziemsko;
Abundance and flight period: 17 exx., V(3) – VI(3) and VII(2) – VIII(2)
Distribution: recorded at scattered localities throughout the study area, and also at many other sites in Poland.

89. *Acronicta euphorbiae* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Szczecin, Świnoujście,
– after 2000: Wrzosowiska Cedyńskie;
Abundance and flight period: 1 ex., V(3)

Distribution: recorded at only three localities in the study area. Very rare in Poland, reported from just a few scattered localities; not found again at most of the localities for which there are early 20th century records.

90. *Acronicta cinerea* (Hufnagel, 1766)

Localities:
– before 1945: Czepino, Drawsko Pomorskie, Redło, Reptowo, Szczecin,
– after 2000: Drawsko Pomorskie, Mrzeżyno;

Abundance and flight period: 2 exx., VI(3)

Distribution: recorded from a few scattered localities in the study area. Local in Poland, with records from a few sites in different parts of the country.

91. *Acronicta rumicis* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Drawsko Military Training Area, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Porzecze, Słońsk, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie, Ziemsko;

Abundance and flight period: 412 exx., IV(2) – VI(2) and VII(1) – IX(1)

Distribution: uniform across the entire study area; also reported from many localities elsewhere in Poland.

92. *Craniophora ligustri* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Puszcza Bukowa,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Porzecze, Santok, Wiejkowski Las, Zalesie, Ziemsko;

Abundance and flight period: 53 exx., V(1) – VI(1) and VII(2) – VIII(2)

Distribution: uniform across the entire study area; also found at many localities in other parts of Poland.

93. *Simyra nervosa* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Czepino, Daleszewo, Szczecin, Świnoujście, Wisełka,
– after 2000: Czelin, Stare Kurowo, Wiejkowski Las;

Abundance and flight period: 3 exx., V(1) and VII(3)

Distribution: recorded at a few scattered localities in the study area. A local species in Poland, with records from a small number of sites in various parts of the country.

94. *Simyra albovenosa* (Goeze, 1781)

Localities:
– before 1945: Drawsko Pomorskie, Kołobrzeg, Police, Raduń, Reptowo, Szczecin, Święta, Świnoujście,
– 1945-2000: Bielinek, Dziwnówek, Puszcza Bukowa,
– after 2000: Czelin, Kostrzyn, Krobielewko, Międzychód, Mrzeżyno, Wiejkowski Las, Zawarcie;

Abundance and flight period: 23 exx., IV(3) – VIII(2)
Distribution: recorded at scattered localities in the study area. Even though this species has a local distribution in Poland, it has been reported from a great many sites all over the country.

METOPONIINAE

95. *Panemeria tenebrata* (Scopoli, 1763)

Localities:
– before 1945: Puszcza Bukowa, Rosowo, Stargard, Szczecin, Świnoujście,
– 1945-2000: Puszcza Bukowa,
– after 2000: Dąbroszyn, Drawsko Military Training Area;

Abundance and flight period: 10 exx., V(1)
Distribution: recorded at scattered localities in the study area and also at many others elsewhere in Poland.

96. *Tyta luctuosa* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Kołobrzeg, Szczecin, Świnoujście,
– 1945-2000: Bielinek,
– after 2000: Bielinek, Czelin, Gryfino, Kaleńsko, Mszczuje, Stare Kurowo;

Abundance and flight period: 18 exx., V(1) – VIII(3)
Distribution: recorded at scattered localities in the study area and at a few others elsewhere in Poland.

CUCULLINAE

97. *Cucullia fraudatrix* Eversmann, 1837

Localities:
– before 1945: Szczecin,
– 1945-2000: Bielinek, Międzyzdroje, Puszcza Bukowa,

– after 2000: Czelin, Wiejkowski Las;
Abundance and flight period: 3 exx., VII(3)
Distribution: recorded at scattered localities in the study area, also at many others all over Poland.

98. *Cucullia absinthii* (Linnaeus, 1761)

Localities:
– before 1945: Czepino, Szczecin,
– 1945-2000: Mrzeżyno,
– after 2000: Mrzeżyno;
Abundance and flight period: 1 ex., VII(1)
Distribution: recorded in the study area at only three widely scattered localities. Though a local species in Poland, there are records from numerous localities all over the country.

99. *Cucullia argentea* (Hufnagel, 1766)

Localities:
– before 1945: Drawsko Pomorskie, Redło,
– 1945-2000: Międzywodzie,
– after 2000: Mrzeżyno;
Abundance and flight period: 1 ex., VII(1)
Distribution: recorded in the study area at just four widely scattered localities. A local species in Poland, but with records from a great many localities in the whole country.

100. *Cucullia artemisiae* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek,
– after 2000: Mrzeżyno;
Abundance and flight period: 3 exx., VII(1)
Distribution: recorded in the study area at scattered localities. In Poland, despite its local distribution, this species has been recorded at many localities throughout the country.

101. *Cucullia lactucae* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Kołobrzeg, Świnoujście;
Distribution: not recorded during this study. There are two historical localities of this species in the study area (Urbahn & Urbahn 1939). Local in Poland, it has been trapped at a few localities in the south of the country.

102. *Cucullia umbratica* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Kostrzyn, Mielenko Drawskie, Mrzeżyno, Ziemsko;

Abundance and flight period: 23 exx., V(3) – VI(1) and VIII(1)
Distribution: uniform across the entire study area; also recorded at many localities elsewhere in Poland.

103. *Cucullia campanulae* Freyer, 1831

Localities:
– before 1945: Szczecin;

Distribution: not recorded during this study. There is one historical locality of this species in the study area (Urbahn & Urbahn 1939). In Poland it is known only from the Tatra Mts. (Batkowski et al. 1972).

104. *Cucullia chamomillae* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Drawsko Pomorskie, Gryfino, Stargard, Szczecin, Wysoka Kamieńska,
– 1945-2000: Dziwnówek, Puszcza Bukowa,
– after 2000: Drawsko Military Training Area, Mrzeżyno;

Abundance and flight period: 2 exx., V(3)
Distribution: found at scattered localities in the study area; though local in Poland, this species has been recorded at numerous sites throughout the country.

105. *Cucullia tanaceti* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Daleszewo, Redło, Szczecin, Wolin,
– after 2000: Mrzeżyno;

Abundance and flight period: 2 exx., V(2-3)
Distribution: found at scattered localities in the study area; though local in Poland, recorded at numerous localities all over the country.

106. *Cucullia asteris* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Drawsko Pomorskie, Kołobrzeg, Police, Puszcza Bukowa, Siadło Dolne, Stargard, Szczawno, Szczecin, Świnoujście,
– after 2000: Czelin, Mielenko Drawskie, Ziemsko;

Abundance and flight period: 5 exx., V(3) – VI(1)

Distribution: found at scattered localities in the study area. Although local in Poland, this species has been recorded at many sites elsewhere in the country.

107. *Shargacucullia scrophulariae* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Świnoujście,
– 1945-2000: Cedynia,
– after 2000: Kaleńsko, Kołomąć, Krobielewko;
Abundance and flight period: 4 exx., V(1-3)
Distribution: found at scattered localities in the study area. A local species in Poland, it has been recorded at many other sites elsewhere in the country.

108. *Shargacucullia lanceolata* (de Villers, 1789)

Localities:
– before 1945: Szczecin;
Distribution: not recorded during this study, although there is one historical locality of this species in the study area (URBAHN & URBAHN 1939). A local species in Poland, it has been recorded at just a few other localities elsewhere in the country.

109. *Shargacucullia lychnitis* (Rambur, 1833)

Localities:
– before 1945: Daleszewo, Drawsko Pomorskie, Redło, Świnoujście,
– after 2000: Bielinek, Mielenko Drawskie, Moczydło;
Abundance and flight period: 5 exx., VI(3)
Distribution: found at scattered localities in the study area. A local species in Poland, it has been recorded at many other localities elsewhere in the country.

110. *Shargacucullia verbasci* (Linnaeus, 1758)

Localities:
– before 1945: Drawsko Pomorskie, Dziwnów, Grędziec, Redło, Strachocin, Szczecin, Świnoujście,
– after 2000: Kołomąć, Krobielewko, Mielenko Drawieńskie, Mrzeżyno;
Abundance and flight period: 4 exx., V(3) – VI(2)
Distribution: found at scattered localities in the study area. A local species in Poland, it has been recorded at many other localities in other parts of the country.

AMPHIPYRINAE

111. *Amphipyra pyramidea* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,

– 1945-2000: Bielinek, Kołobrzeg, Puszcza Bukowa,
– after 2000: Czelin, Drawsko Military Training Area, Kaleńsko, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Mrzeżyno, Wiejkowski Las, Witnica, Zalesie, Zawarcie;

Abundance and flight period: 18 exx., VII(2) – VIII(3)

Distribution: recorded at scattered localities throughout the study area, but also at numerous sites elsewhere in Poland.

112. *Amphipyra berbera* Rungs, 1949

Localities:
– 1945-2000: Bielinek, Międzyzdroje, Puszcza Bukowa, Świnoujście,
– after 2000: Karsibór, Krobielewko, Mielenko Drawskie, Moczydło, Mrzeżyno, Mszczuje, Zawarcie;

Abundance and flight period: 9 exx., VIII(1–3)

Distribution: recorded at scattered localities throughout the study area, but also at many others in Poland.

113. *Amphipyra perflua* (Fabricius, 1787)

Localities:
– before 1945: Kołobrzeg;

Distribution: not recorded during this study, although there is one historical locality of this species in the study area (Urbahn & Urbahn 1939). A local species in Poland, it has been recorded at just a few other localities elsewhere in the country.

114. *Amphipyra livida* (Denis & Schiffermüller, 1775)

Localities:
– after 2000: Kołobrzeg, Międzychód;

Abundance and flight period: 6 exx., VIII(3) – X(2)

Distribution: found in the study area at only two widely scattered licalities. Although a local species in Poland, it has been recorded at numerous other sites right across the country.

115. *Amphipyra tragopoginis* (Clerck, 1759)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Międzywodzie, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Drawsko Military Training Area, Kaleńsko, Kostrzyn, Krobielewko, Międzychód, Mrzeżyno, Nowa Korytnica, Słońsk, Wiejkowski Las, Zawarcie;

Abundance and flight period: 26 exx., VII (2) – X(2)

Distribution: uniform across the entire study area, also at many localities elsewhere in Poland.

PSAPHIDINAE

116. *Asteroscopus sphinx* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Puszcza Bukowa,
– after 2000: Czelin, Kaleńsko, Moczydło;
Abundance and flight period: 48 exx., IX(3) – XI(3)
Distribution: recorded at scattered localities throughout the study area and at many other sites elsewhere in Poland.

117. *Brachionycha nubeculosa* (Esper, 1785)

Localities:
– before 1945: Drawsko Pomorskie,
– after 2000: Czelin, Drawsko Pomorskie, Kaleńsko, Mielenko Drawskie;
Abundance and flight period: 32 exx., III(2) – IV(2)
Distribution: recorded in the study area at four scattered localities. Though local in Poland, it has been recorded at many sites all over the country.

118. *Allophyes oxyacanthae* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzyzdroje, Puszcza Bukowa,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Myślibórz Wielki, Wiejkowski Las, Wrzosowiska Cedyńskie;
Abundance and flight period: 39 exx., IX(2) – XI(1)
Distribution: uniform across the entire study area; also found at many localities elsewhere in Poland.

ONCOCNEMIDINAE

119. *Calophasia lunula* (Hufnagel, 1766)

Localities:
– before 1945: Drawsko Pomorskie, Gryfino, Puszcza Bukowa, Reptowo, Szczecin, Świnoujście,
– 1945-2000: Świnoujście,
– after 2000: Kaleńsko, Krobielewko, Międzychód, Moczydło, Stare Kurowo, Wrzosowiska Cedyńskie, Zawarcie;
Abundance and flight period: 42 exx., IV(3) – VI(2) and VII(1) – VIII(3)
Distribution: recorded at scattered localities throughout the study area; also at many sites in other parts of Poland.

120. *Xylocampa areola* (Esper, 1789)

Localities:
– 1945-2000: Świnoujście,
– after 2000: Karsibór, Świnoujście;

Abundance and flight period: 19 exx., IV(1) – V(2)

Distribution: one individual was recorded in the study area at the end of the 20th century; this was the first record for Poland (Nowacki 1990). Its occurrence has since been confirmed at two closely adjacent localities, which are the only ones in Poland where this species has been found.

CONDICINAE

121. *Eucarta virgo* (Treitschke, 1835)

Localities:
– after 2000: Bielinek, Czelin, Dźwirzyno, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Oksza, Słońsk, Sówka, Zawarcie, Ziemsko;

Abundance and flight period: 162 exx., VI(1) – X(1)

Distribution: these are the first records of this species in the study area. Its distribution is now uniform across the entire area and has been recorded at many other localities elsewhere in Poland.

HELIOTHINAE

122. *Protoschinia scutosa* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Szczecin, Świnoujście,
– after 2000: Kaleńsko;

Abundance and flight period: 1 ex., IX(2)

Distribution: recorded at only three scattered localities in the study area. A local species in Poland. Migrating individuals have been recorded at a few sites in various parts of the country.

123. *Heliothis viriplaca* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Puszcza Bukowa,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Międzychód, Mrzeżyno, Słońsk, Stare Kurowo, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 96 exx., V(2) – VI(1) and VII(1) – IX(2)

Distribution: recorded at scattered localities throughout the study area and at many others elsewhere in Poland.

124. *Heliothis adaucta* Butler, 1878

Localities:
– before 1945: Szczecin,
– after 2000: Drawsko Military Training Area, Kostrzyn, Mrzeżyno;
Abundance and flight period: 3 exx., VII – VIII(1)
Distribution: recorded at only four scattered localities in the study area. A local species in Poland. Migrating individuals have been recorded at a few sites in various parts of the country.

125. *Heliothis ononis* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Redło;
Distribution: not found during the study, but there is one historical record from this area (Urbahn & Urbahn 1939). Occasional migrating individuals in Poland are recorded mainly in the south-east of the country (Bąkowski & Piątek 2012, Nowacki & Hołowiński 1999).

126. *Helicoverpa armigera* (Hübner, 1808)

Localities:
– after 2000: Mrzeżyno, Zawarcie;
Abundance and flight period: 7 exx., VIII(1) – IX(2)
Distribution: recorded for the first time in the study area at two scattered localities. In Poland, migrating individuals are recorded mainly in the south, east and centre of the country.

127. *Pyrrhia umbra* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Międzyzdroje, Puszcza Bukowa,
– after 2000: Czelin, Kaleńsko, Kostrzyn, Kołomąć, Krobielewko, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Nowa Korytnica, Santok, Słońsk;
Abundance and flight period: 21 exx., V(3) – IX(2)
Distribution: recorded at scattered localities throughout the study area and at many others elsewhere in Poland.

ERIOPINAE

128. *Callopistria juventina* (Stoll, 1782)

Localities:
– before 1945: Szczecin, Gunice, Międzyzdroje, Police, Świnoujście,
– 1945-2000: Bielinek,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Nowa Korytnica, Sówka, Stare Kurowo, Wiejkowski Las;

Abundance and flight period: 89 exx., VI(1) – VIII(2)

Distribution: recorded at scattered localities throughout the study area and at many sites in other parts of Poland.

BRYOPHILINAE

129. *Cryphia fraudatricula* (Hübner, 1803)

Localities:
– after 2000: Czelin, Kaleńsko, Zawarcie;

Abundance and flight period: 53 exx., VI(1) – VII(2)

Distribution: these are the first records of this species in the study area, at three scattedred localities. In Poland local, but recorded at many sites all over the country.

130. *Cryphia algae* (Fabricius, 1775)

Localities:
– before 1945: Puszcza Bukowa, Szczecin,
– 1945-2000: Bielinek, Puszcza Bukowa,
– after 2000: Bielinek, Czelin, Kaleńsko, Mielenko Drawskie, Międzychód, Mrzeżyno, Mszczuje, Zawarcie;

Abundance and flight period: 102 exx., VII(3) – IX(1)

Distribution: recorded at scattered localities throughout the study area and also at many others elsewhere in Poland.

131. *Bryophila ereptricula* (Treitschke, 1825)

Localities:
– before 1945: Linki;

Distribution: not recorded during this study. There is one historical locality in the study area (Urbahn & Urbahn 1939). In Poland, the species occurs locally, but has been recorded at a few localities in the south of the country. The latest records come from the Pieniny Mts (Nowacki & Wąsala 2008ab), the province of Opole (Nowacki & Wąsala 2017) and the Świętokrzyskie Mts (Nowacki & Wąsala 2021b).

132. *Bryophila raptricula* (Denis & Schiffermüller, 1775)

Localities:
– 1945-2000: Świnoujście,
– after 2000: Kaleńsko, Międzychód;

Abundance and flight period: 6 exx., VI(1) – VII(2)

Distribution: recorded at only three scattered localities in the study area. In Poland, known from a small numer of sites, mainly in the north, west and south of the country.

133. *Bryophila domestica* (Hufnagel, 1766)

Localities:
– before 1945: Drawsko Pomorskie, Radziszewo, Redło, Stargard, Szczecin, Tanowo, Świnoujście;

Distribution: though not recorded during the present study, there are seven historical localities of this species in the study area (URBAHN & URBAHN 1939). Occurs locally throughout Poland.

XYLENINAE

134. *Caradrina morpheus* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Gryfino, Kaleńsko, Karsibór, Kołobrzeg, Kołomąć, Kostrzyn, Krobielewko, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Oksza, Porzecze, Raduń, Słońsk, Stare Kurowo, Wiejkowski Las, Zalesie, Zawarcie, Ziemsko;

Abundance and flight period: 767 exx., V(3) – IX(1)

Distribution: uniform across the entire study area; recorded at many other localities elsewhere in Poland.

135. *Caradrina selini* (Boisduval, 1840)

Localities:
– before 1945: Międzyzdroje, Świnoujście, Ładzin, Szczecin, Puszcza Bukowa, Reptowo, Rosowo, Dziwnów, Drawsko Pomorskie, Mrzeżyno, Kołobrzeg,
– 1945-2000: Bielinek, Międzywodzie, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Kaleńsko, Krobielewko, Mielenko Drawskie, Międzychód, Mrzeżyno, Sówka, Stare Kurowo, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 554 exx., V(3) – VIII(1)

Distribution: uniform across the entire study area; recorded at many other localities in other parts of Poland.

136. *Caradrina clavipalpis* (Scopoli, 1763)

Localities:
- before 1945: widely distributed,
- 1945-2000: Międzyzdroje, Puszcza Bukowa,
- after 2000: Kaleńsko, Krobielewko, Międzychód, Mrzeżyno, Stare Kurowo, Wiejkowski Las, Ziemsko;

Abundance and flight period: 14 exx., V(3) – VII(1) and IX(1-2)
Distribution: recorded at scattered localities throughout the study area; also reported from many other sites in various parts of Poland.

137. *Hoplodrina octogenaria* (Goeze, 1781)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
- after 2000: Czelin, Kaleńsko, Karsibór, Kostrzyn, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Oksza, Porzecze, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 780 exx., V(3) – VIII(3)
Distribution: uniform across the entire study area; recorded at many other localities throughout Poland.

138. *Hoplodrina blanda* (Denis & Schiffermüller, 1775)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Puszcza Bukowa, Świnoujście,
- after 2000: Czelin, Dźwirzyno, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Porzecze, Słońsk, Sówka, Stare Kurowo, Zawarcie, Ziemsko;

Abundance and flight period: 258 exx., VI(2) – VIII(3)
Distribution: uniform across the entire study area; also records from many other localities elsewhere in Poland.

139. *Hoplodrina respersa* (Denis & Schiffermüller, 1775)

Localities:
- before 1945: Redło, Szczecin, Wysoka Kamieńska,
- after 2000: Kaleńsko;

Abundance and flight period: 3 exx., VI(2) – VII(2)

Distribution: recorded at only four localities scattered across the study area. Elsewhere in Poland, this species is known from a few sites, mainly in the south and east of the country.

140. *Hoplodrina ambigua* (Denis & Schiffermüller, 1775)

Localities:
- before 1945: Daleszewo, Jedliny, Międzyzdroje, Puszcza Bukowa, Raduń, Stargard, Szczecin, Świnoujście,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Świnoujście,
- after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Słońsk, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 198 exx., V(3) – X(2)
Distribution: uniform across the entire study area; known from many other localities elsewhere in Poland.

141. *Chilodes maritima* (Tauscher, 1806)

Localities:
- before 1945: Drawsko Pomorskie, Dziwnów, Szczecin, Świnoujście,
- 1945-2000: Bielinek, Kołobrzeg, Mrzeżyno,
- after 2000: Mielenko Drawskie, Międzywodzie, Mrzeżyno, Zalesie;

Abundance and flight period: 4 exx., VI(2) – VII(2)
Distribution: recorded at scattered localities throughout the study area; occurs locally in Poland, but is known from many other sites all across the country.

142. *Athetis pallustris* (Hübner, 1808)

Localities:
- before 1945: Reptowo, Szczecin, Świnoujście,
- 1945-2000: Kołobrzeg, Świnoujście,
- after 2000: Czelin, Kaleńsko, Krobielewko, Mszczuje;

Abundance and flight period: 11 exx., V(2) – VII(3)
Distribution: recorded at scattered localities throughout the study area; occurring locally in Poland, it is known from a small number of sites all over the country.

143. *Charanyca trigrammica* (Hufnagel, 1766)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Puszcza Bukowa,
- after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Nowa

Korytnica, Porzecze, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 437 exx., V(1) – VII(2)

Distribution: uniform across the entire study area; recorded at numerous other localities elsewhere in Poland.

144. *Charanyca ferruginea* (Esper, 1785)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Kaleńsko, Karsibór, Kostrzyn, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Sówka, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 901 exx., V(2) – IX(1)

Distribution: uniform across the entire study area; records from many other localities elsewhere in Poland.

145. *Dypterygia scabriuscula* (Linnaeus, 1758)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Pobierowo, Słońsk, Stare Kurowo, Troszyn, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie, Ziemsko;

Abundance and flight period: 344 exx., V(2) – VIII(3)

Distribution: uniform across the entire study area; found at many localities in other parts of Poland.

146. *Mormo maura* (Linnaeus, 1758)

Localities:

– before 1945: Jedliny, Międzyzdroje, Świnoujście;

Distribution: not found during the present study, but there are three historical records from the the north-western part of the study area (Urbahn & Urbahn 1939). A locally occurring species in Poland, it is known from a small number of localities in the south and centre of the country. The lastest records come from southern Poland, from the Bieszczady Mts, Lower Silesia and southern Wielkopolska (Nowacki & Wąsala 2018).

147. *Thalpophila matura* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Międzyzdroje,, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Drawsko Military Training Area, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Stare Kurowo, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 441 exx., VII(3) – X(1)

Distribution: uniform across the entire study area; records from many localities elsewhere in Poland.

148. *Trachea atriplicis* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Dźwirzyno, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Oksza, Porzecze, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie, Ziemsko;

Abundance and flight period: 252 exx., V(3) – VIII(1)

Distribution: uniform across the entire study area; recorded at many localities in other parts of Poland.

149. *Euplexia lucipara* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzyzdroje, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Dźwirzyno, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Sówka, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 67 exx., V(3) – VIII(3)

Distribution: uniform across the entire study area; known from localities all over Poland.

150. *Phlogophora meticulosa* (Linnaeus, 1758)

Localities:
– before 1945: Szczecin,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,

– after 2000: Czelin, Kaleńsko, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Sówka, Stare Kurowo, Witnica, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 114 exx., V(3) – X(3)

Distribution: uniform across the entire study area; also found at many other localities all across Poland.

151. *Hyppa rectilinea* (Esper, 1788)

Localities:

– before 1945: Kołobrzeg, Międzyzdroje, Mrzeżyno, Police, Stepnica, Szczecin,
– 1945-2000: Mrzeżyno,
– after 2000: Kaleńsko, Kołobrzeg, Mrzeżyno, Sówka;

Abundance and flight period: 4 exx., VI(2)

Distribution: recorded at scattered localities throughout the study area; though a local species in Poland, it has been recorded at many sites throughout the country.

152. *Actinotia polyodon* (Clerck, 1759)

Localities:

– before 1945: Drawsko Pomorskie, Międzyzdroje, Redło, Stepnica, Szczecin,
– 1945-2000: Bielinek, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Bielinek, Drawsko Military Training Area, Czelin, Kaleńsko, Kostrzyn, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Sówka, Stare Kurowo, Wrzosowiska Cedyńskie;

Abundance and flight period: 71 exx., V(1) – VIII(3)

Distribution: recorded at scattered localities throughout the study area and at many others elsewhere in Poland.

153. *Elaphria venustula* (Hübner, 1790)

Localities:

– before 1945: Bielinek, Drawsko Pomorskie, Jedliny, Szczecin,
– 1945-2000: Bielinek, Międzywodzie, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Dźwirzyno, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Słońsk, Sówka, Stare Kurowo, Wrzosowiska Cedyńskie, Zawarcie, Ziemsko;

Abundance and flight period: 1464 exx., V(2) – VIII(2)

Distribution: uniform across the entire study area; also recorded at many localities in other parts of Poland.

154. *Pseudeustrotia candidula* (Denis & Schiffermüller, 1775)

Localities:
- before 1945: Drawsko Pomorskie, Kołobrzeg, Pęzino, Szczecin, Świnoujście,
- 1945-2000: Bielinek, Kołobrzeg, Puszcza Bukowa,
- after 2000: Bielinek, Czelin, Gryfino, Kaleńsko, Karsibór, Kołobrzeg, Kołomąć, Kostrzyn, Krobielewko, Łukęcin, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Nowa Korytnica, Oksza, Porzecze, Raduń, Santok, Słońsk, Stare Kurowo, Świnoujście, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 854 exx., V(2) – VIII(3)

Distribution: uniform across the entire study area; also recorded at many localities elsewhere in Poland.

155. *Ipimorpha retusa* (Linnaeus, 1761)

Localities:
- before 1945: Jedliny, Kołobrzeg, Raduń, Reptowo, Stargard, Szczecin, Świnoujście,
- 1945-2000: Bielinek, Puszcza Bukowa, Świnoujście,
- after 2000: Kaleńsko, Karsibór, Krobielewko, Międzychód, Oksza, Porzecze, Słońsk, Zawarcie;

Abundance and flight period: 26 exx., V(3) – VIII(1)

Distribution: recorded at scattered localities throughout the study area; also at many other sites elsewhere in Poland.

156. *Ipimorpha subtusa* (Denis & Schiffermüller, 1775)

Localities:
- before 1945: Kołobrzeg, Międzyzdroje, Puszcza Bukowa, Raduń, Stargard, Szczecin, Świnoujście,
- 1945-2000: Bielinek, Kołobrzeg, Międzyzdroje, Puszcza Bukowa, Świnoujście,
- after 2000: Czelin, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Zawarcie;

Abundance and flight period: 33 exx., V(3) – VIII(2)

Distribution: recorded at scattered localities throughout the study area, and at many others elsewhere in Poland.

157. *Enargia paleacea* (Esper, 1788)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Międzywodzie, Międzyzdroje, Puszcza Bukowa, Świnoujście,
- after 2000: Bielinek, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Moczydło, Mszczuje, Wiejkowski Las;

Abundance and flight period: 8 exx., VII(1) – VIII(3)

Distribution: recorded at scattered localities throughout the study area; also at many other sites throughout Poland.

158. *Dicycla oo* (Linnaeus, 1758)

Localities:

– before 1945: Szczawno;

Distribution: not recorded during the present study. There is one historical locality of this species in the study area (URBAHN & URBAHN 1939). Its occurrence is extremely local, and its range has contracted considerably during the past 100 years. Recent records come from the Białowieża Primeval Forest (BUSZKO et al. 1996) and Lower Silesia (NOWACKI & SZPOR 1989).

159. *Cosmia affinis* (Linnaeus, 1767)

Localities:

– before 1945: Kołobrzeg,
– 1945-2000: Bielinek,
– after 2000: Bielinek, Czelin, Gryfino, Kaleńsko, Międzychód, Porzecze, Santok, Słońsk;

Abundance and flight period: 8 exx., VII(2) – IX(3)

Distribution: recorded at scattered localities, mainly in the western and southern parts of the study area; also known from many localities elsewhere in Poland.

160. *Cosmia pyralina* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: Drawsko Pomorskie, Puszcza Bukowa, Szczawno, Szczecin,
– 1945-2000: Bielinek, Puszcza Bukowa,
– after 2000: Czelin, Kaleńsko, Międzychód, Moczydło, Porzecze, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 59 exx., VI(1) – VIII(2)

Distribution: uniform across the entire study area; recorded at many localities elsewhere in Poland.

161. *Cosmia trapezina* (Linnaeus, 1758)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Międzyzdroje, Moczydło, Mrzeżyno, Porzecze, Słońsk, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 164 exx., VI(2) – IX(1)

Distribution: uniform across the entire study area; also recorded at many other localities throughout Poland.

162. *Atethmia centrago* (Haworth, 1809)

Localities:
– after 2000: Stare Kurowo;
Abundance and flight period: 1 ex., VIII(1),
Distribution: the first record of this species in the study area, at one locality in its south-western part. Local in Poland, it is known from a few localities, chiefly in the south and centre of the country.

163. *Xanthia togata* (Esper, 1788)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Myślibórz Wielki, Wrzosowiska Cedyńskie, Zawarcie;
Abundance and flight period: 15 exx., IX(2) – X(2)
Distribution: recorded at scattered localities throughout the study area, also at many others elsewhere in Poland.

164. *Xanthia icteritia* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Nowa Korytnica, Wiejkowski Las;
Abundance and flight period: 3 exx., VIII(3) – X(2)
Distribution: recorded at scattered localities throughout the study area; also known from many other sites elsewhere in Poland.

165. *Xanthia gilvago* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Puszcza Bukowa, Reptowo, Stargard, Szczecin, Świnoujście,
– after 2000: Czelin, Kaleńsko, Kostrzyn, Międzychód;
Abundance and flight period: 9 exx., IX(2) – X(1)
Distribution: recorded at scattered localities throughout the study area; though a local species in Poland, it has been reported from numerous localities throughout the country.

166. *Xanthia ocellaris* (Borkhausen, 1792)

Localities:
– before 1945: Puszcza Bukowa, Szczecin,
– after 2000: Kaleńsko, Kostrzyn, Kołobrzeg, Mielenko Drawskie, Zawarcie;
Abundance and flight period: 13 exx., IX(2) – X(3)
Distribution: recorded at scattered localities throughout the study area; a local species in Poland but recorded at numerous localities in all parts of the country.

167. *Tiliacea aurago* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Drawsko Pomorskie, Międzyzdroje, Puszcza, Redło, Stargard, Szczawno, Szczecin, Świnoujście,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Puszcza Bukowa,
– after 2000: Bielinek, Drawsko Military Training Area, Kaleńsko, Mielenko Drawskie, Międzychód, Międzyzdroje, Zawarcie;
Abundance and flight period: 178 exx., IX(2) – X(3)
Distribution: recorded at scattered localities throughout the study area; local in Poland but nevertheless has been recorded at many sites throughout the country.

168. *Tiliacea citrago* (Linnaeus, 1758)

Localities:
– before 1945: Swobnica,
– after 2000: Kaleńsko, Kostrzyn, Mielenko Drawskie;
Abundance and flight period: 3 exx., IX(3)
Distribution: recorded in the study area at four scattered localities; also at many others elsewhere in Poland.

169. *Agrochola lychnidis* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Drawsko Pomorskie, Kołobrzeg, Puszcza Bukowa, Stargard, Szczecin, Świnoujście,
– 1945-2000: Bielinek, Dziwnówek, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Kostrzyn, Krobielewko, Międzychód, Moczydło, Wiejkowski Las, Wrzosowiska Cedyńskie;
Abundance and flight period: 46 exx., IX(2) – X(2)
Distribution: recorded at scattered localities throughout the study area, and at many others elsewhere in Poland.

170. *Agrochola circellaris* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,

– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Kaleńsko, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 85 exx., IX(1) – XI(3)
Distribution: uniform across the entire study area; also recorded at many localities elsewhere in Poland.

171. *Agrochola lota* (Clerck, 1759)

Localities:
– before 1945: widely distributed,
– 1945-2000: Dziwnówek, Kołobrzeg, Międzyzdroje, Niechorze,
– after 2000: Bielinek, Czelin, Kaleńsko, Mielenko Drawskie, Międzychód, Moczydło, Zawarcie;

Abundance and flight period: 20 exx., IX(3) – X(3)
Distribution: recorded at scattered localities throughout the study area; also known from many other sites in Poland.

172. *Agrochola macilenta* (Hübner, 1809)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzyzdroje, Niechorze, Puszcza Bukowa,
– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Kaleńsko, Międzychód, Moczydło, Wiejkowski Las, Zawarcie;

Abundance and flight period: 74 exx., IX(2) – XI(3)
Distribution: recorded at scattered localities throughout the study area, but also at many others throughout Poland.

173. *Agrochola nitida* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Drawsko Pomorskie, Police, Puszcza Bukowa, Resko, Szczecin, Świnoujście,
– after 2000: Bielinek, Kaleńsko, Międzychód;

Abundance and flight period: 31 exx., IX(1-3)
Distribution: recorded at scattered localities throughout the study area; local in Poland, with records from a few sites in different parts of the country.

174. *Agrochola helvola* (Linnaeus, 1758)

Localities:
- before 1945: widely distributed,
- 1945-2000: Kołobrzeg, Puszcza Bukowa,
- after 2000: Bielinek, Czelin, Drawsko Military Training Area, Kaleńsko, Krobielewko, Moczydło, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 67 exx., IX(1) – X(3)
Distribution: uniform across the entire study area; also recorded at many localities elsewhere in Poland.

175. *Agrochola litura* (Linnaeus, 1758)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Międzywodzie, Puszcza Bukowa,
- after 2000: Bielinek, Kaleńsko, Kostrzyn, Krobielewko, Moczydło, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Wiejkowski Las, Wrzosowiska Cedyńskie;

Abundance and flight period: 165 exx., IX(1) – XI(2)
Distribution: recorded at scattered localities throughout the study area and also at many others in Poland.

176. *Agrochola laevis* (Hübner, 1803)

Localities:
- before 1945: Szczecin,
- after 2000: Bielinek;

Abundance and flight period: 21 exx., IX(1-3)
Distribution: recorded in the study area at only two localities. A local species in Poland, it is known from a small number of sites in almost all parts of the country.

177. *Eupsilia transversa* (Hufnagel, 1766)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Niechorze, Puszcza Bukowa, Świnoujście,
- after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Międzyzdroje, Moczydło, Mrzeżyno, Myślibórz Wielki, Słońsk, Wiejkowski Las, Zawarcie;

Abundance and flight period: 109 exx., IX(1) – XI(2) and III(3) – V(1)
Distribution: uniform across the entire study area; also recorded at many localities elsewhere in Poland.

178. *Conistra vaccinii* (Linnaeus, 1761)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Niechorze, Puszcza Bukowa, Świnoujście,
- after 2000: Bielinek, Czelin, Drawsko Military Training Area, Gryfino, Kaleńsko, Karsibór, Kołobrzeg, Krobielewko, Łukęcin, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Pobierowo, Raduń, Santok, Słońsk, Sówka, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 557 exx., IX(2) – XI(3) and III(2) – V(2)
Distribution: uniform across the entire study area; also recorded at many localities in other parts of Poland.

179. *Conistra ligula* (Esper, 1791)

Localities:
- before 1945: Dobra, Międzyzdroje, Reptowo, Szczecin,
- 1945-2000: Międzyzdroje,
- after 2000: Kaleńsko;

Abundance and flight period: 1 ex., IV(1)
Distribution: recorded in the study area at five scattered localities. A local species in Poland, it has been recorded at a few sites in different parts of the country.

180. *Conistra rubiginosa* (Scopoli, 1763)

Localities:
- before 1945: Kołobrzeg, Międzyzdroje, Puszcza Bukowa, Reptowo, Szczecin, Świnoujście,
- 1945-2000: Bielinek, Puszcza Bukowa, Świnoujście,
- after 2000: Bielinek, Czelin, Kaleńsko, Międzychód, Mrzeżyno, Słońsk, Wiejkowski Las, Zawarcie;

Abundance and flight period: 8 exx., X(3) and III(3) – IV(2)
Distribution: recorded at scattered localities throughout the study area, but also at many other sites in Poland.

181. *Conistra rubiginea* (Denis & Schiffermüller, 1775)

Localities:
- before 1945: Drawsko Pomorskie, Kołobrzeg, Puszczy Bukowej, Reptowo, Rosowo, Szczecin,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Niechorze, Puszcza Bukowa, Świnoujście,

– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Nowa Korytnica, Słońsk, Wiejkowski Las, Zalesie, Zawarcie;

Abundance and flight period: 168 exx., IX(2–3) and III(2) – V(2)

Distribution: recorded at scattered localities throughout the study area, and at many sites elsewhere in Poland.

182. *Conistra erythrocephala* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: Drawsko Pomorskie, Kołobrzeg, Międzyzdroje, Police, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Bielinek, Kaleńsko, Kostrzyn, Międzychód, Moczydło;

Abundance and flight period: 28 exx., IX(3) – X(2) and IV(1) – V(1)

Distribution: Recorded at scattered localities throughout the study area; also at many other sites in different parts of Poland.

183. *Brachylomia viminalis* (Fabricius, 1776)

Localities:

– before 1945: Jedliny, Szczecin,
– after 2000: Gryfino;

Abundance and flight period: 2 exx., VII(2)

Distribution: recorded at only three localities in the western part of the study area. A local species in Poland, it has been recorded at a small number of localities in different parts of the country.

184. *Lithomoia solidaginis* (Hübner, 1803)

Localities:

– before 1945: Jedliny, Puszcza Bukowa, Reptowo, Szczecin,
– 1945-2000: Mrzeżyno,
– after 2000: Drawsko Military Training Area, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Wiejkowski Las;

Abundance and flight period: 15 exx., VIII(2) – IX(1)

Distribution: recorded at scattered localities throughout the study area and at many other sites in Poland.

185. *Lithophane semibrunnea* (Haworth, 1809)

Localities:

– before 1945: Kołobrzeg, Puszcza Bukowa, Stargard, Szczecin, Wisełka, Świnoujście;

Distribution: not recorded during the study. There are historical records from Poznań (Romaniszyn & Schille 1929) and from a few localities in the northern and western part of the study area (Urbahn & Urbahn 1939). The only recent record is from Łazy in Pomerania (Wąsala & Matuszewski 2017).

186. *Lithophane socia* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Puszcza Bukowa,
– after 2000: Bielinek, Kaleńsko, Krobielewko, Mielenko Drawskie, Mrzeżyno, Mszczuje, Słońsk, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 19 exx., IX(3) and III(3) – V(1)

Distribution: recorded at scattered localities throughout the study area; also at many sites elsewhere in Poland.

187. *Lithophane ornitopus* (Hufnagel, 1766)

Localities:
– before 1945: Grzepnica, Kołobrzeg, Police, Puszcza Bukowa, Szczecin, Świnoujście,
– 1945-2000: Bielinek, Puszcza Bukowa,
– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Kaleńsko, Kostrzyn, Moczydło, Mrzeżyno, Słońsk, Zawarcie;

Abundance and flight period: 20 exx., IX(1-3) and IV(1-3)

Distribution: recorded at scattered localities throughout the study area, and also at many others in Poland.

188. *Lithophane furcifera* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Kaleńsko, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Nowa Korytnica, Sówka, Troszyn, Ziemsko;

Abundance and flight period: 35 exx., IX(2) – X(3) and III(3) – IV(3)

Distribution: recorded at scattered localities throughout the study area, and at numerous other sites elsewhere in Poland.

189. *Lithophane lamda* (Fabricius, 1787)

Localities:
– before 1945: Jedliny, Kołobrzeg, Reptowo;

Distribution: not recorded during this study. There are historical records from just three scattered localities in the study area (Urbahn & Urbahn 1939). This is a very local species, recorded only at single, widely scattered localities in Poland, mainly in the north, east and south of the country. The latest records come from the eastern Baltic coast, the Augustów Forest, the Białowieża Primeval Forest, the Janów Forests, the Polesie and Roztocza regions, the Solska Forest, the vicinity of Nowa Dęba in Podkarpacie (Nowacki & Pałka 2015) and also the Świętokrzyskie Mts (Nowacki & Wąsala 2021b).

190. *Lithophane consocia* (Borkhausen, 1792)

Localities:

– before 1945: Kołobrzeg, Szczecin;

Distribution: not recorded during this study. There are historical records from only two scattered localities in the study area (URBAHN & URBAHN 1939). A very local species, it has been reported from just a few sites in north-eastern and southern Poland.

191. *Xylena vetusta* (Hübner, 1813)

Localities:

– before 1945: widely distributed,

– 1945-2000: Puszcza Bukowa,

– after 2000: Kaleńsko;

Abundance and flight period: 1 ex., IV(2)

Distribution: recorded at scattered localities throughout the study area; also at many other sites in Poland.

192. *Xylena exoleta* (Linnaeus, 1758)

Localities:

– before 1945: widely distributed,

– 1945-2000: Kołobrzeg;

– after 2000: Kaleńsko, Mielenko Drawskie, Wiejkowski Las;

Abundance and flight period: 3 exx., IX(3)

Distribution: recorded at scattered localities throughout the study area and at many others in various parts of Poland.

193. *Parastichtis suspecta* (Hübner, 1817)

Localities:

– before 1945: widely distributed,

– 1945-2000: Bielinek, Międzywodzie, Międzyzdroje, Świnoujście,

– after 2000: Bielinek, Kaleńsko, Karsibór, Moczydło, Słońsk, Zawarcie;

Abundance and flight period: 12 exx., VI(3) – VIII(1)

Distribution: recorded at scattered localities throughout the study area and at many others elsewhere in Poland.

194. *Apterogenum ypsillon* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: widely distributed,

– 1945-2000: Bielinek, Kołobrzeg, Międzyzdroje, Puszcza Bukowa, Świnoujście,

– after 2000: Kaleńsko, Mielenko Drawskie, Międzychód, Słońsk, Zawarcie;

Abundance and flight period: 8 exx., VI(3) – VIII(3)

Distribution: recorded at scattered localities throughout the study area; also recorded at many localities elsewhere in Poland.

195. *Aporophyla lueneburgensis* (Freyer, 1848)

Localities:
– before 1945: Szczecin,
– after 2000: Czelin, Drawsko Military Training Area, Kaleńsko, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Zawarcie;
Abundance and flight period: 242 exx., VIII(3) – X(3)
Distribution: found at scattered localities throughout the study area; also known from many other sites, mainly in western Poland.

196. *Aporophyla nigra* (Haworth, 1809)

Localities:
– after 2000: Mielenko Drawskie;
Abundance and flight period: 1 ex., IX(3)
Distribution: the first record for the study area, trapped in the eastern part of the study area. The specimen comes from the collection of Robert Słodzinka (25 IX 1998 1 ex.). A very local species, historically recorded at Lubliniec (Wolf 1935-44), later near Gubin in western Poland (Buszko & Śliwiński 1979) and from the Lower Silesian Forest (Malkiewicz et al. 2002, Nowacki et al. 1997).

197. *Griposia aprilina* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– after 2000: Bielinek, Kaleńsko, Mielenko Drawskie, Międzychód, Wiejkowski Las;
Abundance and flight period: 11 exx., IX(3) – X(2)
Distribution: found at scattered localities throughout the study area; recorded at numerous sites in western Poland.

198. *Dichonia convergens* (Denis & Schiffermüller, 1775)

Localities:
– after 2000: Bielinek;
Abundance and flight period: 8 exx., IX(3) – X(1)
Distribution: new to the study area, it was trapped at one locality in its western part. A local species, it has been recorded at a small number of sites in a belt across Poland from Western Pomerania through Wielkopolska to the south-east of the country.

199. *Antitype chi* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,

– 1945-2000: Międzyzdroje,
– after 2000: Bielinek, Drawsko Military Training Area, Kaleńsko, Mrzeżyno, Mszczuje, Myślibórz Wielki, Troszyn;

Abundance and flight period: 9 exx., VIII(2) – IX(2)

Distribution: recorded at scattered localities throughout the study area; a local species in Poland; but there are records from a small number of sites all over Poland.

200. *Dryobotodes eremita* (Fabricius, 1775)

Localities:
– before 1945: Dobra, Drawsko Pomorskie, Kołobrzeg, Puszcza Bukowa, Stargard, Szczawno, Szczecin, Świnoujście,
– after 2000: Bielinek, Kaleńsko, Międzychód;

Abundance and flight period: 14 exx., IX(3) – X(2)

Distribution: recorded at scattered localities throughout the study area; though a local species in Poland, it has been found at numerous localities throughout the country.

201. *Mesogona oxalina* (Hübner, 1803)

Localities:
– before 1945: Międzyzdroje, Puszcza Bukowa, Szczecin,
– 1945-2000: Międzyzdroje, Puszcza Bukowa, Świnoujście,
– after 2000: Karsibór, Mrzeżyno;

Abundance and flight period: 3 exx., VIII(3) – IX(1)

Distribution: occurs at four localities in the north-western part of the study area. Though local in Poland, this species has been recorded at many different sites all over the country.

202. *Ammoconia caecimacula* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Międzyzdroje, Niechorze, Szczecin,
– after 2000: Bielinek, Czelin, Kaleńsko, Moczydło, Mszczuje, Myślibórz Wielki, Troszyn, Wrzosowiska Cedyńskie;

Abundance and flight period: 132 exx., VIII(2) – X(2)

Distribution: recorded at scattered localities throughout the study area. Though local in Poland, this species is known from many sites in different parts of the country.

203. *Polymixis polymita* (Linnaeus, 1761)

Localities:
– before 1945: Kołobrzeg, Świnoujście;

Distribution: not recorded during the present study. There are historical rescords from two localities in the north of the study area (Urbahn & Urbahn 1939). Very local in Poland, it was recorded in Pomerania in the first half of the 20th century (Romaniszyn & Schille 1929), and at a few localities in Lower Silesia (Wolf 1939-1944). After 1950, recorded at Olszany near Krasiczyn (Bielewicz 1984) and at Unieście (Nowacki 1994).

204. *Polymixis flavicincta* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: Drawsko Pomorskie, Kołbaskowo, Międzyzdroje, Moczyły, Puszcza Bukowa, Reptowo, Stargard, Szczecin, Świnoujście;

Distribution: not recorded during the present study. There are some historical records from scattered localities (Urbahn & Urbahn 1939), and others from Lower Silesia in southern Poland (Wolf 1939-1944); also a more recent record from the Tatra Mts (Batkowski et al. 1972).

205. *Mniotype satura* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa,
– after 2000: Bielinek, Kaleńsko, Karsibór, Krobielewko, Międzychód, Międzyzdroje, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 293 exx., VIII(1) – X(2)

Distribution: uniform across the entire study area; also recorded at many localities elsewhere in Poland.

206. *Mniotype adusta* (Esper, 1790)

Localities:

– before 1945: Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Reptowo, Rosowo, Szczecin, Świnoujście,
– 1945-2000: Międzywodzie, Międzyzdroje, Niechorze,
– after 2000: Drawsko Military Training Area, Drawsko Pomorskie, Karsibór, Krobielewko, Międzywodzie, Mrzeżyno;

Abundance and flight period: 7 exx., VI(3)

Distribution: recorded at scattered localities throughout the study area; local in Poland, but reported from many different sites all over the country.

207. *Apamea monoglypha* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
–1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Dźwirzyno, Kaleńsko, Karsibór, Kostrzyn, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Mrzeżyno, Nowa Korytnica, Oksza, Porzecze, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 159 exx., VI(2) – VIII(3)

Distribution: uniform across the entire study area; also known from many localities in other parts of Poland.

208. *Apamea syriaca* (Osthelder, 1933)

Localities:
– after 2000: Kaleńsko;

Abundance and flight period: 1 ex., VII(1)

Distribution: the first record from the study area, where it was trapped at one locality in its western part. A local species in Poland, it has been recorded in the Roztocze region (Nowacki 2006b), near Pińczów in the Nida valley (Nowacki & Wąsala 2020), in Poznań (Nowacki & Wąsala 2018), and also in the Karkonosze (Nowacki & Wąsala 2021a) and Świętokrzyskie Mts (Nowacki & Wąsala 2021b).

209. *Apamea lithoxylaea* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Kostrzyn, Kołobrzeg, Międzyzdroje, Moczydło, Troszyn, Ziemsko;

Abundance and flight period: 12 exx., VI(3) – VII(3)

Distribution: recorded at scattered localities throughout the study area; also at many sites elsewhere in Poland.

210. *Apamea sublustris* (Esper, 1788)

Localities:
– before 1945: widely distributed,
– 1945-2000: Kołobrzeg, Międzyzdroje, Mrzeżyno,
– after 2000: Drawsko Military Training Area, Kołomąć, Moczydło, Nowa Korytnica, Puszcza Bukowa, Sówka, Wiejkowski Las, Ziemsko;

Abundance and flight period: 10 exx., VI(2) – VII(3)

Distribution: recorded at scattered localities throughout the study area; also at many other sites in various parts of Poland.

211. *Apamea crenata* (Hufnagel, 1766)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
- after 2000: Bielinek, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Nowa Korytnica, Sówka, Wiejkowski Las, Zawarcie;

Abundance and flight period: 50 exx., V(3) – VII(3)
Distribution: uniform across the entire study area; also recorded at many localities elsewhere in Poland.

212. *Apamea epomidion* (Haworth, 1809)

Localities:
- 1945-2000: Bielinek, Międzyzdroje, Puszcza Bukowa,
- after 2000: Kaleńsko, Karsibór, Mielenko Drawskie, Międzychód, Moczydło, Nowa Korytnica, Szczecin, Sówka;

Abundance and flight period: 7 exx., VI(3) – VII(2)
Distribution: recorded at scattered localities throughout the study area; though a local species in Poland, it has been recorded at numerous other sites all over the country.

213. *Apamea lateritia* (Hufnagel, 1766)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa,
- after 2000: Czelin, Kaleńsko, Karsibór, Kostrzyn, Mrzeżyno, Wiejkowski Las, Zawarcie;

Abundance and flight period: 23 exx., VI(3) – VIII(3)
Distribution: recorded at scattered localities throughout the study area; also known from many sites elsewhere in Poland.

214. *Apamea furva* (Denis & Schiffermüller, 1775)

Localities:
- before 1945: Drawsko Pomorskie, Dziwnów, Grębowo, Międzyzdroje, Puszcza Bukowa, Reptowo, Szczecin, Świnoujście,
- after 2000: Drawsko Military Training Area;

Abundance and flight period: 1 ex., VI(2)
Distribution: recorded at scattered localities throughout the study area. During the study period, found at one locality in its eastern part: a voucher specimen from

the collection of ROBERT SŁODZINKA (15 VI 2006 1 ex.). Local in Poland; recorded at a small number of localities throughout the country.

215. *Apamea oblonga* (Haworth, 1809)

Localities:
– before 1945: Szczecin, Puszcza Bukowa,
– 1945-2000: Międzywodzie,
– after 2000: Kaleńsko, Kostrzyn;

Abundance and flight period: 2 exx., VII(3) – VIII(1)

Distribution: recorded at five scattered localities in the study area. Local in Poland; recorded at a small number of localities in all regions of the country.

216. *Apamea remissa* (Hübner, 1809)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Troszyn, Wiejkowski Las;

Abundance and flight period: 20 exx., V(3) – VIII(1)

Distribution: uniform across the entire study area; also recorded at many other localities elsewhere in Poland.

217. *Apamea unanimis* (Hübner, 1813)

Localities:
– before 1945: Drawsko Pomorskie, Police, Puszcza Bukowa, Szczecin,
– 1945-2000: Bielinek, Kołobrzeg, Puszcza Bukowa,
– after 2000: Drawsko Military Training Area, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Santok, Słońsk, Ziemsko;

Abundance and flight period: 26 exx., V(3) – VI(3)

Distribution: recorded at scattered localities throughout the study area; though local in Poland, reported from numerous sites in all parts of the country.

218. *Apamea anceps* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Dźwirzyno, Kaleńsko, Karsibór, Krobielewko, Międzywodzie, Moczydło, Mrzeżyno, Nowa Korytnica, Porzecze, Santok;

Abundance and flight period: 124 exx., V(3) – VII(1)
Distribution: uniform across the entire study area; also found at many localities elsewhere in Poland.

219. *Apamea sordens* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Kaleńsko, Karsibór, Kostrzyn, Kołomąć, Krobielewko, Międzychód, Międzywodzie, Mrzeżyno, Mszczuje, Pobierowo, Słońsk, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 68 exx., V(2) – VII(3)
Distribution: uniform across the entire study area; also recorded at numerous localities elsewhere in Poland.

220. *Apamea scolopacina* (Esper, 1788)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Mielenko Drawskie, Międzychód, Mrzeżyno, Porzecze, Sówka, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 29 exx., VII(1-3)
Distribution: recorded at scattered localities throughout the study area and also at many others elsewhere in Poland.

221. *Pabulatrix pabulatricula* (Brahm, 1791)

Localities:
– before 1945: Drawsko Pomorskie, Puszcza Bukowa;

Distribution: not recorded during the present study, but there are historical records from two localities in the study area (Urbahn & Urbahn 1939). There are a few records from Poland as a whole, mainly in the central and eastern parts of the country.

222. *Lateroligia ophiogramma* (Esper, 1794)

Localities:
– before 1945: Jedliny, Kołobrzeg, Międzyzdroje, Mrzeżyno, Police, Puszcz Bukowa, Raduń, Szczecin, Świnoujście,
– 1945-2000: Bielinek, Międzywodzie, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Drawsko Military Training Area, Kaleńsko, Karsibór, Kołobrzeg, Krobielewko, Mielenko Drawskie, Międzychód, Mrzeżyno, Nowa Korytnica, Zalesie, Zawarcie;

Abundance and flight period: 29 exx., VI(2) – VIII(2)
Distribution: recorded at scattered localities throughout the study area, and also at many others elsewhere in Poland.

223. *Oligia strigilis* (Linnaeus, 1758)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
- after 2000: Czelin, Kaleńsko, Karsibór, Mielenko Drawskie, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Pobierowo, Santok, Stare Kurowo, Słońsk, Sówka, Wiejkowski Las, Zawarcie;

Abundance and flight period: 189 exx., VI(1) – VII(3)
Distribution: uniform across the entire study area; also recorded at many localities elsewhere in Poland.

224. *Oligia latruncula* (Denis & Schiffermüller, 1775)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Świnoujście,
- after 2000: Czelin, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Porzecze, Sówka, Stare Kurowo, Zawarcie, Ziemsko;

Abundance and flight period: 358 exx., VI(1) – VII(3)
Distribution: uniform across the entire study area; also at many other localities elsewhere in Poland.

225. *Oligia versicolor* (Borkhausen, 1792)

Localities:
- before 1945: Drawsko Pomorskie, Jedliny, Międzyzdroje, Reptowo, Szczecin,
- 1945-2000: Bielinek, Kołobrzeg, Międzyzdroje, Niechorze, Puszcza Bukowa, Świnoujście,
- after 2000: Czelin, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Zawarcie;

Abundance and flight period: 141 exx., V(3) – VIII(2)
Distribution: recorded at scattered localities throughout the study area; also found at many others elsewhere in Poland.

226. *Oligia fasciuncula* (Haworth, 1809)

Localities:
– before 1945: Świnoujście,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Dźwirzyno, Kaleńsko, Karsibór, Krobielewko, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Stare Kurowo, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 55 exx., VI(1) – VIII(2)

Distribution: recorded at scattered localities throughout the study area, and at many others elsewhere in Poland.

227. *Mesoligia furuncula* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Świnoujście,
– after 2000: Bielinek, Czelin, Gryfino, Kaleńsko, Karsibór, Kołobrzeg, Kołomąć, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Porzecze, Raduń, Santok, Słońsk, Sówka, Stare Kurowo, Świnoujście, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 477 exx., VI(3) – IX(1)

Distribution: uniform across the entire study area; also recorded at many other localities throughout Poland.

228. *Mesoligia literosa* (Haworth, 1809)

Localities:
– before 1945: Dziwnów, Kołobrzeg, Międzyzdroje, Mrzeżyno,
– 1945-2000: Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Świnoujście,
– after 2000: Dźwirzyno, Karsibór, Kołobrzeg, Mrzeżyno, Świnoujście;

Abundance and flight period: 52 exx., VI(3) – VIII(1)

Distribution: continuous along the Baltic coast all the way from Świnoujście to Kołobrzeg. A local species in Poland, it has been recorded at a small number of localities in the west and north of the country (Nowacki & Buszko 2019). Its distribution is continuous along the whole Baltic Sea coastline (Nowacki 1994).

229. *Mesapamea secalis* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,

– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Nowa Korytnica, Oksza, Sówka, Stare Kurowo, Wiejkowski Las, Zalesie;

Abundance and flight period: 86 exx., VI(1) – VIII(3)

Distribution: recorded at scattered localities throughout the study area; also at many others in various parts of Poland.

230. *Mesapamea secalella* Remm, 1983

Localities:

– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzyzdroje, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Kaleńsko, Krobielewko, Międzychód, Moczydło, Mszczuje, Nowa Korytnica, Zawarcie;

Abundance and flight period: 30 exx., VI(3) – VIII(3)

Distribution: recorded at scattered localities throughout the study area, but also at many others elsewhere in Poland.

231. *Eremobia ochroleuca* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: Drawsko Pomorskie, Redło, Stargard, Strachocin, Świnoujście;

Distribution: not recorded during the present study. There are historical records from five scattered localities in the study area (Urbahn & Urbahn 1939). A local species in Poland, it has been reported from a few other sites in different parts of the country.

232. *Luperina testacea* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Kostrzyn, Międzychód, Moczydło, Mszczuje, Nowa Korytnica, Wiejkowski Las, Zalesie, Zawarcie;

Abundance and flight period: 125 exx., VII(3) – IX(3)

Distribution: recorded at scattered localities throughout the study area, and also at many others elsewhere in Poland.

233. *Amphipoea oculea* (Linnaeus, 1761)

Localities:

– before 1945: Drawsko Pomorskie, Kołobrzeg, Międzyzdroje, Szczecin, Wisełka,

– 1945-2000: Bielinek, Kołobrzeg, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Kaleńsko, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Słońsk;

Abundance and flight period: 29 exx., VI(2) – IX(1)
Distribution: recorded at scattered localities throughout the study area; also known from many others elsewhere in Poland.

234. *Amphipoea fucosa* (Freyer, 1830)

Localities:
– before 1945: Drawsko Pomorskie, Jedliny, Puszcza Bukowa, Raduń, Reptowo, Szczecin, Wisełka,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Porzecze, Słońsk;

Abundance and flight period: 79 exx., VI(2) – VIII(3)
Distribution: recorded at scattered localities throughout the study area; also recorded at many localities in various parts of Poland.

235. *Amphipoea lucens* (Freyer, 1845)

Localities:
– before 1945: Jedliny, Redło, Reptowo,
– after 2000: Czelin, Mszczuje;

Abundance and flight period: 5 exx., VII(2) – IX(1)
Distribution: recorded at five scattered localities in the study area. A local species in Poland, it has been found at a small number of sites all over the country.

236. *Hydraecia micacea* (Esper, 1789)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Słońsk, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 211 exx., VII(2) – IX(3)
Distribution: uniform across the entire study area; also recorded at many other localities throughout Poland.

237. *Hydraecia ultima* Holst, 1965

Localities:
– after 2000: Gryfino, Kołobrzeg, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Nowa Korytnica, Wiejkowski Las, Zawarcie;

Abundance and flight period: 17 exx., VII(3) – IX(2)

Distribution: recorded at scattered localities throughout the study area. A local species that has been reported from a few sites mainly in the east and south of Poland.

238. *Gortyna flavago* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Niechorze, Puszcza Bukowa,
– after 2000: Bielinek, Czelin, Kaleńsko, Mielenko Drawskie, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Słońsk, Troszyn, Wiejkowski Las, Zalesie, Zawarcie;

Abundance and flight period: 21 exx., VIII(2) – IX(3)

Distribution: recorded at scattered localities throughout the study area, but also at many other sites elsewhere in Poland.

239. *Calamia tridens* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek,
– after 2000: Czelin, Kaleńsko, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Nowa Korytnica, Sówka, Stare Kurowo, Ziemsko;

Abundance and flight period: 25 exx., VI(2) – VIII(1)

Distribution: recorded at scattered localities throughout the study area; also known from many sites elsewhere in Poland.

240. *Crypsedra gemmea* (Treitschke, 1825)

Localities:
– before 1945: Czarnogłowy, Drawsko Pomorskie, Jedliny, Kołobrzeg, Międzyzdroje, Puszcza Bukowa, Reptowo, Szczecin,
– after 2000: Bielinek, Drawsko Military Training Area, Kaleńsko, Mielenko Drawskie, Mrzeżyno, Nowa Korytnica, Wrzosowiska Cedyńskie;

Abundance and flight period: 46 exx., VII(3) – IX(3)

Distribution: recorded at scattered localities throughout the study area. Local in Poland; reported from numerous sites throughout the country.

241. *Staurophora celsia* (Linnaeus, 1758)

Localities:

– before 1945: Drawsko Pomorskie, Gryfino, Międzyzdroje, Puszcza Bukowa, Reptowo, Stargard, Szczecin, Widuchowa,

– 1945-2000: Bielinek,

– after 2000: Bielinek, Drawsko Military Training Area, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Międzychód, Moczydło, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Wrzosowiska Cedyńskie;

Abundance and flight period: 152 exx., VIII(3) – X(2)

Distribution: recorded at scattered sites throughout the study area. Found locally in Poland, it has been reported from a great many other localities in all parts of the country.

242. *Helotropha leucostigma* (Hübner, 1808)

Localities:

– before 1945: widely distributed,

– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Mrzeżyno, Puszcza Bukowa, Świnoujście,

– after 2000: Bielinek, Kaleńsko, Karsibór, Kostrzyn, Międzychód, Moczydło, Mrzeżyno, Porzecze, Słońsk, Wiejkowski Las;

Abundance and flight period: 35 exx., VI(3) – VIII(3)

Distribution: recorded at scattered localities throughout the study area, and also at many others in different parts of Poland.

243. *Celaena haworthii* (Curtis, 1829)

Localities:

– before 1945: Jedliny, Kołobrzeg, Międzyzdroje, Puszcza Bukowa, Reptowo, Szczecin,

– 1945-2000: Świnoujście,

– after 2000: Drawsko Military Training Area, Mielenko Drawskie, Mrzeżyno;

Abundance and flight period: 2 exx., VIII(3)

Distribution: recorded at scattered localities throughout the study area. Even though this is a local species in Poland, it has been reported from many sites all over the country.

244. *Rhizedra lutosa* (Hübner, 1803)

Localities:

– before 1945: Międzyzdroje, Szczecin, Widuchowa, Świnoujście,

– 1945-2000: Bielinek, Puszcza Bukowa,

– after 2000: Bielinek, Czelin, Dziwnówek, Gryfino, Kaleńsko, Karsibór, Kostrzyn, Kołobrzeg, Krobielewko, Międzywodzie, Międzyzdroje, Moczydło, Mrzeżyno,

Mszczuje, Niechorze, Nowa Korytnica, Porzecze, Raduń, Słońsk, Wiejkowski Las, Zalesie, Zawarcie;

Abundance and flight period: 105 exx., VIII(3) – XI(3)

Distribution: recorded at scattered localities throughout the study area. A local species in Poland, it has been recorded at many sites all over the country.

245. *Nonagria typhae* (Thunberg, 1784)

Localities:

– before 1945: widely distributed,
– 1945-2000: Kołobrzeg, Mrzeżyno, Puszcza Bukowa,
– after 2000: Kaleńsko, Mielenko Drawskie, Mrzeżyno, Mszczuje, Świnoujście;

Abundance and flight period: 5 exx., IX(2-3)

Distribution: recorded at scattered localities throughout the study area, but also at many others elsewhere in Poland.

246. *Phragmatiphila nexa* (Hübner, 1808)

Localities:

– before 1945: Jedliny, Raduń, Szczecin, Świnoujście,
– 1945-2000: Puszcza Bukowa,
– after 2000: Kaleńsko, Mielenko Drawskie, Międzychód, Nowa Korytnica, Wiejkowski Las;

Abundance and flight period: 11 exx., IX(1) – X(2)

Distribution: recorded at scattered localities throughout the study area. Though local in Poland, known from many different sites all over the country.

247. *Archanara neurica* (Hübner, 1808)

Localities:

– after 2000: Karsibór;

Abundance and flight period: 1 ex., VII(2)

Distribution: the first record for the study area, at one locality in its north-western part (Wąsala 2016). Very local in Poland; there are historical records from Gdańsk and the Poznań area (Romaniszyn & Schille 1929). Also trapped very much later in north-eastern Poland at Białowieża and Czerlonka (Buszko et al. 1996) and at Łeba and Piaski on the Baltic coast (Nowacki 1994).

248. *Archanara dissoluta* (Treitschke, 1825)

Localities:

– before 1945: Drawsko Pomorskie, Dziwnów, Jedliny, Kołobrzeg, Międzyzdroje, Mrzeżyno, Szczecin, Warnowo, Świnoujście,
– 1945-2000: Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa,
– after 2000: Kaleńsko, Karsibór, Mielenko Drawskie, Moczydło, Mrzeżyno, Nowa Korytnica, Świnoujście;

Abundance and flight period: 12 exx., VII(2) – VIII(1)
Distribution: recorded at scattered localities throughout the study area. Though its occurrence is local in Poland, it is known from numerous sites throughout the country.

249. *Globia sparganii* (Esper, 1790)

Localities:
– before 1945: widely distributed,
– 1945-2000: Kołobrzeg, Międzywodzie, Świnoujście,
– after 2000: Gryfino, Krobielewko, Mielenko Drawskie, Mrzeżyno, Nowa Korytnica, Słońsk, Ziemsko;
Abundance and flight period: 12 exx., VII(3) – IX(3)
Distribution: recorded at scattered localities throughout the study area; also at many others elsewhere in Poland.

250. *Globia algae* (Esper, 1789)

Localities:
– before 1945: Kołbaskowo, Maszewo, Międzyzdroje, Stargard, Szczecin, Świnoujście,
– 1945-2000: Bielinek,
– after 2000: Bielinek, Czelin, Kaleńsko, Mielenko Drawskie;
Abundance and flight period: 3 exx., VII(2) – VIII(1)
Distribution: recorded at scattered localities throughout the study area. Though local in Poland, it has been reported from numerous sites in different parts of the country.

251. *Lenisa geminipuncta* (Haworth, 1809)

Localities:
– before 1945: Drawsko Pomorskie, Redło, Resko,
– 1945-2000: Bielinek, Międzyzdroje, Puszcza Bukowa,
– after 2000: Kaleńsko, Karsibór, Mrzeżyno, Mszczuje, Nowa Korytnica, Wiejkowski Las, Zawarcie;
Abundance and flight period: 21 exx., VII(2) – VIII(2)
Distribution: recorded at scattered localities throughout the study area. Local in Poland, known from numerous sites all over the country.

252. *Sedina buettneri* (Hering, 1858)

Localities:
– before 1945: Jedliny, Międzyzdroje, Szczecin, Widuchowa,
– 1945-2000: Bielinek, Międzywodzie, Puszcza Bukowa,
– after 2000: Bielinek, Czelin, Gryfino, Kaleńsko, Międzychód, Moczydło, Nowa Korytnica, Wiejkowski Las;

Abundance and flight period: 22 exx., IX(1) – X(1)
Distribution: recorded at scattered localities throughout the study area and at many others in different parts of Poland.

253. *Arenostola phragmitidis* (Hübner, 1803)

Localities:
– before 1945: Jedliny, Mrzeżyno, Szczecin, Warnowo, Świnoujście,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Świnoujście,
– after 2000: Bielinek, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Moczydło, Mrzeżyno, Nowa Korytnica, Porzecze, Słońsk, Wiejkowski Las, Zawarcie;

Abundance and flight period: 65 exx., VI(2) – VIII(2)
Distribution: recorded at scattered localities throughout the study area, and also at numerous other sites elsewhere in Poland.

254. *Longalatedes elymi* (Treitschke, 1825)

Localities:
– before 1945: Szczecin, Świnoujście,
– 1945-2000: Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Świnoujście,
– after 2000: Dźwirzyno, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Świnoujście;

Abundance and flight period: 291 exx., VI(2) – VII(2)
Distribution: in the study area occurs in a continuous range along the Baltic coast from Świnoujście to Kołobrzeg. In Poland, this species lives exclusively in coastal sand dunes (Nowacki 1994).

255. *Protarchanara brevilinea* (Fenn, 1864)

Localities:
– after 2000: Karsibór;

Abundance and flight period: 2 exx., VII(3) – VIII(1)
Distribution: the first record of this species in the study area, at one locality in its north–western part. In fact, this is the first record and only known locality of this species in the whole of Poland (Nowacki & Wąsala 2015).

256. *Photedes minima* (Haworth, 1809)

Localities:
– before 1945: Drawsko Pomorskie, Międzyzdroje, Puszcza Bukowa, Reptowo, Szczecin, Wisełka,
– 1945-2000: Bielinek, Kołobrzeg, Puszcza Bukowa,
– after 2000: Bielinek, Kaleńsko, Karsibór, Kołomąć, Moczydło, Mrzeżyno, Wiejkowski Las;

Abundance and flight period: 13 exx., VII(1) – IX(1)
Distribution: recorded at scattered localities throughout the study area, and at many other ones elsewhere in Poland.

257. *Photedes extrema* (Hübner, 1809)

Localities:
– 1945-2000: Dziwnówek, Międzywodzie, Mrzeżyno,
– after 2000: Dźwirzyno, Karsibór, Kołomąć, Międzywodzie, Mrzeżyno, Wiejkowski Las;
Abundance and flight period: 56 exx., VI(2) – VII(1)
Distribution: occurs at scattered localities mainly along the coastal belt of sand dunes in the study area. Earlier Polish records are from the dunes on the western Baltic coast (Nowacki 1994) and from Lower Silesia (Wolf 1939-1944).

258. *Photedes fluxa* (Hübner, 1809)

Localities:
– before 1945: Drawsko Pomorskie, Dziwnów, Międzyzdroje, Mrzeżyno, Police, Puszcza Bukowa, Szczecin, Świnoujście,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Świnoujście,
– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Dziwnówek, Gryfino, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Porzecze, Raduń, Słońsk, Stare Kurowo, Wiejkowski Las, Zalesie, Zawarcie;
Abundance and flight period: 531 exx., VI(1) – IX(1)
Distribution: uniform across the entire study area; also found at many localities elsewhere in Poland.

259. *Denticucullus pygmina* (Haworth, 1809)

Localities:
– before 1945: widely distributed,
– 1945-2000: Kołobrzeg, Międzyzdroje, Puszcza Bukowa,
– after 2000: Czelin, Kaleńsko, Mielenko Drawskie, Międzychód, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Stare Kurowo, Zawarcie;
Abundance and flight period: 69 exx., VII(2) – X(2)
Distribution: recorded at scattered localities in all parts of the study area, and at many others elsewhere in Poland.

260. *Coenobia rufa* (Haworth, 1809)

Localities:
– after 2000: Karsibór, Mrzeżyno;

Abundance and flight period: 3 exx., VII(3) – VIII(2)
Distribution: trapped at two localities in the study area. These records are actually the first for Poland. This species had been erroneously placed on the earlier distributional checklist of Lepidoptera in Poland (Buszko & Nowacki 2000); all the previously known localities (Urbahn & Urbahn 1939) in fact lie beyond the Polish-German border.

HADENINAE

261. *Coranarta cordigera* (Thunberg, 1788)

Localities:
– before 1945: Reptowo, Szczecin, Świnoujście;
Distribution: not recorded during this study. There are historical records from three localities scatteared across the north-western part of the study area (Urbahn & Urbahn 1939). A very local species in Poland, it has been recorded at a small number of sites in the north and east of the country and also in the Carpathian and Sudety Mts (Nowacki & Wąsala 2021b).

262. *Anarta myrtilli* (Linnaeus, 1761)

Localities:
– before 1945: widely distributed,
– 1945-2000: Międzywodzie,
– after 2000: Drawsko Military Training Area, Mrzeżyno, Wrzosowiska Cedyńskie;
Abundance and flight period: 30 exx., V(3) and IX(1)
Distribution: occurs at four widely scattered localities in the study area, but also at many other sites elsewhere in Poland.

263. *Anarta trifolii* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Drawsko Military Training Area, Dźwirzyno, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Pobierowo, Porzecze, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie;
Abundance and flight period: 169 exx., IV(3) – IX(2)
Distribution: uniform across the entire study area; also reported from a great many localities in other parts of Poland.

264. *Lacanobia w-latinum* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Kaleńsko, Karsibór, Kostrzyn, Kołobrzeg, Krobielewko, Mielenko Drawskie, Międzychód, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Sówka, Stare Kurowo, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 104 exx., V(2) – VII(1)

Distribution: uniform across the entire study area; also recorded at many localities elsewhere in Poland.

265. *Lacanobia amurensis* (Staudinger, 1901)

Localities:
– before 1945: Szczecin,
– 1945-2000: Mrzeżyno, Szczecin;

Distribution: the species was not found during this study. Earlier it had been found at just two widely separated localities (Nowacki 1994, Studziński 1979, Urbahn & Urbahn 1939). A local species in Poland, it has been reported from a small number of localities in various parts of the country.

266. *Lacanobia splendens* (Hübner, 1808)

Localities:
– before 1945: Jedliny, Wolin, Ładzin, Świnoujście,
– 1945-2000: Bielinek, Puszcza Bukowa,
– after 2000: Gryfino, Międzychód, Międzywodzie, Moczydło, Nowa Korytnica, Porzecze, Słońsk, Zalesie, Ziemsko;

Abundance and flight period: 32 exx., VI(2) – VIII(2)

Distribution: recorded at scattered localities throughout the study area. This species has a local occurrence in Poland; it is known from a few sites in different parts of the country.

267. *Lacanobia oleracea* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Oksza, Słońsk, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie, Ziemsko;

Abundance and flight period: 315 exx., V(3) – IX(1)

Distribution: uniform across the entire study area; also known from a great many localities throughout Poland.

268. *Lacanobia thalassina* (Hufnagel, 1766)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnów, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
- after 2000: Czelin, Kaleńsko, Karsibór, Krobielewko, Międzychód, Międzywodzie, Moczydło, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Santok, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Zawarcie;

Abundance and flight period: 156 exx., V(3) – X(2)
Distribution: uniform across the entire study area; reported from many localities elsewhere in Poland.

269. *Lacanobia contigua* (Denis & Schiffermüller, 1775)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Międzyzdroje, Mrzeżyno, Szczecin, Świnoujście,
- after 2000: Bielinek, Kaleńsko, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzywodzie, Międzyzdroje, Moczydło, Mrzeżyno, Nowa Korytnica, Puszcza Bukowa, Sówka, Wiejkowski Las;

Abundance and flight period: 13 exx., VI(1) – VII(3)
Distribution: recorded at scattered localities throughout the study area, also at many others elsewhere in Poland.

270. *Lacanobia suasa* (Denis & Schiffermüller, 1775)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
- after 2000: Bielinek, Czelin, Drawsko Military Training Area, Kaleńsko, Karsibór, Kostrzyn, Kostrzyn, Kołomąć, Krobielewko, Międzychód, Moczydło, Mszczuje, Nowa Korytnica, Słońsk, Sówka, Wiejkowski Las, Zawarcie;

Abundance and flight period: 154 exx., V(3) – IX(2)
Distribution: uniform across the entire study area; known from many localities elsewhere in Poland.

271. *Hada plebeja* (Linnaeus, 1761)

Localities:
- before 1945: widely distributed,

– 1945-2000: Bielinek, Kołobrzeg, Mrzeżyno, Puszcza Bukowa, Szczecin,
– after 2000: Kaleńsko, Karsibór, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Pobierowo, Sówka, Stare Kurowo, Zawarcie;

Abundance and flight period: 275 exx., V(1) – VIII(3)

Distribution: recorded at scattered localities throughout the study area, and at many others in various parts of Poland.

272. *Hecatera dysodea* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Swobnica, Szczecin,
– 1945-2000: Szczecin,
– after 2000: Czelin;

Abundance and flight period: 1 ex., VII(1)

Distribution: recorded at two localities in the north-west of the study area. A local species in Poland, it has been reported from a small number of sites all over the country.

273. *Hecatera bicolorata* (Hufnagel, 1766)

Localities:
– before 1945: Puszcza Bukowa, Stargard, Stargard, Szczecin, Wisełka, Świnoujście,
– 1945-2000: Puszcza Bukowa, Szczecin,
– after 2000: Mrzeżyno;

Abundance and flight period: 1 ex., VII(3)

Distribution: recorded at scattered localities throughout the study area. Local in Poland, recorded at a few localities in various parts of the country.

274. *Hadena compta* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Czepino, Grędziec, Międzyzdroje, Siadło Dolne, Stargard, Szczecin, Wisełka, Świnoujście,
– 1945-2000: Bielinek, Międzyzdroje, Puszcza Bukowa, Szczecin,
– after 2000: Czelin, Troszyn;

Abundance and flight period: 2 exx., VII(1)

Distribution: recorded at scattered localities throughout the study area, but also at many others elsewhere in Poland.

275. *Hadena confusa* (Hufnagel, 1766)

Localities:
– before 1945: Szczecin, Stargard;

Distribution: not recorded during this study. There are two historical localities in the study area (Urbahn & Urbahn 1939). Though local in Poland, it has been recorded from many sites all over the country.

276. *Hadena albimacula* (Borkhausen, 1792)

Localities:

– before 1945: Szczecin;

Distribution: not recorded during this study, but there is one historical locality in the study area (Urbahn & Urbahn 1939). Though local in Poland, it has been recorded from a few localities, mainly in the east and south of the country. Current records are only from the Hel Peninsula, the Augustów Forest, the Białowieża Primeval Forest, the Pieniny Mts and the Kraków-Częstochowa Upland (Nowicki & Wąsala 2006), and also the Świętokrzyskie Mts (Nowicki & Wąsala 2021b).

277. *Hadena filograna* (Esper, 1788)

Localities:

– before 1945: Swobnica,

– 1945-2000: Szczecin;

Distribution: not recorded during this study. There are two historical localities in the study area (Urbahn & Urbahn 1939). Local in Poland, it has been recorded from a small number of scattered localities, mainly in the east and south of the country.

278. *Hadena capsincola* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: widely distributed,

– 1945-2000: Bielinek, Kołobrzeg, Międzyzdroje, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,

– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kostrzyn, Kołomąć, Krobielewko, Międzychód, Moczydło, Mszczuje, Nowa Korytnica, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 95 exx., V(2) – IX(3)

Distribution: uniform across the entire study area; also recorded at many localities elsewhere in Poland.

279. *Hadena perplexa* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: Moczyły, Siadło Dolne, Szczecin,

– 1945-2000: Szczecin,

– after 2000: Czelin, Wiejkowski Las;

Abundance and flight period: 5 exx., VI(2-3)

Distribution: recorded at scattered localities, mainly in the western part of the study area; also found at many other sites elsewhere in Poland.

280. *Hadena irregularis* (Hufnagel, 1766)

Localities:
– before 1945: Strachocin, Szczecin,
– 1945-2000: Szczecin;
– after 2000: Czelin;

Abundance and flight period: 3 exx., VII(1)

Distribution: recorded at three scattered localities in the study area. Local in Poland, it is known from a small number of sites scattered across the country.

281. *Sideridis reticulata* (Goeze, 1781)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Kaleńsko, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Stare Kurowo, Wiejkowski Las;

Abundance and flight period: 64 exx., V(2) – VII(3)

Distribution: recorded at scattered localities throughout the study area; also from many others elsewhere in Poland.

282. *Sideridis rivularis* (Fabricius, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin,
– after 2000: Bielinek, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Mrzeżyno, Mszczuje, Nowa Korytnica, Słońsk, Sówka, Troszyn, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 38 exx., V(1) – VIII(3)

Distribution: recorded at scattered localities in all parts of the study area, and also at many sites elsewhere in Poland.

283. *Sideridis turbida* (Esper, 1790)

Localities:
– before 1945: Kołobrzeg, Międzyzdroje, Redło, Stargard, Stepnica, Szczecin, Świnoujście,
– 1945-2000: Międzywodzie, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Kaleńsko, Krobielewko, Mielenko Drawskie, Międzywodzie, Moczydło, Mrzeżyno, Wrzosowiska Cedyńskie;

Abundance and flight period: 29 exx., V(2) – VII(1)

Distribution: recorded at scattered localities throughout the study area; also found at numerous other sites all over Poland.

284. *Conisania leineri* (Freyer, 1836)

Localities:
– before 1945: Dziwnów, Kołobrzeg, Międzyzdroje,
– 1945-2000: Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Świnoujście,
– after 2000: Dźwirzyno, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Pobierowo, Świnoujście;

Abundance and flight period: 673 exx., VI(2) – VII(2)

Distribution: continuous along the whole Baltic coast within the study area, from Świnoujście to Kołobrzeg. In Poland this species occurrs exclusively in the coastal dune belt (Nowacki 1994, Nowacki & Buszko 2019).

285. *Melanchra persicariae* (Linnaeus, 1761)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Kaleńsko, Karsibór, Kołomąć, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Nowa Korytnica, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 45 exx., VI(2) – VIII(1)

Distribution: uniform across the entire study area; also known from many localities elsewhere in Poland.

286. *Ceramica pisi* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin,
– after 2000: Czelin, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Międzychód, Moczydło, Mszczuje, Porzecze, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Ziemsko;

Abundance and flight period: 60 exx., V(1) – VIII(3)

Distribution: recorded at scattered localities throughout the study area; also reported from many sites all over Poland.

287. *Mamestra brassicae* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Myślibórz

Wielki, Nowa Korytnica, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie;

Abundance and flight period: 96 exx., V(2) – IX(1)

Distribution: uniform across the entire study area; also recorded from numerous other localities in Poland.

288. *Papestra biren* (Goeze, 1781)

Localities:

– before 1945: Międzyzdroje, Reptowo, Szczecin, Świnoujście,
– 1945-2000: Kołobrzeg, Szczecin,
– after 2000: Drawsko Military Training Area, Karsibór, Krobielewko, Moczydło;

Abundance and flight period: 16 exx., V(2-3)

Distribution: recorded at scattered localities throughout the study area. Local in Poland, recorded from a small number of sites in the south of the country.

289. *Polia bombycina* (Hufnagel, 1766)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Kaleńsko, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Nowa Korytnica, Sówka, Wiejkowski Las, Ziemsko;

Abundance and flight period: 33 exx., V(3) – VII(3)

Distribution: recorded at scattered localities throughout the study area, and at many others elsewhere in Poland.

290. *Polia hepatica* (Clerck, 1759)

Localities:

– before 1945: Jedliny, Kołobrzeg, Police, Puszcza Bukowa, Reptowo, Szczecin,
– 1945-2000: Międzyzdroje, Mrzeżyno, Szczecin,
– after 2000: Drawsko Military Training Area, Mielenko Drawskie, Sówka, Troszyn, Wiejkowski Las, Ziemsko;

Abundance and flight period: 5 exx., VI(2)

Distribution: recorded at scattered localities throughout the study area. Local in Poland, reported from a few sites in the south of the country.

291. *Polia nebulosa* (Hufnagel, 1766)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Mrzeżyno, Troszyn, Ziemsko;

Abundance and flight period: 33 exx., V(3) – VII(3)
Distribution: recorded at scattered localities throughout the study area, and also at many others elsewhere in Poland.

292. *Pachetra sagittigera* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Puszcza Bukowa, Szczecin,
– after 2000: Drawsko Military Training Area, Kaleńsko, Kostrzyn, Krobielewko, Moczydło, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Sówka, Troszyn, Wiejkowski Las, Wrzosowiska Cedyńskie;

Abundance and flight period: 1691 exx., IV(3) – VI(2)
Distribution: recorded at scattered localities throughout the study area, and also at a great many sites all over Poland.

293. *Mythimna turca* (Linnaeus, 1758)

Localities:
– before 1945: Jedliny, Międzyzdroje, Reptowo,
– 1945-2000: Bielinek, Kołobrzeg, Puszcza Bukowa, Szczecin,
– after 2000: Czelin, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mszczuje, Nowa Korytnica, Słońsk, Sówka, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 332 exx., VI(1) – VII(3)
Distribution: recorded at scattered localities in the study area, and at many others elsewhere in Poland.

294. *Mythimna conigera* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Mrzeżyno, Puszcza Bukowa, Szczecin,
– after 2000: Czelin, Kostrzyn, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Stare Kurowo, Wiejkowski Las, Ziemsko;

Abundance and flight period: 125 exx., VI(1) – VIII(2)
Distribution: recorded at scattered localities throughout the study area; also known from many other sites in Poland.

295. *Mythimna ferrago* (Fabricius, 1787)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,

– after 2000: Czelin, Drawsko Military Training Area, Kaleńsko, Karsibór, Kostrzyn, Kołomąć, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Oksza, Słońsk, Sówka, Stare Kurowo, Troszyn, Wiejkowski Las, Zalesie, Zawarcie, Ziemsko;

Abundance and flight period: 121 exx., V(3) – IX(1)

Distribution: uniform across the entire study area; also recorded at many other localities in Poland.

296. *Mythimna albipuncta* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: Dziwnów, Jedliny, Kołbacz, Mrzeżyno, Reptowo, Stargard, Swobnica, Szczecin,
– 1945-2000: Bielinek, Kostrzyn, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Santok, Słońsk, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie, Ziemsko;

Abundance and flight period: 521 exx., V(3) – X(3)

Distribution: uniform across the entire study area; also recorded at many other localities in Poland.

297. *Mythimna pudorina* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Dźwirzyno, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mszczuje, Nowa Korytnica, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 87 exx., V(3) – VII(3)

Distribution: recorded at scattered localities throughout the study area, and at many other sites in Poland.

298. *Mythimna straminea* (Treitschke, 1825)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Dźwirzyno, Kaleńsko, Karsibór, Kostrzyn, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Porzecze, Słońsk, Wiejkowski Las;

Abundance and flight period: 23 exx., VI(1) – VII(2)

Distribution: recorded at scattered localities throughout the study area. Local in Poland, reported from a small number of localities in the south of the country.

299. *Mythimna impura* (Hübner, 1808)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Drawsko Military Training Area, Dźwirzyno, Kaleńsko, Karsibór, Kostrzyn, Kołomąć, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Oksza, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Zalesie, Zawarcie, Ziemsko;

Abundance and flight period: 470 exx., V(3) – IX(2)
Distribution: uniform across the entire study area; also found at many localities elsewhere in Poland.

300. *Mythimna pallens* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Porzecze, Santok, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 906 exx., V(1) – X(1)
Distribution: uniform across the entire study area; also recorded from many other localities in Poland.

301. *Mythimna litoralis* (Curtis, 1827)

Localities:
– before 1945: Dziwnów, Międzyzdroje, Mrzeżyno;

Distribution: not recorded during the present study. There are three historical localities in the north-west of the study area (Urbahn & Urbahn 1939). Currently known in Poland only from the central and eastern parts of the Baltic coast (Nowacki 1994).

302. *Mythimna l-album* (Linnaeus, 1767)

Localities:
– before 1945: Puszcza Bukowa, Szczecin, Świnoujście,
– 1945-2000: Bielinek, Międzyzdroje, Puszcza Bukowa, Szczecin,

– after 2000: Bielinek, Czelin, Dźwirzyno, Kaleńsko, Krobielewko, Międzychód, Moczydło, Mrzeżyno;

Abundance and flight period: 41 exx., VI(1) – X(2)

Distribution: recorded at scattered localities throughout the study area, but also at many other sites in Poland.

303. *Leucania obsoleta* (Hübner, 1803)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Dźwirzyno, Kaleńsko, Karsibór, Kostrzyn, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Nowa Korytnica, Pobierowo, Porzecze, Słońsk, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 114 exx., V(1) – IX(1)

Distribution: recorded at scattered localities throughout the study area; a local species, but known from numerous sites all over Poland.

304. *Leucania comma* (Linnaeus, 1761)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Kaleńsko, Karsibór, Kostrzyn, Mielenko Drawskie, Międzychód, Moczydło, Mszczuje, Nowa Korytnica, Wiejkowski Las, Ziemsko;

Abundance and flight period: 22 exx., VI(1) – VII(3)

Distribution: recorded at scattered localities throughout the study area; also reported from many other sites in Poland.

305. *Senta flammea* (Curtis, 1828)

Localities:

– before 1945: Szczecin, Wisełka,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Mrzeżyno, Szczecin,
– after 2000: Gryfino, Mielenko Drawskie, Międzychód, Mrzeżyno, Nowa Korytnica, Sówka;

Abundance and flight period: 16 exx., V(2) – VI(2)

Distribution: recorded at scattered localities throughout the study area; local in Poland, but reported from many sites all over the country.

306. *Orthosia incerta* (Hufnagel, 1766)

Localities:

– before 1945: widely distributed,

– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Łukęcin, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Słońsk, Stare Kurowo, Wiejkowski Las, Zalesie, Zawarcie, Ziemsko;

Abundance and flight period: 835 exx., III(2) – VI(1)
Distribution: uniform across the entire study area; also recorded at many localities elsewhere in Poland.

307. *Orthosia gothica* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Gryfino, Kaleńsko, Karsibór, Kołomąć, Kostrzyn, Krobielewko, Łukęcin, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Raduń, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie, Ziemsko;

Abundance and flight period: 1012 exx., III(3) – V(3)
Distribution: uniform across the entire study area; found at many sites elsewhere in Poland.

308. *Orthosia cruda* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Krobielewko, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Santok, Słońsk, Stare Kurowo, Wiejkowski Las, Zalesie, Zawarcie, Ziemsko;

Abundance and flight period: 1705 exx., III(2) – V(2)
Distribution: recorded at scattered localities throughout the study area; also at many other sites all over Poland.

309. *Orthosia miniosa* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Police, Puszcza Bukowa, Swobnica, Szczecin,
– 1945-2000: Szczecin,

– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Gryfino, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Moczydło, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Słońsk, Wiejkowski Las;

Abundance and flight period: 31 exx., IV(2) – V(2)

Distribution: recorded at scattered localities throughout the study area, but also at many others in Poland.

310. *Orthosia opima* (Hübner, 1809)

Localities:

– before 1945: Jedliny, Międzyzdroje, Police, Puszcza Bukowa, Reptowo, Szczecin, Tanowo, Świnoujście,
– 1945-2000: Niechorze, Szczecin,
– after 2000: Kaleńsko, Krobielewko, Mszczuje, Nowa Korytnica, Raduń, Ziemsko;

Abundance and flight period: 26 exx., IV(2) – V(1)

Distribution: recorded at scattered localities throughout the study area; local in Poland, known from a small number of sites in other parts of the country.

311. *Orthosia populeti* (Fabricius, 1781)

Localities:

– before 1945: Międzyzdroje, Szczecin,
– 1945-2000: Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Gryfino, Kaleńsko, Karsibór, Mielenko Drawskie, Moczydło, Nowa Korytnica, Słońsk, Wiejkowski Las;

Abundance and flight period: 56 exx., III(2) – V(2)

Distribution: recorded at scattered localities throughout the study area; local in Poland, reported from a small number of sites in other parts of the country.

312. *Orthosia cerasi* (Fabricius, 1775)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Gryfino, Kaleńsko, Karsibór, Krobielewko, Łukęcin, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Słońsk, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 324 exx., III(2) – V(3)

Distribution: uniform across the entire study area; also found at many other localities in Poland.

313. *Orthosia gracilis* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: Jedliny, Międzyzdroje, Police, Puszcza Bukowa, Reptowo, Szczecin, Tanowo, Świnoujście,
– 1945-2000: Bielinek, Kołobrzeg, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Gryfino, Kaleńsko, Karsibór, Kostrzyn, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Słońsk, Zawarcie, Ziemsko;

Abundance and flight period: 41 exx., III(3) – V(3)

Distribution: recorded at scattered localities throughout the study area, and at many others elsewhere in Poland.

314. *Orthosia munda* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: Jedliny, Police, Puszcza Bukowa, Stargard, Szczecin, Świnoujście,
– 1945-2000: Bielinek, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Wiejkowski Las;

Abundance and flight period: 22 exx., III(3) – V(2)

Distribution: recorded at scattered localities throughout the study area; also at many other sites in Poland.

315. *Panolis flammea* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Bielinek, Czelin, Gryfino, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Łukęcin, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Pobierowo, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie, Ziemsko;

Abundance and flight period: 2607 exx., III(2) – VI(1)

Distribution: uniform across the entire study area; also recorded from a great many other localities in Poland.

316. *Egira conspicillaris* (Linnaeus, 1758)

Localities:

– before 1945: Szczecin, Widuchowa,
– 1945-2000: Bielinek,
– after 2000: Bielinek, Gryfino, Kaleńsko, Kostrzyn, Krobielewko, Moczydło;

Abundance and flight period: 49 exx., IV(2) – V(3)

Distribution: recorded at scattered localities in different parts of the study area, and at many others throughout Poland.

317. *Cerapteryx graminis* (Linnaeus, 1758)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
- after 2000: Bielinek, Czelin, Drawsko Military Training Area, Gryfino, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Porzecze, Raduń, Santok, Słońsk, Wiejkowski Las, Zalesie;

Abundance and flight period: 746 exx., VII(3) – IX(1)
Distribution: uniform across the entire study area; also found at many localities elsewhere in Poland.

318. *Tholera cespitis* (Denis & Schiffermüller, 1775)

Localities:
- before 1945: Drawsko Pomorskie, Grębowo, Jedliny, Reptowo, Stargard, Szczecin,
- 1945-2000: Puszcza Bukowa, Szczecin,
- after 2000: Kaleńsko, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Sówka, Wrzosowiska Cedyńskie, Zalesie;

Abundance and flight period: 58 exx., VII(2) – IX(1)
Distribution: recorded at scattered localities throughout the study area, and also at many others in Poland.

319. *Tholera decimalis* (Poda, 1761)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
- after 2000: Bielinek, Czelin, Drawsko Military Training Area, Gryfino, Kaleńsko, Karsibór, Kostrzyn, Międzychód, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Słońsk, Wiejkowski Las, Wrzosowiska Cedyńskie;

Abundance and flight period: 221 exx., VIII(1) – X(2)
Distribution: uniform across the entire study area; also recorded from many other sites in Poland.

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320. *Axylia putris* (Linnaeus, 1761)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
- after 2000: Czelin, Gryfino, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Santok, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie, Ziemsko;

Abundance and flight period: 315 exx., V(3) – IX(1)
Distribution: uniform across the entire study area; also at many localities elsewhere in Poland.

321. *Ochropleura plecta* (Linnaeus, 1761)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście
- after 2000: Bielinek, Czelin, Drawsko Military Training Area, Gryfino, Kaleńsko, Karsibór, Kostrzyn, Kołobrzeg, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Oksza, Porzecze, Raduń, Santok, Słońsk, Sówka, Stare Kurowo, Świnoujście, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zalesie, Zawarcie;

Abundance and flight period: 411 exx., V(1) – IX(2)
Distribution: uniform across the entire study area; also recorded at many other sites across Poland.

322. *Diarsia mendica* (Fabricius, 1775)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Świnoujście,
- after 2000: Karsibór, Kostrzyn, Mielenko Drawskie, Międzywodzie, Mrzeżyno, Pobierowo, Wiejkowski Las;

Abundance and flight period: 27 exx., VI(1) – VII(3)
Distribution: recorded at scattered localities throughout the study area; also at many others elsewhere in Poland.

323. *Diarsia dahlii* (Hübner, 1813)

Localities:
– before 1945: Jedliny, Reptowo, Szczecin,
– after 2000: Karsibór;

Abundance and flight period: 2 exx., VIII(3)

Distribution: found at four scattered localities in the west of the study area. Local in Poland, recorded from a small number of sites in various parts of the country.

324. *Diarsia brunnea* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Dźwirzyno, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Pobierowo, Santok, Słońsk, Sówka, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 268 exx., V(3) – IX(1)

Distribution: uniform across the entire study area; also reported from many other localities in Poland.

325. *Diarsia rubi* (Vieweg, 1790).)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Drawsko Military Training Area, Kaleńsko, Karsibór, Kostrzyn, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Słońsk, Sówka, Wiejkowski Las, Zawarcie;

Abundance and flight period: 148 exx., V(2) – VIII(3)

Distribution: uniform across the entire study area; also recorded at many localities elsewhere in Poland.

326. *Diarsia florida* (Schmidt, 1859)

Localities:
– before 1945: Drawsko Pomorskie, Jedliny, Szczecin;

Distribution: not recorded during this study. There are three historical localities scattered across the study area (Urbahn & Urbahn 1939). Local in Poland, it has been found at a few sites in the north and east of the country.

327. *Noctua pronuba* Linnaeus, 1758

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Gryfino, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Oksza, Porzecze, Raduń, Santok, Słońsk, Sówka, Stare Kurowo, Świnoujście, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie, Ziemsko;

Abundance and flight period: 1400 exx., V(3) – X(3)

Distribution: uniform across the entire study area; also recorded from a great many other localities in Poland.

328. *Noctua orbona* (Hufnagel, 1766)

Localities:

– before 1945: Puszcza Bukowa, Reptowo, Szczecin,
– 1945-2000: Bielinek, Międzywodzie, Międzyzdroje, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Drawsko Military Training Area, Dźwirzyno, Kaleńsko, Mielenko Drawskie, Międzychód, Moczydło, Nowa Korytnica, Wiejkowski Las;

Abundance and flight period: 32 exx., VII(1) – IX(3)

Distribution: recorded at scattered localities throughout the study area, also at many sites elsewhere in Poland.

329. *Noctua interposita* (Hübner, 1790)

Localities:

– after 2000: Czelin, Kaleńsko, Karsibór, Mielenko Drawskie, Moczydło, Zawarcie;

Abundance and flight period: 38 exx., VI(1) – IX(3)

Distribution: these are the first records of this species in the study area, where it was found at scattered localities; it is also known from numerous other sites in Poland.

330. *Noctua comes* Hübner, 1813

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Drawsko Military Training Area, Dźwirzyno, Kaleńsko, Karsibór, Kostrzyn, Mielenko Drawskie, Międzychód, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 60 exx., VII(2) – X(1)

Distribution: recorded at scattered localities throughout the study area, also at many sites elsewhere in Poland.

331. *Noctua fimbriata* (Schreber, 1759)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
- after 2000: Bielinek, Czelin, Drawsko Military Training Area, Dźwirzyno, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie, Ziemsko;

Abundance and flight period: 275 exx., VI(2) – IX(1)
Distribution: uniform across the entire study area; also reported from many localities elsewhere in Poland.

332. *Noctua janthina* (Denis & Schiffermüller, 1775)

Localities:
- before 1945: Puszcza Bukowa, Pyrzyce, Raduń, Reptowo, Szczecin,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
- after 2000: Czelin, Drawsko Military Training Area, Kaleńsko, Kostrzyn, Międzychód, Moczydło, Mrzeżyno, Stare Kurowo, Sówka, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie, Ziemsko;

Abundance and flight period: 95 exx., VII(2) – IX(1)
Distribution: recorded at scattered localities throughout the study area, also at many other sites in Poland.

333. *Noctua janthe* (Borkhausen, 1792)

Localities:
- 1945-2000: Bielinek, Kołobrzeg,
- after 2000: Czelin, Kaleńsko, Karsibór, Kostrzyn, Międzychód, Mrzeżyno, Stare Kurowo, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 36 exx., VII(2) – VIII(3)
Distribution: recorded at scattered localities throughout the study area; also known from many other sites in Poland.

334. *Noctua interjecta* (Hübner, 1790)

Localities:
- 1945-2000: Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Świnoujście,

– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Gryfino, Kaleńsko, Karsibór, Kostrzyn, Kołobrzeg, Mielenko Drawskie, Międzychód, Międzywodzie, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Raduń, Świnoujście, Zalesie, Zawarcie;

Abundance and flight period: 95 exx., VI(2) – IX(1)

Distribution: recorded at scattered localities throughout the study area; known in Poland from numerous sites practically all over the country.

335. *Epilecta linogrisea* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: Szczecin, Świnoujście,
– 1945-2000: Dziwnówek, Międzywodzie, Międzyzdroje, Mrzeżyno, Szczecin, Świnoujście,
– after 2000: Dźwirzyno, Kaleńsko, Międzychód, Międzywodzie, Mrzeżyno;

Abundance and flight period: 20 exx., VII(2) – IX(2)

Distribution: recorded at scattered localities throughout the study area; recorded from a few other sites in western and central Poland.

336. *Lycophotia porphyrea* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Drawsko Military Training Area, Dźwirzyno, Kaleńsko, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Sówka, Zawarcie, Ziemsko;

Abundance and flight period: 32 exx., VI(3) – VIII(3)

Distribution: recorded at scattered localities throughout the study area, and at many others elsewhere in Poland.

337. *Rhyacia simulans* (Hufnagel, 1766)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Międzywodzie, Międzyzdroje, Puszcza Bukowa, Świnoujście,
– after 2000: Drawsko Military Training Area, Kaleńsko, Mielenko Drawskie, Mrzeżyno;

Abundance and flight period: 5 exx., VII(1) – VIII(2)

Distribution: recorded at scattered localities throughout the study area; also recorded from many sites elsewhere in Poland.

338. *Paradiarsia punicea* (Hübner, 1803)

Localities:
– before 1945: Jedliny;

Distribution: not recorded during this study. There is one historical locality in the study area (Urbahn & Urbahn 1939). In Poland, known from a small number of sites in northern and eastern parts of the country.

339. *Eurois occulta* (Linnaeus, 1761)

Localities:
– before 1945: widely distributed,
– 1945-2000: Kołobrzeg, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Międzychód, Mrzeżyno, Nowa Korytnica, Sówka, Ziemsko;

Abundance and flight period: 5 exx., VI(2) – VII(1)

Distribution: recorded at scattered localities throughout the study area; also at many other sites in Poland.

340. *Spaelotis ravida* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Drawsko Pomorskie, Reptowo, Stargard, Szczecin,
– 1945-2000: Świnoujście,
– after 2000: Karsibór;

Abundance and flight period: 2 exx., VIII(2)

Distribution: recorded at scattered localities throughout the study area, but also known from many other sites in Poland.

341. *Opigena polygona* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Drawsko Pomorskie,
– 1945-2000: Bielinek, Dziwnówek, Puszcza Bukowa,
– after 2000: Mrzeżyno;

Abundance and flight period: 3 exx., VII(3) – VIII (1)

Distribution: recorded at five scattered localities in the study area; also reported from many other sites in Poland.

342. *Graphiphora augur* (Fabricius, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Mrzeżyno, Puszcza Bukowa,
– after 2000: Bielinek, Mielenko Drawskie;

Abundance and flight period: 2 exx., VII(1)

Distribution: recorded at scattered localities throughout the study area; also known from many localities elsewhere in Poland.

343. *Eugnorisma glareosa* (Esper, 1788)

Localities:

– after 2000: Zawarcie;

Abundance and flight period: 1 ex.,X(1)

Distribution: trapped at one single locality in the south of the study area. There are historical records from western Pomerania (Urbahn & Urbahn 1939). Local in Poland; recorded at a few sites, mainly in the south-western part of the country – the Gubin area (Buszko & Śliwiński 1979, Nowacki & Sosiński 1998) – and at a few localities in Pomerania (Nowacki 1994).

344. *Protolampra sobrina* (Duponchel, 1843)

Localities:

– before 1945: Drawsko Pomorskie, Międzyzdroje, Reptowo, Szczecin,

– after 2000: Drawsko Military Training Area, Mszczuje, Mrzeżyno;

Abundance and flight period: 3 exx., VIII(3)

Distribution: recorded at scattered localities throughout the study area; local in Poland; known from a few sites in different parts of the country.

345. *Xestia c-nigrum* (Linnaeus, 1761)

Localities:

– before 1945: widely distributed,

– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin,

– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Gryfino, Kaleńsko, Karsibór, Kostrzyn, Kołobrzeg, Kołomąć, Krobielewko, Łukęcin, Mielenko Drawskie, Międzychód, Międzywodzie, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Oksza, Pobierowo, Porzecze, Raduń, Santok, Słońsk, Sówka, Stare Kurowo, Świnoujście, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 3708 exx., V(2) – XI(1)

Distribution: uniform across the entire study area; also found at a great many localities elsewhere in Poland.

346. *Xestia ditrapezium* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: widely distributed,

– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie,

– after 2000: Czelin, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Międzychód, Moczydło, Mrzeżyno, Oksza, Porzecze, Słońsk, Sówka, Wiejkowski Las, Zawarcie;

Abundance and flight period: 215 exx., V(3) – VIII(3)

Distribution: recorded at scattered localities throughout the study area and at many others in Poland.

347. *Xestia triangulum* (Hufnagel, 1766)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
- after 2000: Czelin, Gryfino, Kaleńsko, Karsibór, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Moczydło, Mrzeżyno, Porzecze, Słońsk, Sówka, Stare Kurowo, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 551 exx., VI(1) – VIII(3)
Distribution: uniform across the entire study area; also recorded at numerous other sites right across Poland.

348. *Xestia ashworthii* (Doubleday, 1855)

Localities:
- before 1945: Reptowo, Szczecin, Świnoujście;

Distribution: not recorded during this study. There are three historical localities of this species in the study area (Urbahn & Urbahn 1939). Local in Poland; known from a few sites in various parts of the country.

349. *Xestia baja* (Denis & Schiffermüller, 1775)

Localities:
- before 1945: widely distributed,
- 1945-2000: Bielinek, Kołobrzeg, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
- after 2000: Czelin, Drawsko Military Training Area, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Sówka, Stare Kurowo, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 287 exx., VI(3) – IX(3)
Distribution: uniform across the entire study area; also reported from many other localities in Poland.

350. *Xestia stigmatica* (Hübner, 1813)

Localities:
- before 1945: Drawsko Pomorskie, Kołobrzeg, Police, Puszcza Bukowa, Redło, Reptowo, Stargard, Szczecin,
- 1945-2000: Bielinek, Kołobrzeg, Puszcza Bukowa, Szczecin, Świnoujście,
- after 2000: Dąbroszyn, Kaleńsko, Kostrzyn, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno;

Abundance and flight period: 83 exx., VII(3) – IX(3)
Distribution: recorded at scattered localities throughout the study area, and also at many localities elsewhere in Poland.

351. *Xestia castanea* (Esper, 1798)

Localities:
– before 1945: Dobieszczyn, Jedliny, Międzyzdroje, Reptowo, Szczecin, Świnoujście,
– 1945-2000: Mrzeżyno,
– after 2000: Mrzeżyno, Mszczuje;

Abundance and flight period: 3 exx., VIII(3) – IX(1)

Distribution: recorded at scattered localities, mainly in the north-west of the study area. Local in Poland; known from a small number of sites mainly in the north and west of the country.

352. *Xestia sexstrigata* (Haworth, 1809)

Localities:
– before 1945: Jedliny, Kołobrzeg, Pyrzyce, Raduń, Redło, Szczecin, Świnoujście,
– 1945-2000: Bielinek, Kołobrzeg, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Gryfino, Kaleńsko, Karsibór, Kostrzyn, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Sówka, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 156 exx., VI(1) – X(3)

Distribution: recorded at scattered localities throughout the study area, and at many others elsewhere in Poland.

353. *Xestia xanthographa* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Bielinek, Czelin, Drawsko Military Training Area, Gryfino, Kaleńsko, Kostrzyn, Kołobrzeg, Kołomąć, Krobielewko, Łukęcin, Międzychód, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Pobierowo, Santok, Słońsk, Stare Kurowo, Świnoujście, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 1432 exx., VIII(2) – X(1)

Distribution: uniform across the entire study area; also reported from many other localities in all parts of Poland.

354. *Xestia agathina* (Doubleday, 1827)

Localities:
– after 2000: Mrzeżyno;

Abundance and flight period: 1 ex., VIII(2)

Distribution: this is the first record of this species in the study area, at one locality in its northern part. Local in Poland; it has been reported from two localities on

the central part of the coast (Nowacki 1994) and from a few other sites in the west of the country.

355. *Eugraphe sigma* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Kołobrzeg, Międzyzdroje, Police, Stargard, Szczecin, Świnoujście,
– 1945-2000: Międzyzdroje, Świnoujście,
– after 2000: Mszczuje;

Abundance and flight period: 3 exx., VII(1-2)

Distribution: recorded at scattered localities throughout the study area, and at many others in Poland.

356. *Coenophila subrosea* (Stephens, 1829)

Localities:
– before 1945: Jedliny, Świnoujście,
– after 2000: Drawsko Military Training Area, Mszczuje;

Abundance and flight period: 2 exx., VIII(2-3)

Distribution: found at only four scattered localities in the western part of the study area. In Poland, it has been reported from a small number of localities mainly in the north and east of the country. The latest records are from the Biebrza Marshes, the Augustów Forest, the Białowieża Primeval Forest, the Polesie and Roztocze regions, around Nowa Dęba in the Podkarpacie region and in the Świętokrzyskie Mts (Nowacki & Wąsala 2021b).

357. *Cerastis rubricosa* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Niechorze, Puszcza Bukowa, Świnoujście,
– after 2000: Czelin, Drawsko Military Training Area, Gryfino, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Oksza, Słońsk, Sówka, Wiejkowski Las, Zawarcie;

Abundance and flight period: 277 exx., III(3) – V(3)

Distribution: uniform across the entire study area; also found at many localities elsewhere in Poland.

358. *Cerastis leucographa* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Drawsko Pomorskie, Kołobrzeg, Moczyły, Puszcza Bukowa, Reptowo, Szczecin, Świnoujście,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Niechorze, Szczecin,

– after 2000: Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie, Międzychód, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Sówka, Świnoujście, Wiejkowski Las, Zawarcie, Ziemsko;

Abundance and flight period: 32 exx., III(3) – IV(3)

Distribution: recorded at scattered localities throughout the study area, but also at many others in Poland.

359. *Naenia typica* (Linnaeus, 1761)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Puszcza Bukowa, Świnoujście,
– after 2000: Słońsk;

Abundance and flight period: 1 ex., VII(1)

Distribution: recorded at scattered localities throughout the study area. Though local in Poland, it has been reported from numerous sites all over the country.

360. *Anaplectoides prasina* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Puszcza Bukowa,
– after 2000: Czelin, Kaleńsko, Karsibór, Kostrzyn, Mielenko Drawskie, Międzychód, Międzywodzie, Sówka, Wiejkowski Las, Ziemsko;

Abundance and flight period: 14 exx., VI(2) – VII(2)

Distribution: recorded at scattered localities throughout the study area, and also at many other in various parts of Poland.

361. *Actebia praecox* (Linnaeus, 1758)

Localities:

– before 1945: Szczecin, Świnoujście,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzyzdroje, Mrzeżyno, Niechorze, Szczecin, Świnoujście,
– after 2000: Mrzeżyno;

Abundance and flight period: 1 ex., VIII(2)

Distribution: recorded at scattered localities throughout the study area. A local species in Poland, but known from many other sites all over the country.

362. *Euxoa aquilina* (Denis & Schiffermüller, 1775)

Localities:

– before 1945: Pyrzyce,
– 1945-2000: Bielinek,
– after 2000: Czelin;

Abundance and flight period: 1 ex., VII(1)
Distribution: found at three scattered localities in the study area. Though local in Poland, it has been reported from many sites elsewhere in the country.

363. *Euxoa nigricans* (Linnaeus, 1761)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzyzdroje, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Drawsko Military Training Area, Międzychód, Moczydło, Nowa Korytnica;
Abundance and flight period: 6 exx., VIII(1)
Distribution: recorded at scattered localities throughout the study area, but also at many others elsewhere in Poland.

364. *Euxoa tritici* (Linnaeus, 1761)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Drawsko Military Training Area, Kaleńsko, Kostrzyn, Krobielewko, Mielenko Drawskie, Moczydło, Mrzeżyno, Nowa Korytnica, Słońsk, Sówka, Wrzosowiska Cedyńskie, Zawarcie;
Abundance and flight period: 56 exx., VII(1) – IX(1)
Distribution: recorded at scattered localities throughout the study area, and at many others in different parts of Poland.

365. *Euxoa obelisca* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: Jedliny, Police, Reptowo, Szczecin, Świnoujście,
– 1945-2000: Bielinek,
– after 2000: Czelin, Drawsko Military Training Area, Kaleńsko, Międzyzdroje, Myślibórz Wielki, Nowa Korytnica, Sówka, Wrzosowiska Cedyńskie;
Abundance and flight period: 27 exx., VIII(3) – X(1)
Distribution: recorded at scattered localities throughout the study area, and also at many others in Poland.

366. *Euxoa vitta* (Esper, 1798)

Localities:
– after 2000: Kaleńsko, Mszczuje, Myślibórz Wielki, Wrzosowiska Cedyńskie;
Abundance and flight period: 7 exx., IX(1-2)

Distribution: the first records of this species in this region, it was found at four scattered localities in the western part of the study area. Local in Poland; reported from a small number of sites in the west and south-east of the country.

367. *Euxoa cursoria* (Hufnagel, 1766)

Localities:
– before 1945: Dziwnów, Jedliny, Stargard, Szczecin, Świnoujście,
– 1945-2000: Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Świnoujście,
– after 2000: Międzywodzie, Międzyzdroje, Mrzeżyno, Świnoujście;

Abundance and flight period: 239 exx., VIII(1) – IX(3)

Distribution: occurs in a continuous range along the northern boundary of the study area. Local in Poland; found predominantly in the coastal dune belt on the Baltic coast (Nowacki 1994).

368. *Agrotis bigramma* (Esper, 1790)

Localities:
– before 1945: Pyrzyce, Redło, Świnoujście,
– after 2000: Czelin, Kaleńsko, Moczydło, Nowa Korytnica, Stare Kurowo;

Abundance and flight period: 59 exx., VII(2) – VIII(3)

Distribution: recorded at scattered localities throughout the study area, and also at many others in Poland.

369. *Agrotis ripae* (Hübner, 1823)

Localities:
– before 1945: Dziwnów, Międzyzdroje, Mrzeżyno,
– 1945-2000: Międzywodzie, Międzyzdroje, Świnoujście,
– after 2000: Międzywodzie, Mrzeżyno, Świnoujście;

Abundance and flight period: 34 exx., VI(1-3)

Distribution: recorded at five localities along the northern border of the study area. Local in Poland, known only from scattered sites along the Baltic coast (Nowacki 1994).

370. *Agrotis puta* (Hübner, 1803)

Localities:
– after 2000: Bielinek, Kaleńsko, Mrzeżyno;

Abundance and flight period: 3 exx., VI(1) – X(1)

Distribution: found at three scattered localities in the study area. The first record from this area was also the first for Poland (Wąsala & Maciąg 2011). It has also been reported from Poznań (Wąsala & Matuszewski 2020).

371. *Agrotis ipsilon* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Puszcza Bukowa, Szczecin,
– after 2000: Bielinek, Kaleńsko, Kostrzyn, Mielenko Drawskie, Międzychód, Mrzeżyno, Mszczuje, Nowa Korytnica, Wiejkowski Las, Wrzosowiska Cedyńskie, Zawarcie;

Abundance and flight period: 21 exx., VII(2) – X(3)

Distribution: recorded at scattered localities throughout the study area, and at many others in Poland.

372. *Agrotis exclamationis* (Linnaeus, 1758)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Kostrzyn, Kołobrzeg, Kołomąć, Krobielewko, Mielenko Drawskie, Międzychód, Międzywodzie, Międzyzdroje, Moczydło, Mrzeżyno, Mszczuje, Nowa Korytnica, Pobierowo, Porzecze, Raduń, Santok, Słońsk, Sówka, Stare Kurowo, Świnoujście, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;

Abundance and flight period: 456 exx., V(1) – IX(1)

Distribution: uniform across the entire study area; also known from a great many localities elsewhere in Poland.

373. *Agrotis clavis* (Hufnagel, 1766)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Kołobrzeg, Międzywodzie, Międzyzdroje, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Gryfino, Karsibór, Kołomąć, Mielenko Drawskie, Moczydło, Mrzeżyno, Nowa Korytnica, Stare Kurowo, Sówka;

Abundance and flight period: 46 exx., VI(1) – VII(2)

Distribution: recorded at scattered localities throughout the study area, and at many others elsewhere in Poland.

374. *Agrotis segetum* (Denis & Schiffermüller, 1775)

Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Niechorze, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Bielinek, Czelin, Kaleńsko, Karsibór, Krobielewko, Mielenko Drawskie,

Międzychód, Międzyzdroje, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Słońsk, Sówka, Stare Kurowo, Szczecin, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;
Abundance and flight period: 390 exx., V(1) – X(1)
Distribution: uniform across the entire study area; also reported from many other localities in Poland.

375. *Agrotis vestigialis* (Hufnagel, 1766)

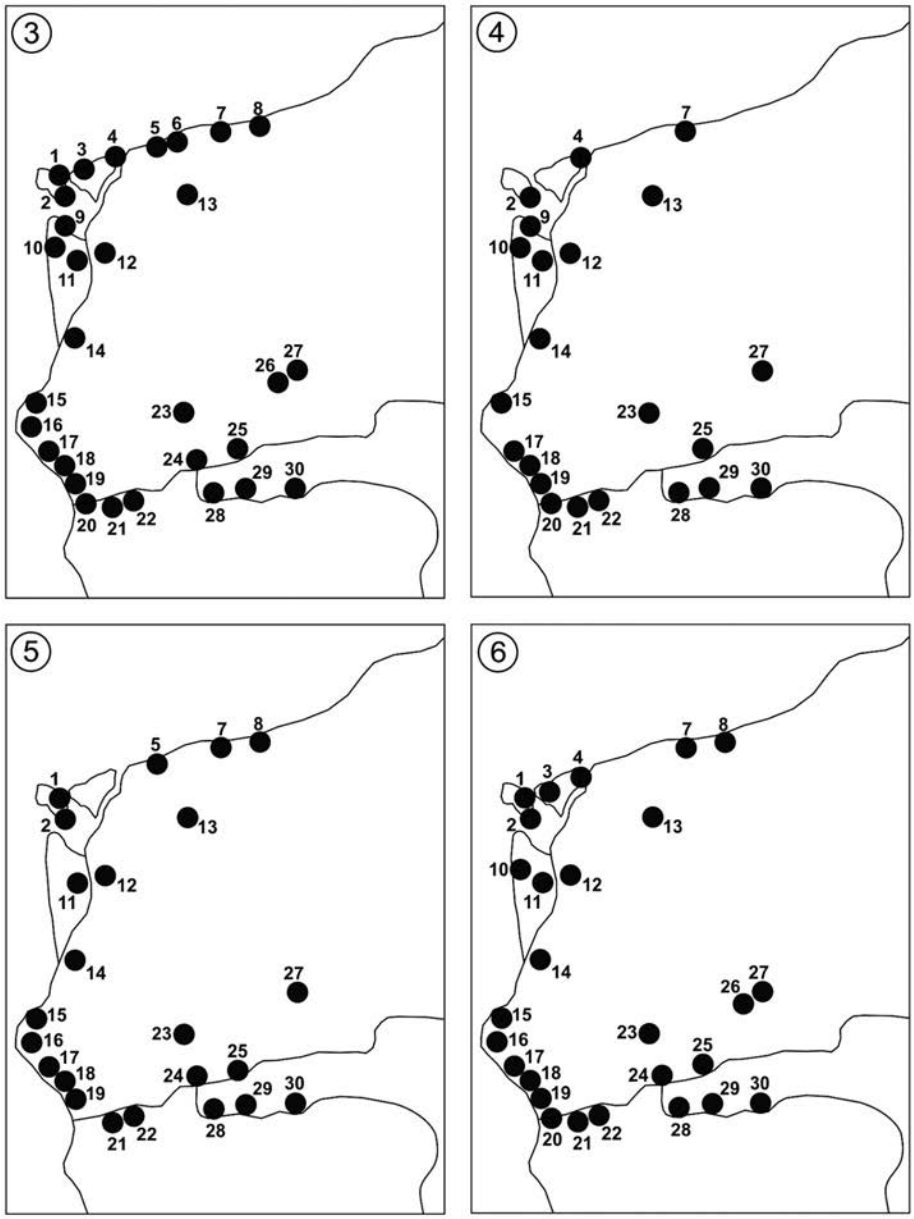
Localities:
– before 1945: widely distributed,
– 1945-2000: Bielinek, Dziwnówek, Kołobrzeg, Międzywodzie, Międzyzdroje, Mrzeżyno, Puszcza Bukowa, Szczecin, Świnoujście,
– after 2000: Czelin, Drawsko Military Training Area, Kaleńsko, Kostrzyn, Międzychód, Mrzeżyno, Mszczuje, Myślibórz Wielki, Nowa Korytnica, Słońsk, Wiejkowski Las, Wrzosowiska Cedyńskie, Zalesie, Zawarcie;
Abundance and flight period: 219 exx., V(2) – IX(1)
Distribution: uniform across the entire study area; also known from many localities elsewhere in Poland.

376. *Agrotis cinerea* (Denis & Schiffermüller, 1775)

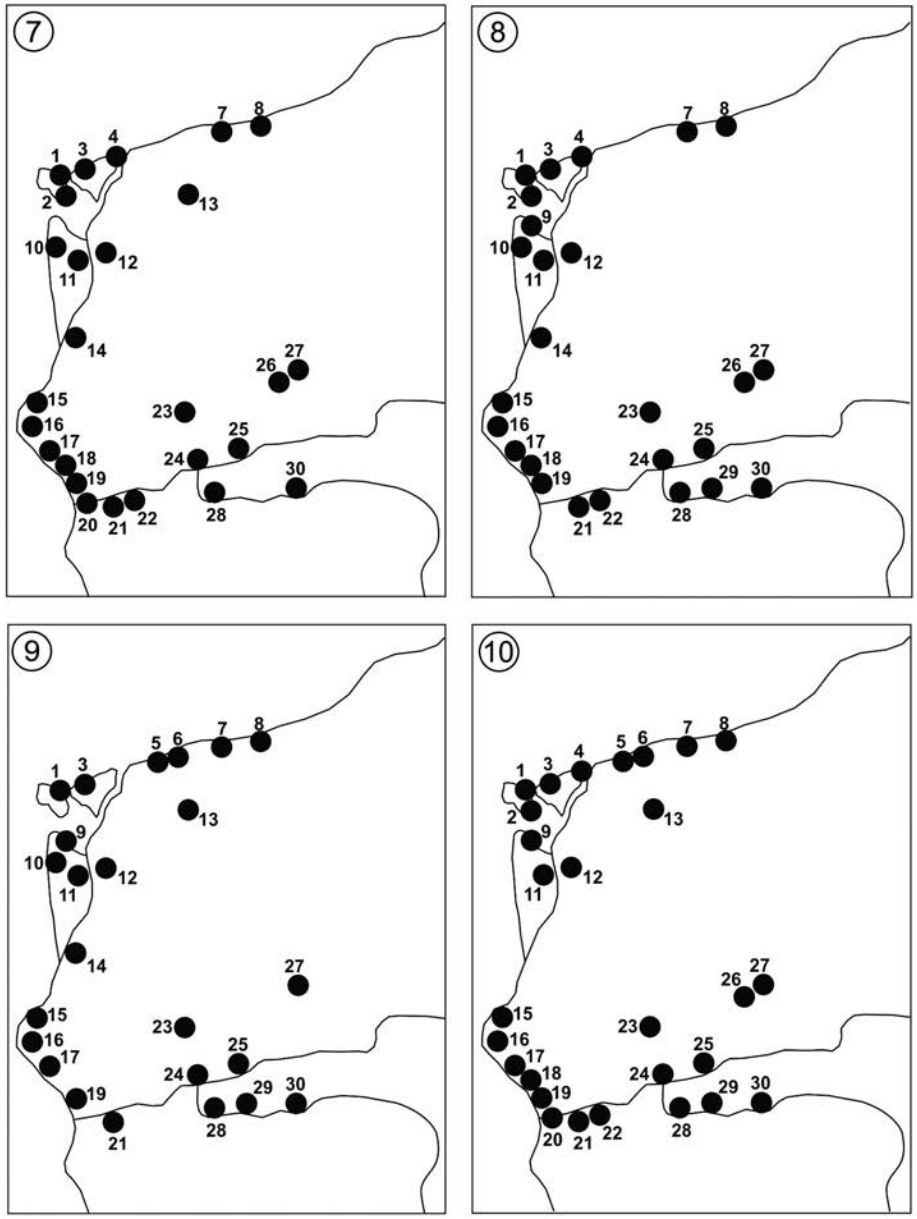
Localities:
– before 1945: Dobieszczyn, Szczecin, Świnoujście,
– 1945-2000: Międzyzdroje, Szczecin,
– after 2000: Drawsko Military Training Area, Stare Kurowo;
Abundance and flight period: 2 exx., V(2-3)
Distribution: recorded at scattered localities throughout the study area. Local in Poland, but reported from numerous sites all over the country.

RANGE DYNAMICS

The general characteristics of the ranges of all the noctuid moth species recorded, both in the study area and in Poland as a whole, were outlined earlier in the systematic review. This showed that as many as 90% of them are very common, i.e. their range boundaries do not cross this area and they are distributed continuously across central Europe. The density of their localities indicates that they have colonized the entire study area and are potentially to be found in any suitable biotope. In the study area they occur at many localities and in large numbers. Examples of the distributions of such species in the study area are shown in Figs. 3-10. Most of them are eurytopic, easily capable of adapting to a broad spectrum of environmental conditions, and large numbers of them are found in various habitats. Examples include *D. pygarga, C. morpheus, P. candidula, M. furuncula, O. plecta, N. pronuba, X. c- nigrum, X. xanthographa, A. exclamationis* and *A. segetum.*



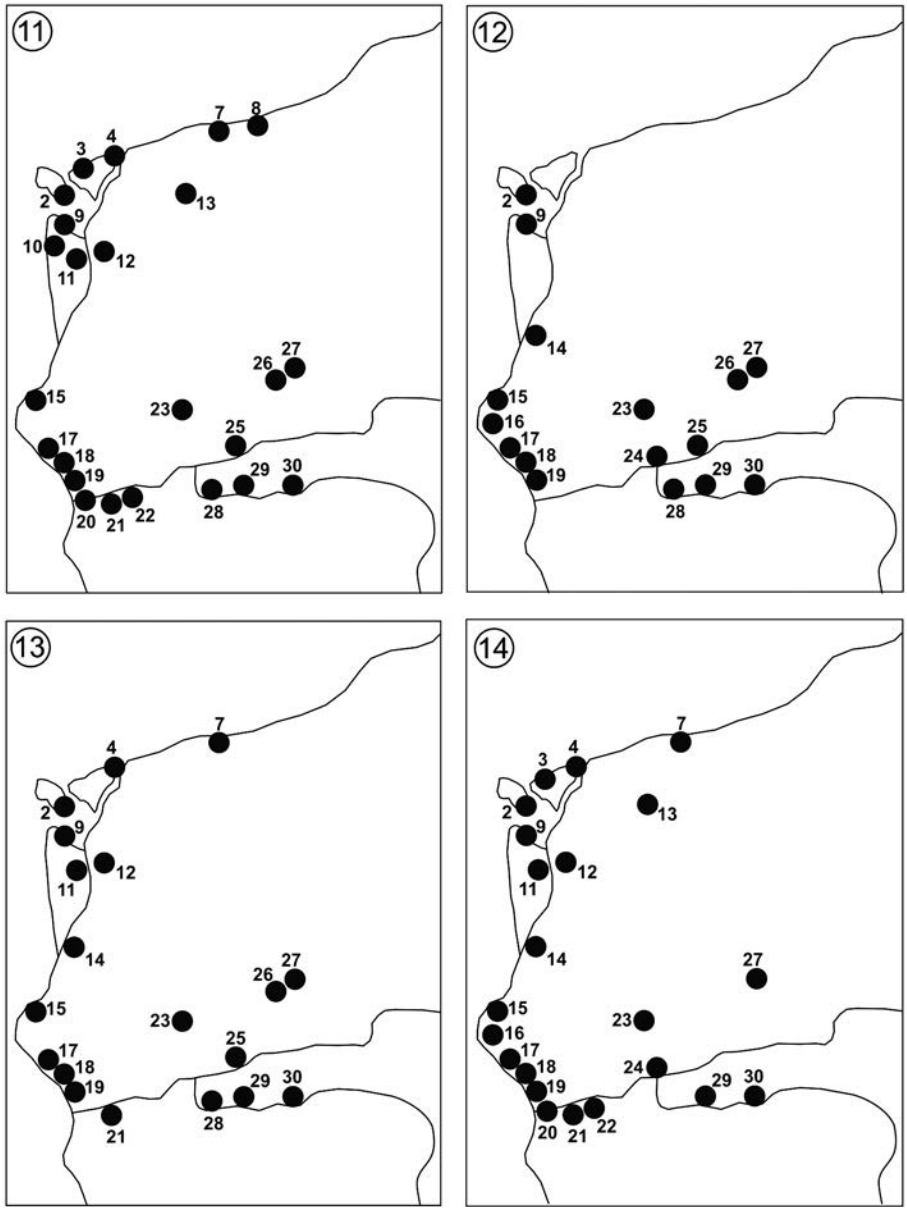
Figs. 3-6. Localities: 3 – *Deltote pygarga* (Hufn.) and *Xestia c-nigrum* (L.); 4 – *Caradrina morpheus* (Hufn.); 5 – *Pseudeustrotia candidula* (Den. & Schiff.); 6 – *Mesoligia furuncula* (Den. & Schiff.).



Figs. 7-10. Localities: 7 – *Ochropleura plecta* (L.); 8 – *Noctua pronuba* L.; 9 – *Xestia xanthographa* (Den. & Schiff.); 10 – *Agrotis exclamationis* (L.).

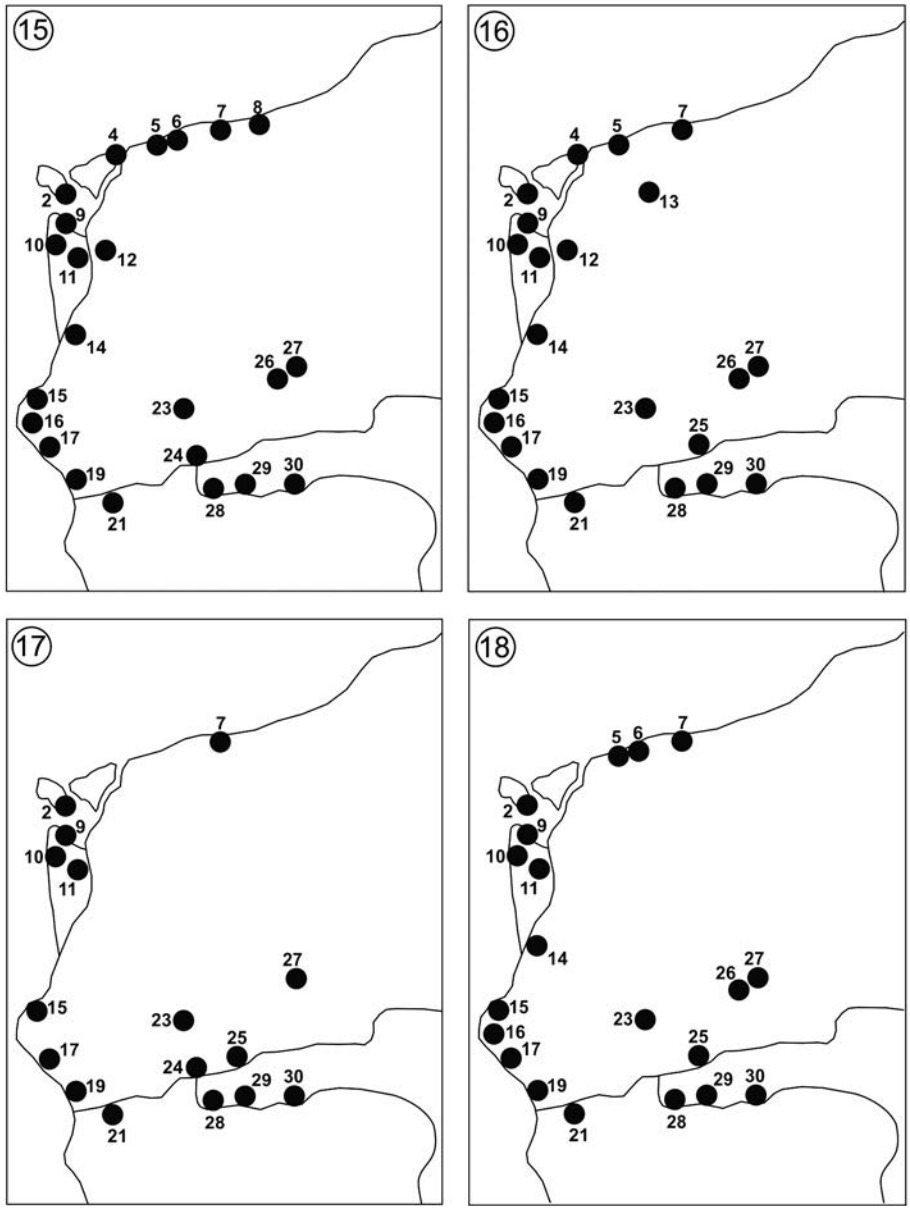
A separate group of common species are those displaying a distinct preference for habitats in river valleys. In the past, meandering lowland rivers, with their periodically changing water levels, created a mosaic of environments associated with

alluvial deposits, and the extensive biotopes that came into existence on them were suitable for numerous noctuid moth species. The distributions of these species, as exemplified by *R. sericealis, D. deceptoria, P. fluxa* and *C. graminis*, are illustrated in Figs. 11-14.



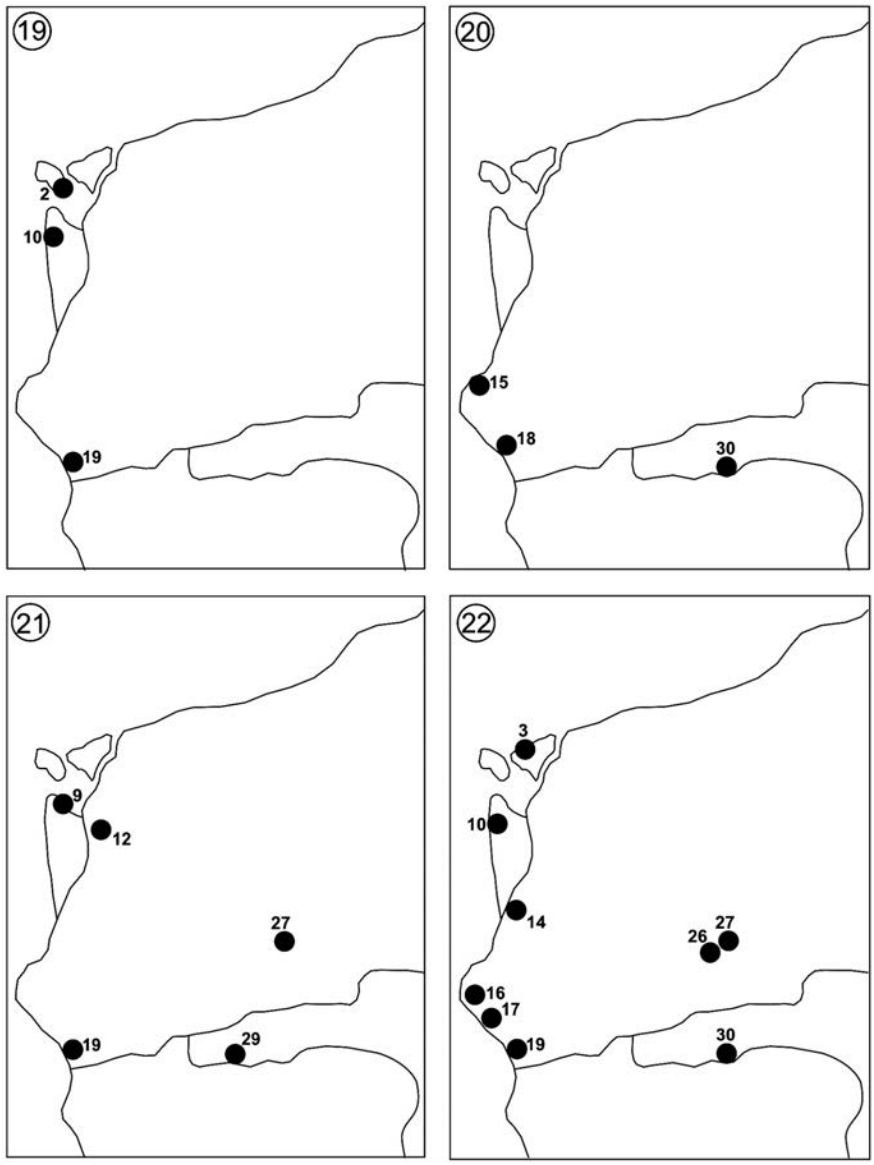
Figs. 11-14. Localities: 11 – *Rivula sericealis* (Scop.); 12 – *Deltote deceptoria* (Scop.); 13 – *Photedes fluxa* (Hbn.); 14 – *Cerapteryx graminis* (L.).

Another group of common species are those associated with deciduous and coniferous woodlands, which cover large parts of the study area. These moths are therefore common and very abundant there. They include *C. vaccinii, O. gothica, O. cruda* and *P. flammea.* Their distributions are shown in Figs 15-18.



Figs. 15-18. Localities: 15 – *Conistra vaccinii* (L.); 16 – *Orthosia gothica* (L.); 17 – *Orthosia cruda* (Den. & Schiff.); 18 – *Panolis flammea* (Den. & Schiff.).

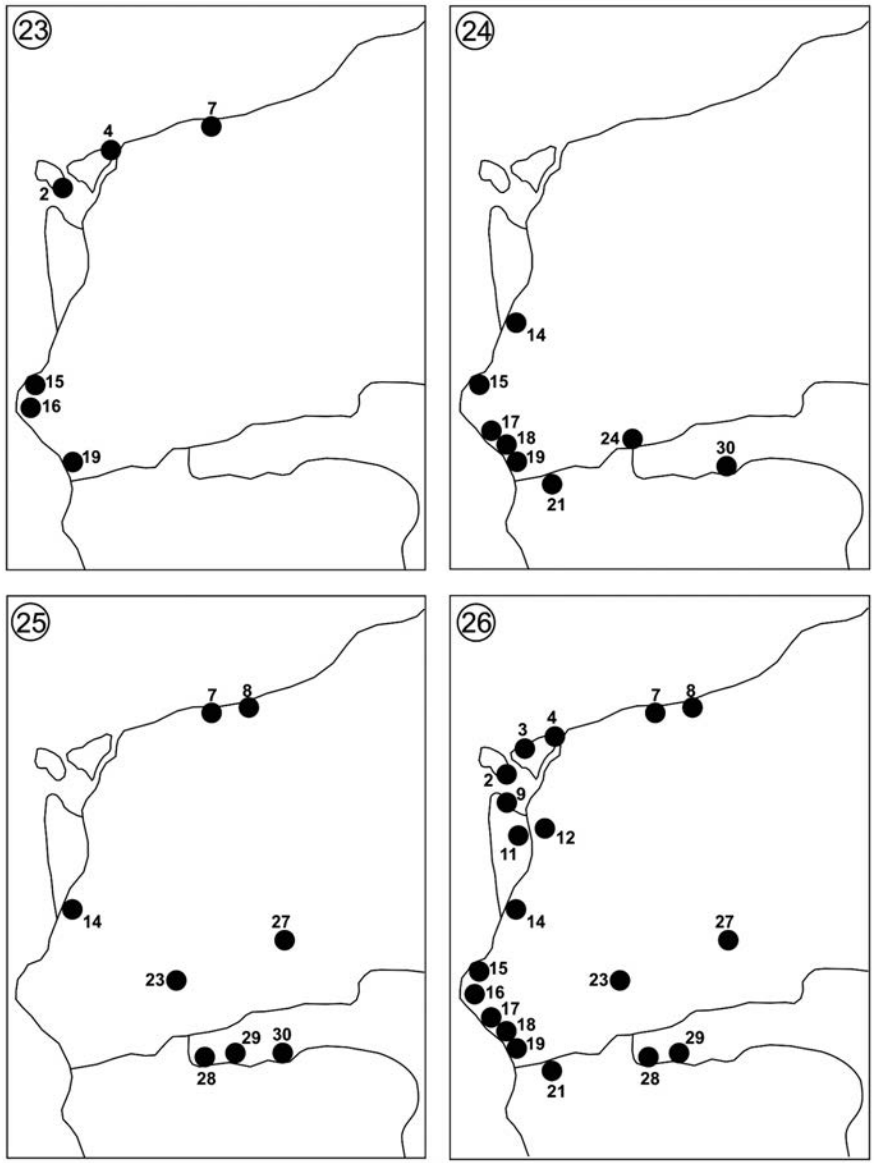
However, only small numbers were recorded of the vast majority of noctuid moth species. This was probably due to habitat fragmentation, and the individuals trapped may have been migrating from neighbouring habitats. In the study area, they were found at widely scattered localities. The distributions of environmentally more demanding species, such as *S. costaestrigalis*, *A. nitida*, *D. eremita*, *O. opima*



Figs. 19-22. Localities: 19 – *Schrankia costaestrigalis* (Steph.); 20 – *Agrochola nitida* (Den. & Schiff.) and *Dryobotodes eremita* (F.); 21 – *Orthosia opima* (Hbn.); 22 – *Euxoa obelisca* (Den. & Schiff.).

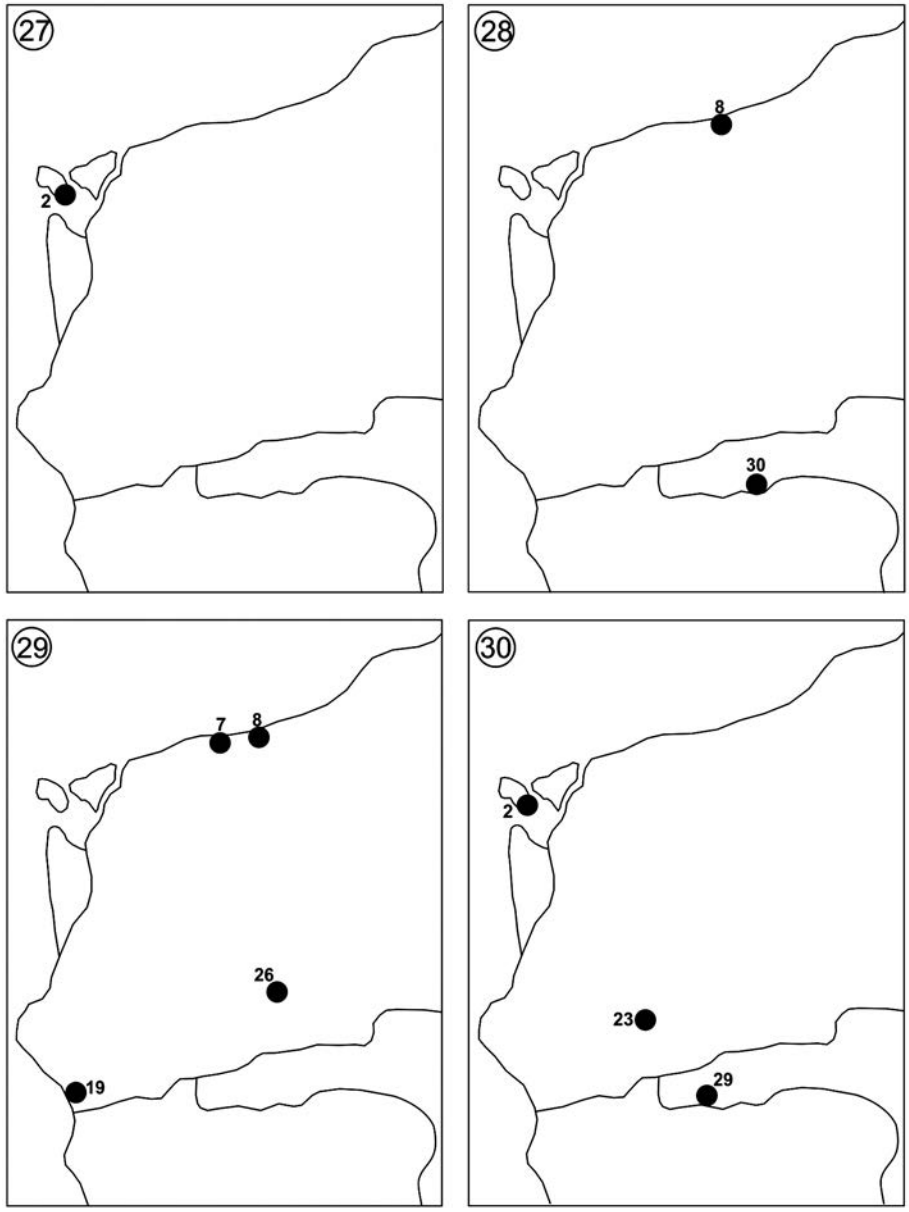
and *E. obelisca*, were local, occurring either at scattered localities, or were concentrated in just a few areas (Figs 19-22).

The ranges of monophagous and oligotrophic species, whose food plants are rare or occur only locally, largely correspond with those of their host plants. Examples include *A. asclepiadis*, *C. affinis*, *H. ultima* and *R. lutosa* (Figs. 23-26).



Figs. 23-26. Localities: 23 – *Abrostola asclepiadis* (Den. & Schiff.); 24 – *Cosmia affinis* (L.); 25 – *Hydraecia ultima* Holst; 26 – *Rhizedra lutosa* (Hbn.).

The distributions of a number of species found at only single localities are sometimes hard to explain, because it is often the case that both the food plant is common and suitable environments are in plentiful supply. These species may be exemplified by *Z. lunalis*, *A. livida*, *H. rectilinea* and *P. biren* (see Figs. 27-30).



Figs. 27-30. Localities: 27 – *Zanclognatha lunalis* (Scop.); 28 – *Amphipyra livida* (Den. & Schiff.); 29 – *Hyppa rectilinea* (Esp.); 30 – *Papestra biren* (Goeze).

The remaining 10% of species reach their range boundaries in the study area or occur in just a small part of Europe. For most of them, north-western Poland is their northern range limit. Their localities are concentrated mostly in the river valleys or along the Baltic coast. The majority are xerothermophilous species associated with the warm slopes of river valleys. 22 such species were recorded in the study area, i.e. 6.2% of all the species recorded there: *C. elocata, M. lunaris, E. vernana, A. funesta, A. euphorbiae, S. nervosa, P. tenebrata, C. juventina, H. adaucta, C. fraudatricula, H. respersa, A. centrago, A. laevis, C. ligula, D. convergens, L. splendens, H. dysodea, P. extrema, E. conspicillaris, E. aquilina, A. bigramma* and *A. puta.* These species were recorded only at single localities. Figs 31-62 illustrate their distributions. Three of these species warrant a more detailed discussion.

A. funesta was recorded in the study area in two disparate environments. One was the Odra valley from Kaleńsko through Czelin to Bielinek, where 10 individuals were trapped. The other was the Warta valley near Słońsk, where 1 specimen was caught (Fig. 31). *A. funesta* is a thermophilous species with a preference for forest-steppe or open deciduous woodland habitats. Usually these are found on the well-warmed southern and western slopes of eminences (the edges of the river valleys), where their larval food plants grow. Before 1950, it was found at a few localities: Legnica, Racibórz, Wrocław, Zielona Góra (Wolf 1935-1944), Bielinek on the Oder (Urbahn & Urbahn 1939) and Jeżewo near Poznań (Romaniszyn & Schille 1929). Later, it was trapped at Czorsztyn in the Pieniny Mts (Błeszyński et al. 1965), but after 1975 it was recorded only at Bielinek on the Oder (Blaik 2010, Nowacki 1993). In Europe (Fig. 32), its range extends from France and Italy in the west to the Balkan Peninsula, Ukraine and southern Russia in the east (Nowacki 2004b).

P. extrema was recorded only in the north of the study area, at localities lying along the shores of the Baltic and the Szczecin Lagoon, from Karsibór to Dźwirzyno. It was also found at two inland localities, namely, Kołomąć and Wiejkowski Las (leg. K. Demski), some 25 km distant from the Baltic shoreline. It was the most abundant at Mrzeżyno, where 41 exx. were trapped, both on coastal dunes and along the River Rega about 1 km from its mouth (Fig. 33). In Poland, it was previously recorded only along the belt of coastal dunes on the western Baltic coast at three localities, i.e. Międzywodzie, Dziwnówek and Mrzeżyno (Nowacki 1994) and historically in Lower Silesia (Wolf 1939-1944). A species with a Euro-Siberian range, it is distributed in Europe (Fig. 34) from eastern England and France, across Germany, and farther southwards as far as Romania and Bulgaria. It is also known from scattered localities along the Baltic Sea coast (Nowacki 1994).

A. puta was recorded for the first time in Poland during this study (Wąsala & Maciąg 2011). Single specimens were recorded at only three localities in the western part of the study area (Fig. 35). Since then, it has also been reported from Poznań (Wąsala & Matuszewski 2020). The locality at Mrzeżyno is the north-easternmost one of this species in central Europe. A Ponto-Mediterranean species (Fig. 36),

it occurs throughout the Mediterranean and Black Sea basins, from where it migrates northwards every year (Nowacki & Buszko 2019).

Species that reach their eastern or north-eastern range limits in the study area form a much smaller group, 9 species in fact, which is 2.64% of the overall number of noctuid moth species recorded during this study. They are *X. areola, A. nigra, A. neurica, P. brevilinea, C. rufa, E. linogrisea, E. glareosa, X. agathina,* and *A. ripae.*

X. areola was recorded at just two localities on the island of Uznam, whereby 18 specimens were trapped at Karsibór (Fig. 37). Previously, just one single specimen was known to have been trapped in Poland, at Świnoujście (Nowacki 1990).

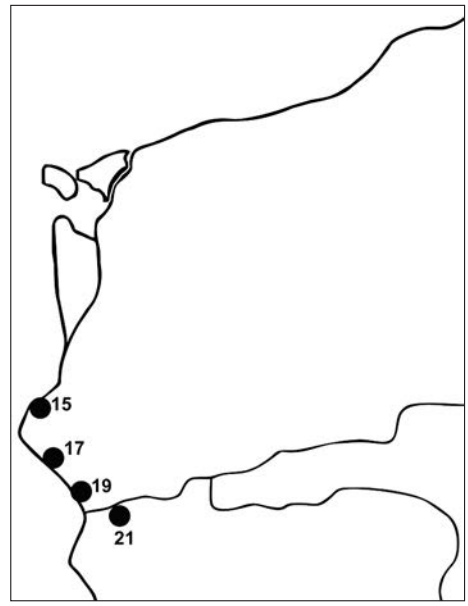


Fig. 31. The localities where *Aedia funesta* was recorded.

Fig. 32. The range of *Aedia funesta* in Europe.

Despite the ready availability of the species' host plant along the Baltic coast – honeysuckle (*Lonicera periclymenum* L.), its range in the study area has hardly changed during 30 years. The species occurs in western Europe (Fig. 38), from Spain to Italy in the south and from Great Britain to northern Germany, Denmark and southern Sweden in the north (Ronkay et al. 2011).

A. nigra – just a single specimen was trapped at Mielenko Drawskie (Fig. 39). Its range boundary was thus shifted by some 200 km to the north-east. This is a very local species, with a historical record from Lubliniec (Wolf 1935-44). Subsequently, it was reported from western Poland, i.e. the Gubin area (Buszko & Śliwiński 1979) and the Lower Silesian

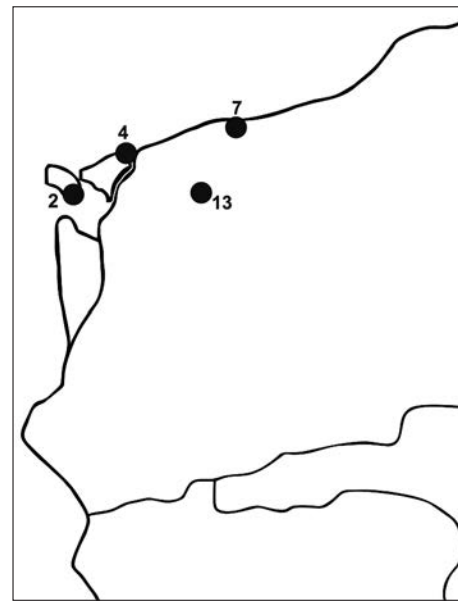


Fig. 33. The localities where *Photedes extrema* was recorded.

Fig. 34. The range of *Photedes extrema* in Europe.

Forest (Kokot & Hyjek 2011, Malkiewicz et al. 2002, Nowacki et al. 1997). It is an Atlantic-Mediterranean species (Fig. 40), occurring from Portugal, through Spain and France, and further eastwards as far as the Black Sea. It has also been recorded in countries bordering the North Sea (Ronkay et al. 2001, Nowacki & Buszko 2019).

A. neurica is a species with a European distribution, which was recorded for the first time in the study area at Karsibór (Fig. 41). The closest known localities are near the town of Anklam in Germany, 40 km west of Świnoujście (Wąsala 2016). An extremely local species in Poland, it was recorded historically at Gdańsk and in the Poznań area (Romaniszyn &

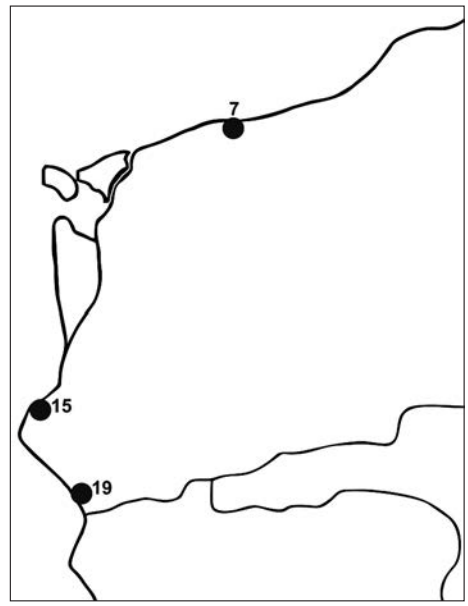


Fig. 35. The localities where *Agrotis puta* was recorded.

Fig. 36. The range of *Agrotis puta* in Europe.

Schille 1929). Later it was reported from north-eastern Poland at Bialowieża and Czerlonka (Buszko et al. 1996) and also from Łeba and Piaski on the Baltic coast (Nowacki 1994). In Europe (Fig. 42), it occurs only along North and Baltic Sea coasts, and in a broader range south of the Carpathians (Zilli et al. 2005).

During this study, *P. brevilinea* was trapped for the first time in Poland (Nowacki & Wąsala 2015) at Karsibór (Fig. 43). As a result, the limit of the western, Atlantic part of its range has shifted slightly to the east. In Europe (Fig. 44), the species occurs in two widely separated areas: a north-western one, displaying the typical Atlantic range and a south-eastern one, extending from Crimea across the steppes of southern

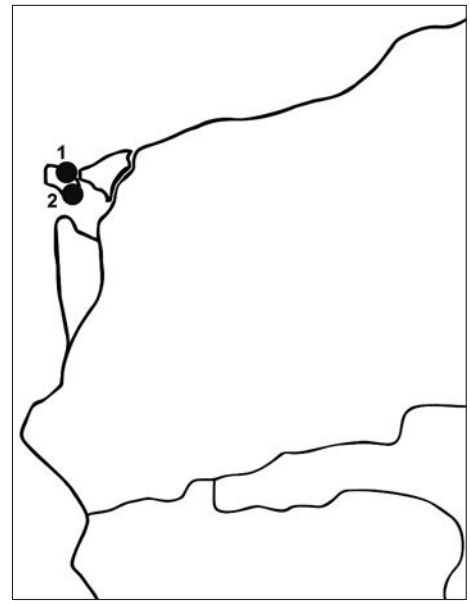


Fig. 37. The localities where *Xylocampa areola* was recorded.

Fig. 38. The range of *Xylocampa areola* in Europe.

Russia to the Caspian Sea coast. In the Atlantic region, *P. brevilinea* occurs at an isolated locality in western France and along the coasts of the North Sea, in England, the Netherlands, Denmark and Germany. It is also found along the Baltic coast in Denmark, Germany and southern Sweden, and in the east in southern Finland, Estonia, Latvia and Lithuania (Nowacki & Wąsala 2015).

C. rufa is another species that was recorded for the first time in Poland during this study. Single specimens were trapped at only two localities on the coast, in the northern part of the study area (Fig. 45). The locality at Mrzeżyno is the north-easternmost one of this species in central Europe. Thus, its range has been extended by ca 80 km to the east.

Fig. 39. The locality where *Aporophyla nigra* was recorded.

Fig. 40. The range of *Aporophyla nigra* in Europe.

The nearest hitherto known localities of *C. rufa* are in north-eastern Germany. An Atlantic-Mediterranean species (Fig. 46), it occurs in the countries of western Europe (Nowacki & Buszko 2019).

E. glareosa was recorded only at Zawarcie, a locality in the south-western part of the study area (Fig. 47). This means that the continuous range of this species has shifted slightly to the east (by 70 km). There are historical records from the Bytów area in Pomerania (Urbahn & Urbahn 1939) and the Pieniny Mts (Romaniszyn & Schille 1929). In Poland, this is a local species, recorded from a few localities in the south-west of the country: near Gubin (Buszko & Śliwiński 1979, Nowacki & Sosiński 1998), in the Lower Silesian Forest (Kokot & Hyjek 2011) and

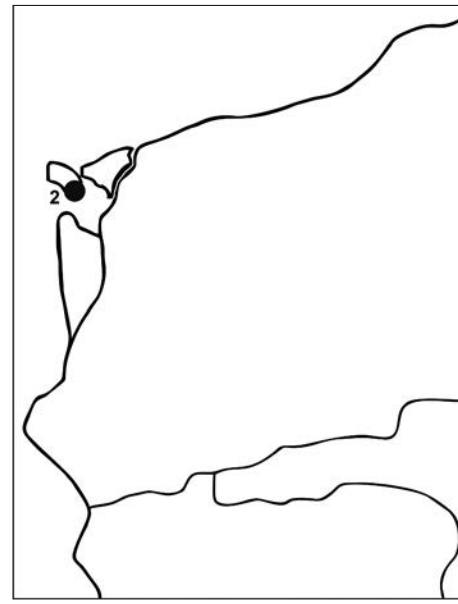


Fig. 41. The locality where *Archanara neurica* was recorded.

Fig. 42. The range of *Archanara neurica* in Europe.

three sites on the Baltic coast: Czołpino, Białogóra and Ostrowo (Nowacki 1994).

This is an Atlantic-Mediterranean species (Fig. 48), whose range stretches from Morocco and the Iberian Peninsula, through western and central Europe to the British Isles, then from southern Norway to southern Sweden, Poland, Estonia and southern Finland (Aarvik et al. 2017, Nowacki 1994, Nowacki & Buszko 2019).

E. linogrisea was recorded at four localities, including two very close to one another on the Baltic coast. It was also found at Kaleńsko in the Odra valley and at Międzychód in the Warta valley (Fig. 49). Elsewhere in Poland, there are records from a small number of localities in the western and central parts of the country (Nowacki & Wąsala 2017).

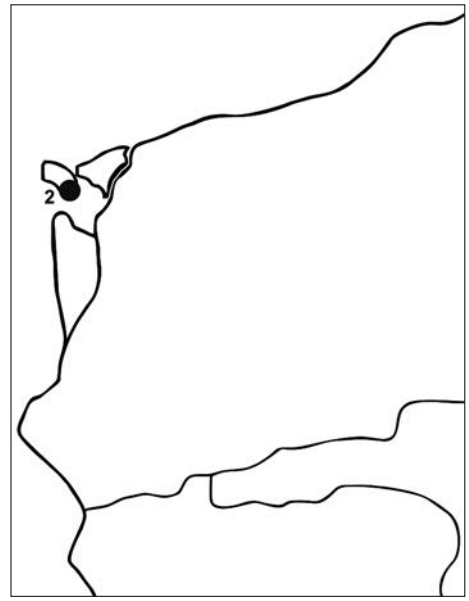


Fig. 43. The locality where *Protarchanara brevilinea* was recorded.

Fig. 44. The range of *Protarchanara brevilinea* in Europe.

A Ponto-Mediterranean species (Fig. 50), it occurs throughout the basins of the Mediterranean and Black Seas. Its eastern range boundary crosses central Poland, thereafter running northwards up the Baltic coast as far as Estonia (Nowacki 1994, Nowacki & Buszko 2019).

X. agathina – this is the first and only record of the species in the study area, where it was trapped at Mrzeżyno (Fig. 51). The only historical records are from Lower Silesia (Wolf 1939-1944), although later it was reported from the Gubin area in western Poland (Nowacki & Sosiński 1998(1997) and from the Lower Silesian Forest (Kokot & Hyjek 2011, Malkiewicz et al. 2002). It was also found at Osetnik and Białogóra on the

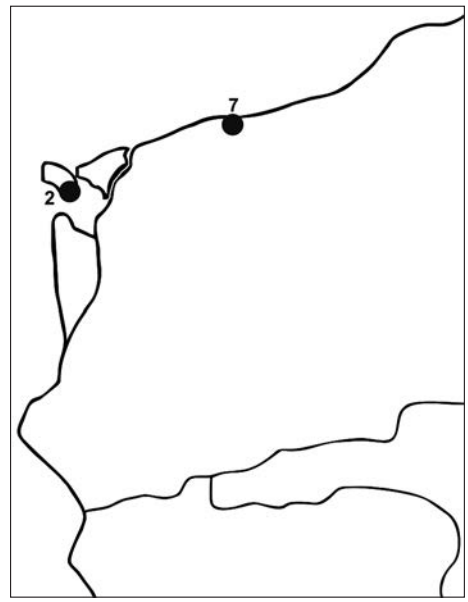


Fig. 45. The localities where *Coenobia rufa* was recorded.

Fig. 46. The range of *Coenobia rufa* in Europe.

central Baltic coast (NOWACKI 1994). The Mrzeżyno locality lies roughly halfway between the species' known localities in Germany and Poland. *X. agathina* occurs (Fig. 52) on the Atlantic coasts of Portugal and Spain, its range then extending over France, Belgium, the Netherlands, the British Isles, Denmark and Germany. In the Mediterranean Basin it is found from Spain through France to Italy (FIBIGER 1993).

A. ripae was recorded in two separate parts of the study area. One is the western part of the coast from Świnoujście to Międzywodzie, where 33 specimens were trapped. The other locality was at Mrzeżyno, where 1 specimen was caught. *A. ripae* did not occur anywhere along the 40 km stretch from Międzywodzie

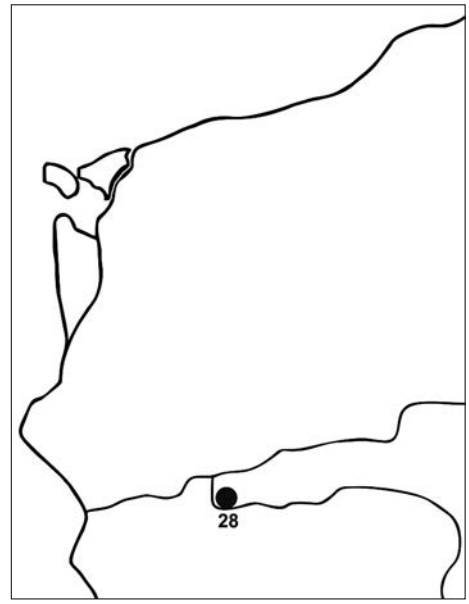


Fig. 47. The locality where *Eugnorisma glareosa* was recorded.

Fig. 48. The range of *Eugnorisma glareosa* in Europe.

to Mrzeżyno (Fig. 53). In Poland, this species is local. It is known from two distinct areas on the Baltic coast. The first covers the western end of the coast, where it was recorded at Świnoujście, Międzyzdroje, Międzywodzie, Dziwnów and Mrzeżyno (Nowacki 1994, Urbahn & Urbahn 1939). The second area of occurrence is the eastern part of the coast from Czołpino in the Słowiński National Park all the way to Piaski on the Vistula Spit (Nowacki 1994). The larval host plants of this species are halophytes, which grow only on the coasts of the Atlantic Ocean, North Sea and Baltic Sea (Fig. 54) (Nowacki 1994, Nowacki & Buszko 2019).

One species, whose range reaches its southernmost boundary in the study

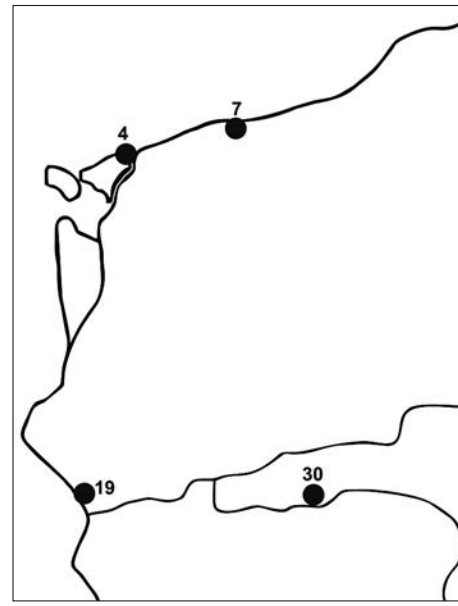


Fig. 49. The localities where *Epilecta linogrisea* was recorded.

Fig. 50. The range of *Epilecta linogrisea* in Europe.

area, is *L. elymi*. In Poland, it occurs (Fig. 55) only on the coastal dunes on the country's Baltic coast (Nowacki 1994). It is a Euro-Siberian species (Fig. 56), which in Europe is found only along North and Baltic Sea coasts (Nowacki & Buszko 2019).

A. syriaca is a species that reaches its north-western range boundary in the study area. It was recorded only at Kaleńsko in the Odra valley (Fig. 57), which showed that its range boundary had shifted some 150 km westwards. A local species in Poland, it was first recorded in the Roztocze region (Nowacki 2006b), and thereafter at Pińczów in the Nida valley (Nowacki & Wąsala 2020), in Poznań (Nowacki & Wąsala 2018) and also in the Karkonosze (Nowacki &

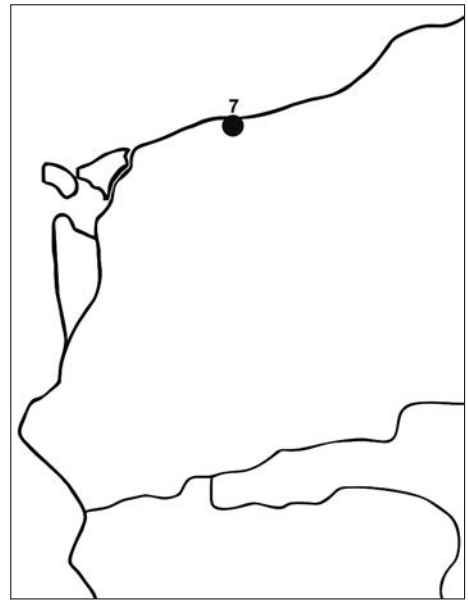


Fig. 51. The locality where *Xestia agathina* was recorded.

Fig. 52. The range of *Xestia agathina* in Europe.

Wąsala 2021a) and Świętokrzyskie Mts (Nowacki & Wąsala 2021b). It is a Ponto-Mediterranean species (Fig. 58), occurring in the Mediterranean and Black Sea basins (Nowacki & Buszko 2019).

Besides the above species, it is worth drawing attention to *C. leineri*, whose range in Europe is highly distinctive. It is a species that was trapped in some numbers in the study area on the Baltic coastal dunes from Świnoujście to Kołobrzeg (Fig. 59). In Poland, it is found exclusively on the dunes along the Baltic coast (Nowacki 1994, Nowacki & Buszko 2019). It is a Euro-Siberian species with a curiously disjunct distribution (Fig. 60) in three widely separated regions in Europe. Its core region of occurrence lies mainly along the coasts of the Baltic

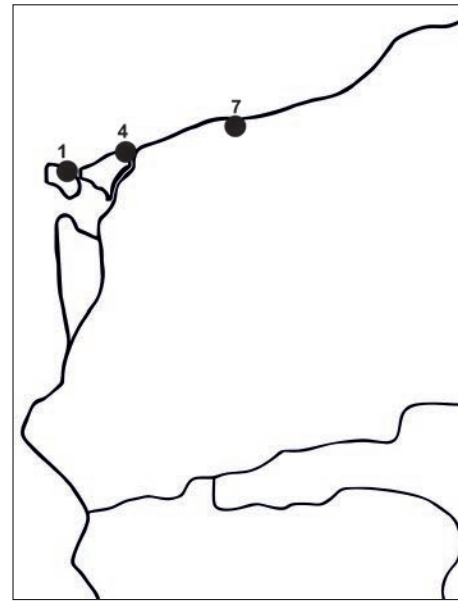


Fig. 53. The localities where *Agrotis ripae* was recorded.

Fig. 54. The range of *Agrotis ripae* in Europe.

Sea, from Denmark, through Germany, southern Sweden and Finland, and then southwards through the Baltic countries to Poland. It is also known to occur in the Alpine region as far east as the Pannonian Plain, and along the northern and western shores of the Black Sea (HACKER et al. 2002).

There were also two species – *E. virgo* and *N. interjecta* – which were found to have expanded their ranges very considerably.

E. virgo was recorded in north-western Poland for the first time during this study (Fig. 61). Over a period of several decades, ever since it was first reported from the Bieszczady Mts (BIELEWICZ 1973), this species has extended its range north-westwards by nearly 1400 km.

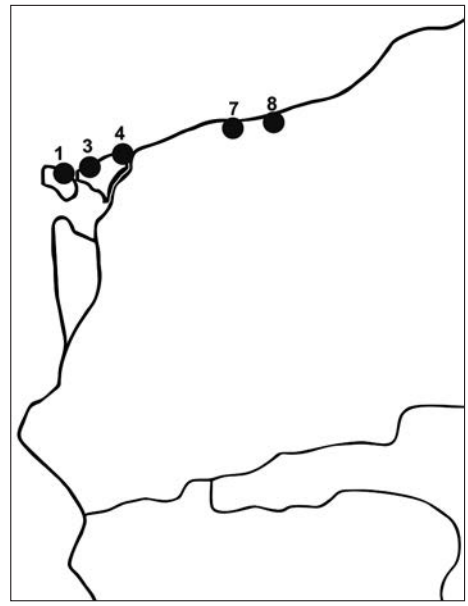


Fig. 55. The localities where *Longalatedes elymi* was recorded.

Fig. 56. The range of *Longalatedes elymi* in Europe.

It is currently known from the whole of Poland (Nowacki & Buszko 2019), and its western boundary now runs longitudinally from Norway, across Denmark, the Netherlands and Germany as far as Italy (Fig. 62).

N. interjecta was trapped at scattered localities throughout the study area (Fig. 63). Two-sub-species are known: the nominative *N. interjecta interjecta* Hbn., which occurs in southern and south-eastern Europe, and the expansive *N. interjecta caliginosa*, which is found north of the Alps (Schawerda 1919) (Nowacki et al. 2019). All the specimens caught during this study were *ssp. caliginosa.* Before the end of the 20th century, the only Polish records of this species were from a few localities in the west

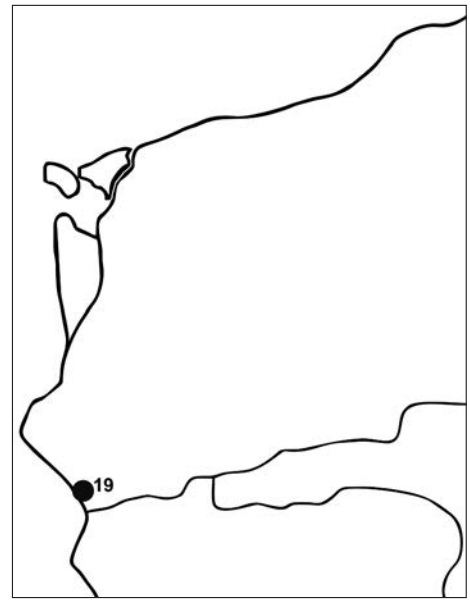


Fig. 57. The locality where *Apamea syriaca* was recorded.

Fig. 58. The range of *Apamea syriaca* in Europe.

of the country, from the Baltic coast to Lower Silesia (Nowacki 1994). In the last 30 years it has been expanding very rapidly eastwards, both within Poland and in other countries around the Baltic. In contrast, *ssp. interjecta* has entered Poland from the south-east, so that at present both subspecies occur in Poland (Nowacki et al. 2019). This species has an Atlantic-Mediterranean distribution. Its current range extends (Fig. 64) from the Iberian Peninsula across the whole of western and southern Europe as far as the Baltic Sea in the north (Nowacki et al. 2019).

Range expansions were established for a number of other species, not analysed above, namely: *N. asiatica, D. stenochrysis, M. confusa, P. putnami,*

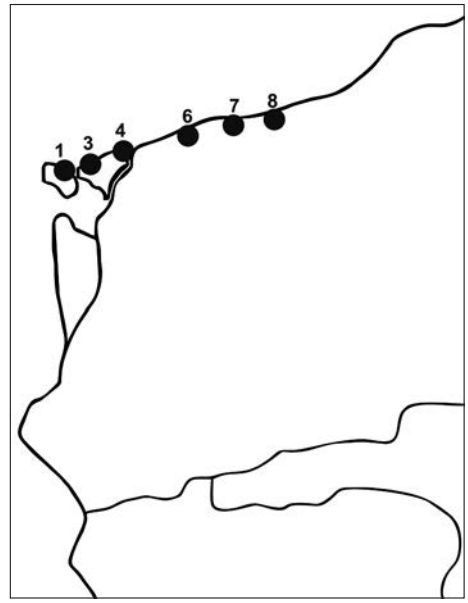


Fig. 59. The localities where *Conisania leineri* was recorded.

Fig. 60. The range of *Conisania leineri* in Europe.

A. buraetica, A. asclepiadis, A. berbera, A. livida, H. adaucta, H. armigera, P. meticulosa, C. fraudatricula, A. centrago, A. lueneburgensis, D. convergens, H. ultima, M. secalella, N. interposita, N. janthe, P. sobrina and *E. vitta.*

Among them are species, like *N. asiatica* and *A. lueneburgensis*, which in the last few decades have colonized practically the whole of Poland and have distinctly expanded their ranges in Europe. The former is a Euro-Siberian species that was first recorded in Poland in the Białowieża Primeval Forest (Kokot 1986); now it is present in almost all of Poland (Nowacki & Wąsala 2017, Nowacki 2019). The latter was historically recorded in Pomerania as *Aporophyla lutulenta* (Denis & Schiffermüller,

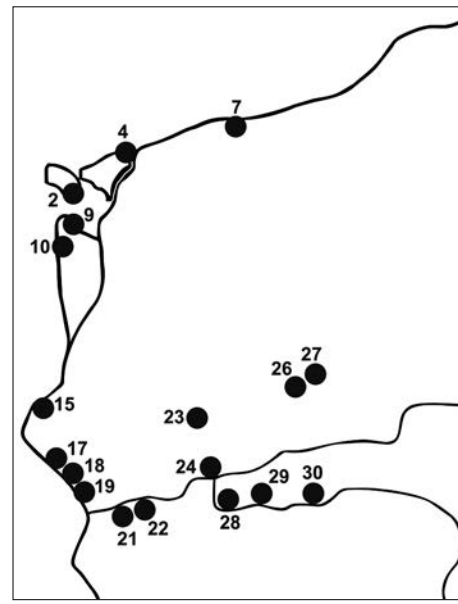


Fig. 61. The localities where *Eucarta virgo* was recorded.

Fig. 62. The range of *Eucarta virgo* in Europe.

1775) near Szczecin (Urbahn & Urbahn 1939), in Gdańsk (Speiser 1903) and in Lower Silesia (Wolf 1935-1944). Field studies have shown that only *A. lueneburgensis* occurs in north-western Poland (Nowacki et al. 2019), although it has also been reported from eastern Poland. At present, it is constantly expanding its range: in the 20th century it was recorded in the countries around the Baltic, and also in Latvia and Lithuania (Aarvik et al. 2017). During the present study, it was trapped at eight scattered localities in the Odra and Warta valleys, and also on the Drawsko Military Training Area.

Another group consists of Palearctic species with a propensity to migrate; their numbers fluctuate widely from year to year. Some of them, like *M. confusa*,

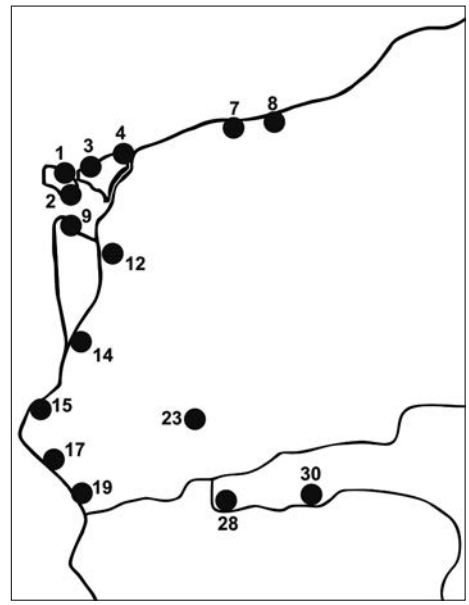


Fig. 63. The localities where *Nactua interjecta* was recorded.

Fig. 64. The range of *Nactua interjecta* in Europe.

were not recorded historically by URBAHN & URBAHN (1939); very much later, this species was found at three localities by NOWACKI (1993b, 1994), whereas nowadays it is present throughout the study area. Again, *H. armigera* was recorded for the first time in north-western Poland, at two localities: Zawarcie in the Warta valley and Mrzeżyno on the Baltic coast. This species undertakes annual northward migrations and has been known to reach the northern extremities of the British Isles and central Scandinavia (NOWACKI 2019). *P. meticulosa* has a similar distribution and migratory capabilities. Historically, it was recorded only in the Szczecin area (URBAHN & URBAHN 1939), but at present it can be found throughout the study area.

A distinctive group of species are those that are hard to identify, for which there are no historical records from the study area. This was due to changes in the status of particular species, the separation of twin species, their identification was problematic because of similarities in their external morphologies or they were difficult to identify on the basis of a genitalia examination. These species include *D. stenochrysis, P. putnami, A. buraetica, A. asclepiadis, H. adaucta, A. berbera, H. ultima, M. secalella, N. interposita* and *N. janthe.*

This study has also shown that in north-western Poland, changes are taking place in the noctuid moth fauna that are characteristic of natural ecosystems; unfortunately, they are regressive. 36 species recorded earlier in the study area were not found again: *C. electa, C. pacta. C. alchymista, E. adulatrix, N. degenerana, P. moneta, L. c-aureum, P. cheiranthi, A. mandarina, A. bractea, A. lucida, C. lactucae, C. campanulae, S. lanceolata, A. perflua, H. ononis, B. ereptricula, B. domestica, M. maura, D. oo, L. semibrunnea, L. lamda, L. consocia, P. polymita, P. flavicincta, P. pabulatricula, E. ochroleuca, C. cordigera, L. aliena, H. confusa, H. albimacula, H. filigrana, M. litoralis, D. florida, P. punicea* and *X. ashworthii.* As many as 16 of them are on the "Red list of endangered animals in Poland" (BUSZKO & NOWACKI 2002).

Six species associated with peatbogs and marshland ecosystems could not be found again: their distribution contracted markedly in the second half of the 20th century, mainly because of the degradation of peatbog habitats. They are *C. electa, C. pacta, L. lamda, C. cordigera, D. florida* and *P. punicea*. *C. pacta* is worth a second look. A Euro-Siberian species, it has to date been reported from Denmark, Estonia, Finland, Lithuania, Latvia, Germany, Poland, Russia and Sweden (NOWACKI & FIBIGER 1996). In Poland before 1950, it was found at a dozen or so localities in various parts of the country. Its contemporary range is very much smaller: it no longer occurs in northern Germany, in Denmark or in north-western and east-central Poland (HEINICKE & NAUMANN 1980-82, NOWACKI 2004a, SKOU 1991). Its only surviving localities in Poland are in the north-east of the country.

There is another group of noctuid moths, the presence of which in the study area was likewise not confirmed. These 13 species are associated with various types of near-natural woodlands and glades: *C. alchymista, N. degenerana, L. c-aureum*

P. moneta, A. mandarina, A. bractea, A. perflua, M. maura, D. oo, L. semibrunnea, L. consocia, P. polymita and *P. pabulatricula.* Most of these species are local, usually occurring at scattered localities; greater densities of localities are found only in certain areas. Of particular interest is *P. moneta*, a species with a western Palearctic range, the disappearance of which from the study area was hinted at already in the early 20th century (Urbahn & Urbahn 1939). Currently in Poland it is found locally all over the country, but records have dwindled in recent decades (Nowacki & Buszko 2019).

The greatest losses – of 16 species – have probably been sustained by xerothermophilous noctuids, namely, *E. adulatrix, P. cheiranthi, A. lucida, C. lactucae, C. campanulae, S. lanceolata, H. ononis, B. ereptricula, B. domestica, P. flavicincta, E. ochroleuca, L. aliena, H. confusa, H. albimacula, H. filigrana* and *X. ashworthii.* The range boundaries of the majority cross north-western Poland, while others, like *E. adulatrix* and *H. ononis*, are occasional migrants, very rarely recorded in northern Europe. These species are particularly vulnerable to unpropitious biotic and abiotic factors, and some of them occur at disjunct localities. Many are stenotopes living in extreme environments. One such species is *B. ereptricula*, trophically associated with lichens growing on rocks, boulders and old walls. It was recorded at just one historical locality in the study area – Linki near Szczecin – which was destroyed in 1870 (Urbahn & Urbahn 1939). Since that time, it has never again been recorded in northern Poland, although it is known from a very few localities in the south of the country (Nowacki 2019). The halophilous species *M. littoralis* was not recorded again in the study area either. It is a European species, inhabiting the coasts of the Atlantic Ocean, and the North and Baltic Seas. It has also been reported from the western Mediterranean, where very small local populations have been found (Hacker et al. 2002). Historically, it used to be recorded along the whole Baltic coast, *inter alia* at three localities in the study area (Urbahn & Urbahn 1939). During fieldwork carried out in 1989-1993, its occurrence was not confirmed in north-west Poland. But it was found in the dune belts in the central and eastern sections of the Baltic coast in a continuous range from Łazy to Hel (Nowacki 1994).

Many species have suffered considerable reductions in the numbers of localities where they used to occur, and at their surviving localities numbers are usually small. This applies in the main to stenotopes, from tyrphophilous species like *H. humidalis, N. aerugula, S. interrogationis* and *A. menyanthidis*, through species associated with various types of woodland, e.g. *A. cuspis, E. vernana, C. ligula* and *X. vetusta*, to xerothermic species, such as *C. artemisiae, C. tanaceti, A. furva, H. bicolorata, H. compta* and *A. praecox*.

SUMMARY OF RESULTS AND CONCLUSIONS

Carried out in the years 2005–2020, this study of noctuid moths (Lepidoptera: Noctuoidea: Erebidae, Euteliidae, Nolidae, Noctuidae) in north-western Poland yielded 340 species, including 18 recorded in this region of Poland for the first time. Among them are *Protarchanara brevilinea, Coenobia rufa* and *Agrotis puta*, which are also first-time records for the whole of Poland. In addition, the systematic list contains species that were recorded throughout the history of lepidopterological research in this region, but were not confirmed in the 21st century. If we include these latter species, we reach a grand total of 376 species of Noctuoidea for the study area. It is remarkable that such a large number of species – 74% of the national total – was recorded in ecosystems that have been substantially transformed by humans. For comaprison, the numbers of noctuid moth species reported from other parts of Poland are as follows: the Biebrza Marshes – 300 species (Frąckiel & Nowacki 2010), the Bieszczady Mts and Przemyśl Foothills – 307 (Bielewicz 1973, 1984, Nowacki et al. 1993), the Augustów Forest – 323 (Nowacki & Rudny 1990, 1992, Nowacki 1993c, 1997, Kokot 1995), the Białowieża Primeval Forest – 352 (Buszko et al. 1996, Wąsala 2001, Kokot & Wasiluk 2004), the Sandomierz Forest – 270 (Nowacki & Pałka 2015), the Kraków area – 316 (Razowski & Palik 1969), the Sobibor Forest in Polish Polesie – 344 (Nowacki & Hołowiński 1999, 2002, 2010, 2015, 2020), the Roztocze region – 301 (Nowacki 1992, 1993, 2006a, 2006b, Nowacki & Pałka 2013, 2015), central Podlasie – 319 (Nowacki et al. 1997, Frąckiel et al. 1997, Nowacki & Wasiluk 2004, 2010) and the Province of Wielkopolska – 362 (Nowacki & Wąsala 2018).

Analysis of the distributions of these moth species in the study area helped to explain their large number. It showed unequivocally that the current species composition of noctuid moths in this part of Poland is to a large extent the upshot of the historical intermixing of faunas. The great majority of species are common ones, distributed in continuous ranges right across central Europe (Fibiger 1990, 1993, 1997, Fibiger & Hacker 2007, Fibiger et al. 2009, 2010, Goater et al. 2003, Hacker et al. 2002, Hrubý 1964, Karsholt & Nielsen 1998, Mikkola et al. 1991, Nowacki 1994, 1998, Nowacki & Buszko 2019, Ronkay & Ronkay 1994, 1995, Ronkay et al. 2001, Ronkay et al. 2011, Savenkov et al. 1996, Sinev 2008, Skou 1991, Witt & Ronkay 2012, Zilli et al. 2005) and are equally abundant in Western Pomerania (Blaik 2010, Nowacki 1993ab, 1994, Urbahn & Urbahn 1939). As there are at least two aspects relating to their presence in this region, we can divide them into two groups.

The first group contains eurytopic species, along with other species with a preference for riparian habitats, and deciduous/mixed and coniferous woodlands. Such environments are still extant at many localities. There are a great many such species and their numbers are comparable with those in other parts of Poland. Examples include *R. sericealis, D. pygarga, D. deceptoria, D. bankiana, C. morpheus,*

P. candidula, C. vaccini, M. furuncula, P. fluxa, P. sagittigera, O. incerta, O. gothica and *O. cruda*; and also *P. flammea, C. graminis*, *O. plecta, N. pronuba, X. c-nigrum, X. xanthographa, A. exclamationis* and *A. segetum* (Kordy 1996, Nowacki 1989, 1992, Studziński 1979, Wąsala 2005, Węgorek 1966).

The second group are nationally common species but only small numbers of which which were recorded at scattered localities in the study area. Here, their distributions are local, mostly dependent on the availability of host plants or the existence of distinctive microclimates.

The noctuid moth fauna of north-western Poland is not very different from that in the centre of the country. A great variety of factors will have shaped it. Historically, the most important one was the climate. Some 8 000 years BP, there began the 2 500 year long Atlantic period, during which the climate was warm and humid. In the aftermath of the Baltic Sea transgression, large areas of land were inundated, and new connections with the sea were created. The rising water table led to the large-scale formation of peatbogs, there arose new lakes and existing ones became larger, and the ranges of many deciduous tree species expanded. The noctuid moth fauna at that time became enriched with species moving in from the south and west, like halophiles and other species associated with deciduous woodland ecosystems. That was probably the time when the following ones arrived in the study area: *A. funesta, L. elymi, P. extrema, E. linogrisea, N. interjecta, P. glareosa, X. agathina, X. castanea* and *A. ripae*, to name but a few. The subsequent Sub-Boreal cooling of the climate, which followed the climatic optimum 4 500 years BP, led to the dominance in many places of psammophilous plants, particularly pine. Woodland species, together with the receding forests, withdrew southwards and westwards, which again modified the fauna in north-west Poland, altering the distributions of some species. Then, around 2 500 years BP, humidity levels increased but temperatures fell as the climate became cooler, which encouraged the expansion of beech-hornbeam forests. Presumably, it was then that species associated with fertile deciduous forests arrived in this region, among others, *P. prasinana, X. areola, T. aurago, L. semibrunnea* and *P. polymita.* The conditions in this Sub-Atlantic period were much the same as those prevailing nowadays, which will have consolidated the composition of the noctuid moth fauna in the study area as we find it today.

This conception of the origin of Atlantic and European species in this region generally coincides with the succession of the vegetation there (Borówka & Osadczuk 2001, Brykczyńska 1978, Strakel 1967, Szafer & Kostyniuk 1962, Środon 1972), and also with the overall trends in faunal changes in Poland during the Holocene (Kostrowicki 1953, 1965ab, 1969).

It was midway through the 19th century that lepidopterological studies began in this region. Since then, it has undergone far-reaching changes, in particular, industrialization and urbanization. In consequence, woodlands shrank in area and became subject to planned management. This led to the growth of more closed-canopy tree

stands. Their species compositions also changed gradually, and many woodland complexes were clear-felled and converted to arable land. Besides these changes to the extents and structures of woodlands, aquatic and waterlogged ecosystems were also much modified, as a result of which the original mosaics of wet forests, meadows and emergent vegetation were transformed into grasslands. Many water bodies were drained during land reclamation projects, as a result of which their overall surface area contracted. After the Second World War, crucial changes affected the agricultural landscape, when the earlier mosaics of small fields were combined into large crop fields belonging to state-owned farms. Trees growing singly in open terrain, hedgerows, mid-field scrub and balks gradually disappeared from the landscape. Ongoing large-scale land reclamation and drainage eliminated more marshland and ponds. Natural migration corridors were blocked or removed. In time, isolated "micropopulations" dwindled, and gene pools could no longer be regenerated. The application of non-selective chemical compounds also had an impact on the noctuid moth species composition. After World War II, indiscriminate spraying of pesticides took place on a large scale in both agriculture and forestry, killing most of the organisms that happened to be within range. In combination with the disappearance of environmental corridors, this produced "faunistic deserts" in many places. For whole decades, trophic networks were disrupted, which cannot have failed to affect the fauna of particular habitats and areas.

The present-day structure of noctuid moth ranges is determined by ecological factors, principally long-term climatic fluctuations, the availability of larval host plants, to which we have to add the effects of human activities. Climatic factors, ever present, modify the environments in which moths develop and also the extents of their ranges. These changes are discernible on the scale of years, decades or even longer periods of time, and butterflies and moths have reacted to them in very many ways. Some species have benefitted from them, expanded their ranges and colonized new localities. But others have declined and eventually disappeared from the areas where they once flourished.

These changes are exemplified by many species of lepidopterans. For instance, 258 species were recorded in just one province in Finland for the first time ever during the period 1987-2010 (Itämies et al. 2011). Butterflies (Rhopalocera) have also been expanding north-eastwards. Parmesan et al. (1999) studied the changes in distribution of 35 lepidopteran species, none of which was migratory. They found that 63% of those species had expanded their ranges in a northerly direction, while their range boundaries had shifted 35-240 km to the north. In contrast, only 3% of these species turned out to have expanded southwards. These trends were confirmed by Saarinen et al. (2003), who established that the range boundaries of 7 butterfly species had shifted northwards. These processes have also affected noctuid moths, many species of which, previously not found in northern Europe, were recorded there between 1990-2010 (Aarvik et al. 2017). By way of example,

numbers of noctuid moth species increased in Denmark by 30, in Sweden by 31 and in Finland by 32 (Fibiger et al. 2010).

This study in north-west Poland also revealed northward range boundary extensions in the following 33 noctuid moth species: *N. asiatica, D. stenochrysis, M. confusa, P. putnami, A. buraetica, A. asclepiadis, A. berbera, A. livida, E. virgo, H. adaucta, H. armigera, P. meticulosa, C. fraudatricula, A. centrago, A. luneburgensis, A. nigra, D. convergens, A. syriaca, H. ultima, A. neurica, P. brevilinea, P. extrema, C. rufa, M. secalella, N. interposita, N. interjecta, N. janthe, E. glareosa, P. sobrina, X. agathina, E. vitta, A. ripae* and *A. puta.*

Human activities often lead to sudden, catastrophic transformations of whole ecosystems. Stenotopes or species living at their range limits are the most vulnerable to such changes. Human pressure is not infrequently potentiated by environmental changes caused, among other things, by climatic fluctuations. The adverse effects of human activities in the study area are well exemplified by the fragmented and diminishing ranges of species like *X. agathina* and *X. castanea.* These moths, typical representatives of the Atlantic zone, which reached this part of the world during the Atlantic period, chiefly inhabit heather peatbogs, heathlands and crowberry pine forests. The anthropogenic changes that have occurred in the study area systematically destroyed these ecosystems, with the result that a whole series of Atlantic plants were lost. As these plants disappeared from north-western Poland, so did their associated moth species. Thus, *X. agathina*, being a secondary relict species, is currently found only at Mrzeżyno in the north-east of the study area. This is the only place in north-western Poland where a fully-developed crowberry pine forest has managed to survive in its typical coastal dune habitat, which provides optimal conditions for the development of this moth. That this habitat has survived is due to historical reasons (it used to be a closed military zone) and natural ones (a large area of waterlogged terrain), both of which hindered intensive anthropogenic development. A similar tendency for a range to become fragmented was observed in *Xestia castanea*. Urbahn & Urbahn (1939) reported this species from a few localities near Świnoujście and Szczecin. But during the present study, *X. castanea* was confirmed only at Mrzeżyno, where Nowacki (1994) also found it, and at Mszczuje, a locality 80 km to the west in the Wkrzańska Forest. A tendency for a continuous range to break up was also observed in *A. ripae*, another species mentioned by Urbahn & Urbahn (1939) as occurring along the whole Baltic coast. This observation was confirmed by Fibiger (1990), who stated that *A. ripae* occurred in a continuous range all the way to Latvia. But Nowacki (1994) showed that in Poland this species now occurs in two distinct regions of the Baltic coast: one at the western end of the coast, where it was recorded at Międzywodzie, Międzyzdroje and Świnoujście, and the other on the eastern section of the coast from Czołpino in the Słowiński National Park to Piaski on the Vistula Spit (Nowacki 1994). During the present study, *A. ripae* was also found at Mrzeżyno, to the east of its known western localities on the islands

of Wolin and Uznam. This species is halophilous and inhabits coastal sand dunes. Its continuous range probably split up following the widespread degradation of its dune habitats caused by human activities on long stretches of the Baltic coast in Poland (Łabuz 2013).

In some cases, however, human activities may have actually helped species to expand their ranges. Examples include *A. lueneburgenis* and *A. nigra*, Atlantic-Mediterranean species that prefer dry, warm psammophilous swards and heathlands. Such environments also exist on the slopes of river valleys or subsist with the aid of human intervention, as a result of which the succession of small-seeded trees (birch, pine, aspen) is prevented and the area remains open. This often favours the occurrence of ecologically more demanding species. *Aporophyla nigra* is one of these: it was recorded for the first time in the study area on the Drawsko Military Training Area, the largest area of its type in Europe. Despite being intensively utilized, this area supports species associated with open environments, including heathlands. During this study, it was found that *A. lueneburgenis* also occurs in such biotopes. Presumably, then, military training areas are important refugia for psammophilous and xerothermic lepidopterans, both in Poland and in Europe as a whole. This has been confirmed by research carried out on military training areas in Poland (Nowacki & Pałka 2015, Walczak 2002, 2011) and elsewhere in Europe (Derzhinsky 2016, Konvička et al. 2008, Šumpich 2010).

The dynamics and extent of a species' range expansion depend on many factors, for example, external environmental ones, its propensity to disperse and its morphological adaptations. Among the external factors, a significant part is played by the genetic factors governing the population's polymorphism, as a result of which individuals come into being that are inclined to migrate or are better adapted to atypical properties of food. This is one of the main arguments put forward to explain the sudden expansion of species, whose ranges were hitherto stable (Buszko 1990). This may explain the expansions of *N. asiatica, E. virgo*, *A. syriaca, N. interjecta* and *N. interposita*, which have colonized practically the whole of Poland in the last 30-40 years. In contrast, the range of *X. areola* has remained almost unchanged. The tempo of expansion thus varies for different species.

The following conclusions can be drawn from the results of this study:

1. Of the not inconsiderable group of 340 species of noctuid moth (Noctuoidea: Erebidae, Euteliidae, Nolidae, Noctuidae), currently recorded from the study area in north-west Poland, 90% are common ones abundant all over central Europe, the northern range boundaries of nearly 7% cross the study area and a little over 2% reach their eastern or north-eastern range limits here. Three species (1% of the total) reach their southern or north-western range limits here or are characterized by a distinctive type of distribution.
2. From the beginnings of lepidopterological studies in north-western Poland to the present, this region's noctuid moth fauna has undergone significant chang-

es, which have left their mark on stenotopic species in particular. The number of these latter species has fallen, as has the number of localities where they occur. This applies both to species associated with peatbogs, e.g. *H. humidalis, A. menyanthidis C. pacta, L. lamda, C. cordigera* and *P. punicea,* and to those associated with natural woodlands, e.g. *M. maura, L. semibrunnea, L. consocia, P. polymita* and *P. pabulatricula*. The greatest adverse changes have taken place among the xerothermophilous noctuids: the following historically recorded species were not found again: *A. lucida, S. lanceolata, P. flavicincta, H. confusa, H. albimacula, H. filigrana* and *X. ashworthii.*

3. The south-western Baltic coast is a corridor enabling the expansion across Europe of a few Atlantic noctuid moth species, namely, *P. brevilinea, P. extrema, C. rufa* and *A. puta.* Their ranges were found to have shifted slightly eastwards.
4. Despite the general availability of host plants, the tempo of expansion varies for different species. For some, like *E. virgo* and *A. syriaca*, it is fast, for others, like *X. areola*, it is slow.
5. In central Europe, river valleys are corridors along which some noctuid moths migrate from east to west, e.g. *N. asiatica, E. virgo* and *A. syriaca*, others, like *A. funesta, C. rufa* and *A. puta*, from south to north.
6. Evidence was obtained that current and former military training areas constitute important refugia for Atlantic noctuid moth species, such as *A. luneburgensis, A. nigra, P. sobrina, X. agathina* and *X. castanea.*
7. It is ecological factors that govern the range structures of noctuid moths in north-western Poland. The presence of suitable larval host plants and imagines is not a sufficient determinant. An equilibrium has to be maintained within whole ecosystems, in terms of both the natural structure of plant communities and the microclimate.
8. One of the most important factors underlying the contemporary distribution of noctuid moths in the study area is the activities of humans and the resulting transformation of natural plant communities into anthropogenic ones. The majority of these moths currently present in the study area are woodland species, which have become adapted to the secondary conditions prevailing in these altered environments.

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