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Leaf-mining moths (Lepidoptera) of the Biedrusko military area in western Poland

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Abstract: Results of the research on the leaf-mining moths (Lepidoptera) carried out in the Biedrusko military area in 1997–2008 are presented. The investigation showed great species richness of the moths. 258 species have been recorded in the military area, which makes about 47% of this fauna reported from Poland. 24 species are new to Greater Poland Voivodeship and several were reported from few, scattered localities. The most interesting species are described in details. New data on the biology of *Syncopacma ochrofasciella* are also given.

Key words: Lepidoptera, leaf-miners, W Poland, military area, diversity, faunistics, new records

INTRODUCTION

The military grounds in Biedrusko cover the area of about 7200 ha to the north of Poznan. The area has been used as military grounds for over a hundred years and thus it shows little anthropogenic transformation. The "Biedrusko" Protected Landscape Area has been established in 1995 to protect this naturally valuable area. Later this area has been included into the European Ecological Natura 2000 Network as a Special Area of Conservation (site code PLH300001).

The earliest information on the nature of the Biedrusko military ground comes from the beginning of the 20th century (Dorn 1919). Subsequent papers were published only in the beginning of 1990s, so after the political transformations in Poland, when it was possible to perform studies over this area. However, despite the attractiveness of the area, closeness to the academic centres and approval of the military authorities, the grounds have not been comprehensively studied yet. The hitherto studies concerned the flora and selected plant associations (Borysiak & Brzeg 1994; Wyrwol 1994; Zielińska 1994; Rakowski 1996; Stachnowicz 1996, 1997; Borysiak et al. 1998), vertebrates, mostly the birds, (Winiecki 1992) and insects: butterflies (Walczak 2002), beetles (e.g. Konwerski 2002; Konwerski & Sienkiewicz 2005), aphids (Wilkaniec et al. 2008) and parasitic wasps (Piekarska-Boniecka & Wilkaniec 2008). The mining moths of this area have not been studied yet.

The main aim of the study was to recognise the species composition of mining moths of this area and their environment selectivity in relation to vegetation type.

STUDY AREA

The area has diversified post-glacial landscape. The central part is the moraine plateau bordering on the south with the hills of the terminal moraine of Poznań Phase of the Baltic Glaciation. On the north and east the area covers fragments of the Warta River valley (Bartkowski 1962). To a great extent the area is covered with forest. However, parts of these forested grounds do not present high natural value mainly because of incorrect forest management that has led to degradation of habitats and degeneration of vegetation. A large part

of the area is grown with pine monocultures with some deciduous species; the ground is often occupied by reed grass *Calamagrostis epigeios* (L.) Roth and various species of the genus Rubus L. The contribution of oak forests is relatively large, and is represented mainly by acidophilous oak forests Calamagrostio-Quercetum petraeae (Borysiak & Brzeg 1994). There are well-developed ash-alder forests Fraxino-Alnetum, which greatest cluster is localised near the Glinnowiecki Brook and in the valley of the Północny Ditch. In the northern part of the military grounds, along the old river beds, there are patches of elm-ash forest Ficario-Ulmetum campestris (Wyrwol 1994). About 5% of the forested area is covered by alder forests, including fertile alder forest Ribo nigri-Alnetum and oligotrophic woodland Sphagno squarrosi-Alnetum (Borysiak & Brzeg 1994).

Thicket communities are widespread over the area; the greatest part is occupied by the thickets with common broom *Cytisus scoparius* (L.) Link, responsible for the specific look of the central part of the area (Borysiak & Brzeg 1994), deforested for the purpose of military training. Thickets with blackthorn and hawthorn Pruno-Crataegetum, occurring as shrubs in forest edge or more often individually in the open landscape, plays also an important role. Sallow thickets Salicetum pentandro-cinereae are common along the watercourses and on the banks of lakes and small ponds. Less frequent are the filbert thickets Euonymo-Coryletum and thickets with spindle-tree, cranberry-tree and red dogwood Euonymo-Cornetum (Borysiak & Brzeg 1994). Typical elements of the weakly transformed landscape are the ecotone communities: herbaceous vegetation of forest edges and thicket fringes. Among the nitrophilous forest edge communities the most important are the hygrophilous communities from the allion Convolvulion sepium, related to the Warta River valley and local depressions. Xerothermophilous forest edge communities representing the class Trifolio-Geranietea sanguinei are more frequently met and better developed. They grow along the forest edges and accompany the thickets of the class Rhamno-Prunetea, in particular thickets with blackthorn and hawthorn Pruno-Crataegetum (Borysiak & Brzeg 1994).

Vast area of the military grounds is covered with meadows of the class Molinio-Arrhenatheretea, left after former use. Semi-moist purple moor-grass meadows Molinietum medioeuropaeum, represented by a very rare thermophilous and calcareous form, are of particular value (Borysiak & Brzeg 1994). These meadows are found mainly in valleys along the watercourses. A relatively large group of *Molinia* meadows is localised on the Północny Ditch and its tributaries, between Chludowo and Cielak Forest and on the southern margin of the Sarnia Meadow (Stachnowicz 1996).

The wide open areas of the central part of the military grounds are covered with grassland communities. The site is dominated by large extents of psammophilous grassland Diantho-Armerietum, although its patches are often poorly developed and of low value (Borysiak & Brzeg 1994). Smaller areas are occupied by xerothermic grasslands representing three associations identified. Particularly interesting are the grasslands of the meadow steppe type, classified by Rakowski (1996) to the community *Carlina vulgaris-Ononis spinosa*. These flowery grasslands are floristically the richest over the whole military grounds. The synanthropic, segetal and ruderal communities occupy relatively small area and have not been subjected to detailed phytosociological studies. The military grounds border on the arable fields only along the western edge and the weed communities are rather poorly developed there (Borysiak & Brzeg 1994).

Leaf-mining moths were studied at 47 sites (Fig. 1):

1. Radojewo, Piołunowa street – roadside trees and ruderal vegetation
2. pine greenwood
3. left-bank terrace of Glinnowiecki Brook, ash-alder forest Fraxino-Alnetum

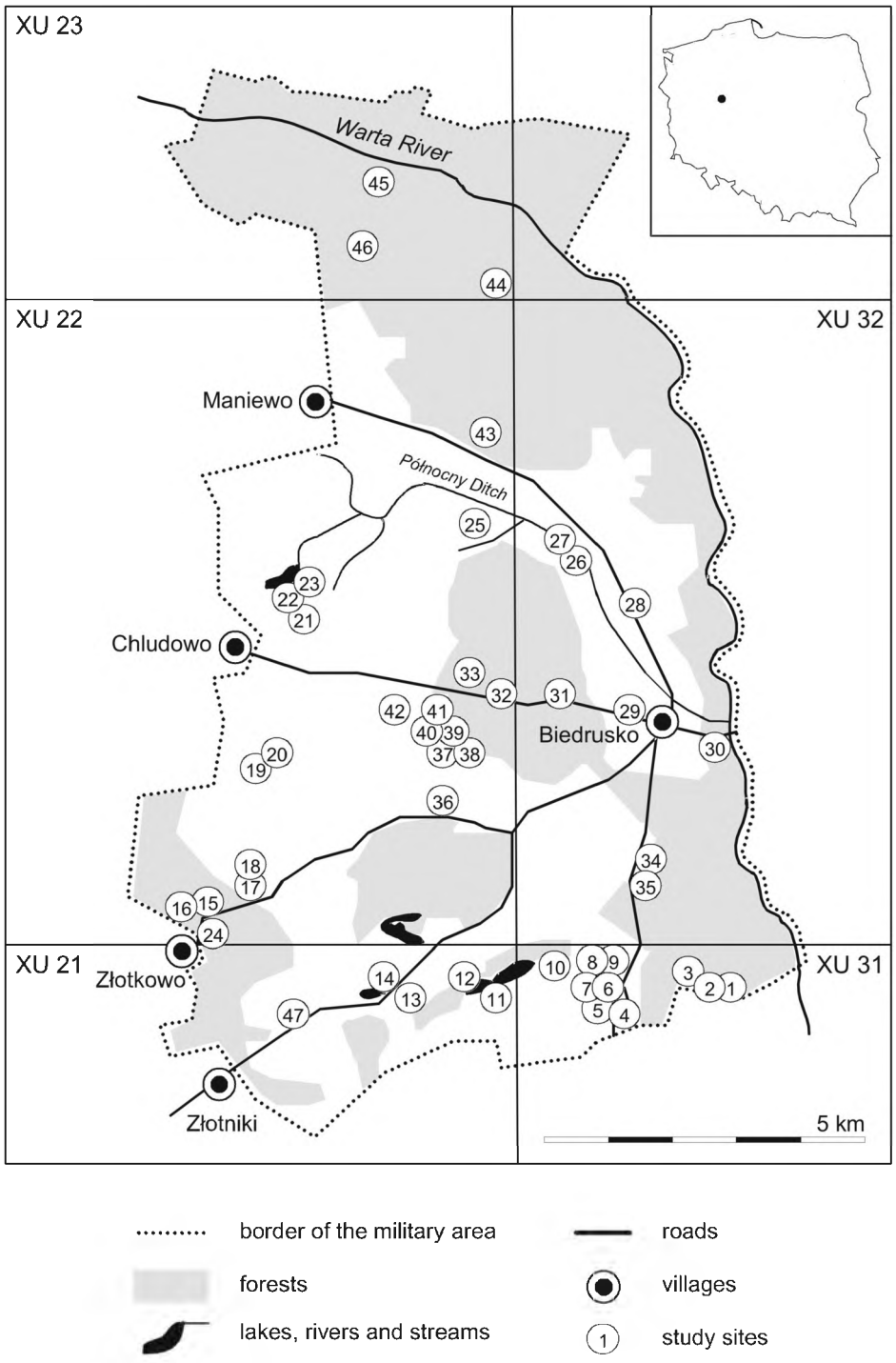

Fig. 1. Location of the study sites in the UTM grid system.

4. psammophilous grassland of the class Koelerio-Corynephoretea between road fork Radojewo – Biedrusko

5. trees and herbaceous vegetation of the class Artemisietea along the road Biedrusko-Radojewo

6. xerothermic grassland of the class Festuco-Brometea

7. psammophilous grasslands, herbaceous vegetation, willow, birch and alder thickets in the vicinity of tank road

8. psammophilous grassland of the class Koelerio-Corynephoretea in the vicinity of tank road

9. Biedrusko-Radojewo road – ruderal and forest edge vegetation of the class Artemisietea, thickets and roadside trees

10. psammophilous grassland of the class Koelerio-Corynephoretea, forest edge vegetation of the class Artemisietea, thickets, roadside trees and fertile alder forest Ribo nigri-Alnetum

11. southern shore of Glinnowieckie Lake – fertile alder forest Ribo nigri-Alnetum

12. north-western shore of Glinnowieckie Lake – oak-hornbeam forest Galio silvatici-Carpinetum

13. Bogusławski Road – ruderal and forest edge vegetation of the class Artemisietea, thickets and fertile alder forest Ribo nigri-Alnetum

14. northern shore of no-name little lake – xerothermic vegetation of the class Festuco-Brometea

15. oligotrophic woodland Sphagno squarrosi-Alnetum, a patch adjoining the northern part of transitional peat-bog of the Gogulec Reserve

16. sallow thickets Salicetum pentandro-cinereae surrounding a transitional peat-bog of the Gogulec Reserve and rushes of the class Phragmitetea

17. Złotkowo-Biedrusko road – psammophilous grassland of the class Koelerio-Corynephoretea in an old gravel-pit

18. heath communities of the order Calluno-Ulicetalia and birch thickets

19. S slope of Napoleon Hill – xerothermic grassland of the class Festuco-Brometea on the south-facing slope

20. xerothermic grassland of the class Festuco-Brometea, meadows of the class Molinio-Arrhenatheretea, thickets of the class Rhamno–Prunetea

21. sallow thickets Salicetum pentandro-cinereae between Chludowo and Cielak Forest

22. ground road leading to Chludowskie Lake – common broom thickets

23. S-E shore of Chludowskie Lake – a mixture of grasslands, meadows and thickets

24. Złotkowo – forest road and old, neglected orchard

25. grasslands of the class Festuco-Brometea, meadows of the class Molinio-Arrhenatheretea, thickets of the class Rhamno-Prunetea and sallow thickets Salicetum pentandro-cinereae along Północny Ditch, to the north of the Lody Forest

26. Maniewska Road, ponds along Północny Ditch – aquatic vegetation and rushes of classes Lemnetea, Potamogetonetea and Phragmitetea

27. meadows of the class Molinio-Arrhenatheretea, grasslands of the class Koelerio-Corynephoretea, herb vegetation of the class Artemisietea and willow thickets

28. Maniewska Road, along Olszynka to the sentry box with barrier – roadside trees, thickets and herb communities of the class Artemisietea

29. Biedrusko – roadside trees, thickets and ruderal vegetation

30. left bank of Warta River – below a bridge in Biedrusko – fertile alder forest Ribo nigri-Alnetum and Populetum albae riparian woodland

31. Chludowska Road – acidophilous oak woodland Calamagrostio-Quercetum petraeae

32. Chludowska Road – trees, shrubs and herbaceous plants along forest road

33. Chludowska Road – acidophilous oak woodland Calamagrostio-Quercetum petraeae

34. Biedrusko-Radojewo road – sub-xerothermophilous oak woodland Potentillo albae-Quercetum
35. Biedrusko-Radojewo road – thermophilous forest edge communities of the class Trifolio-Geranietea sanguinei and oak greenwood
36. Stalina Hill and areas situated to the north – a mixture of grasslands, meadows, thickets and forests
37. the Sarnia Meadow – herb vegetation of the class Molinio-Arrhenatheretea, willow and alder thickets
38. the Sarnia Meadow – semi-moist purple moor-grass meadow Molinietum medioeuropaeum
39. the Sarnia Meadow – blackthorn and hawthorn shrubs Pruno-Crataegetum
40. the Sarnia Meadow – semi-moist purple moor-grass meadow Molinietum medioeuropaeum
41. the Sarnia Meadow – a mixture of grasslands, meadows, shrubs and ash-alder forest
42. a mixture of grasslands, meadows and thickets to the south of Chludowska Road
43. plant community with *Alnus incana*
44. pinewood of the allion Dicrano-Pinion
45. elm-ash forest Ficario-Ulmetum campestris
46. forest road
47. Złotniki-Biedrusko road – roadside trees and thickets of the class Rhamno-Prunetea

Material and method

The field study was carried out in the years 1997–2008, from early spring to late autumn, at 47 localities representing plant communities most characteristic of this area. In the years 2002–2008 the study was less intense and concentrated on the search for the species not evidenced in the first period of observations. The study was qualitative in character and all known methods of detection of the leaf-mining moths were applied. The main method was the search for mined leaves, both left empty and with larvae. Larvae of later stages, feeding on the surface of the leaves or under a folded leaf margin or lobe, as well as Coleophoridae cases and Bucculatricidae pupal cocoons were also collected.

The mines were usually identified in fresh state. The mined leaves were dried in the same way as for herbarial purposes and placed in labelled paper envelopes. The preimaginal stages were reared taking into regard the recommendations of Borkowski (1969b), Buszko (1990a) and Beiger (1991).

Apart from collection of mined leaves adult specimens were also collected by sweeping with entomological net over the herbaceous vegetation, shaking branches to dislodge them and picking from the tree trunks. The moths were also collected at light. The caught or reared imagines were killed with the vapour of ethyl acetate and set according to the procedures accepted for the Microlepidoptera (Borkowski 1969b; Landry & Landry 1994). Identification of some species was possible only after careful examination of genital apparatus morphology. Preparation of genital organs was made taking into regard the procedures recommended by Razowski (1973). The nomenclature of Lepidoptera was accepted after Fauna Europaea (2010), and the systematic arrangement of families, genera and species was assumed after a distributional checklist by Buszko & Nowacki (2000).

Results

The number of species of leaf-mining moths found over the area of the Biedrusko military area is 258. They represent 20 families, the most abundantly represented were Gracillariidae (71 species), Nepticulidae (56 species), Coleophoridae (47) and Elachistidae (25). The other families were represented by a bit over ten species (Bucculatricidae – 12 species) or usually by

a few species. The disproportion follows from the biology of the species belonging to a given family, e.g. in some families only a few species are leaf-miners (Crambidae) and can also be a consequence of a small number of species in a given family, e.g. Tischeriidae. The list of species found in particular types of vegetation together with the time of appearance of different developmental stages and feeding marks are given in Table 1. The last but one column gives the results of the search in the habitats not listed in the table, such as forest edge communities, young tree stands, forest tracts, combinations of plant species difficult for classification, species aggregations etc. (the details are given in the list of study sites). The greatest number of mining moths (164) was collected in those habitats. Large numbers of species were found in oak forests (73), synanthropic communities (64), riparian forests (45), xerothermic grasslands (42) and alder forests (40). Fauna of the pine forest (3 species), heath land (4 species), water and rush communities (8 species) was the poorest. Among the species identified, 24 were found at more than 10 sites (Table 1, entry 8, 13, 19, 22, 29, 34, 37, 38, 42, 59, 67, 82, 93, 98, 106, 108, 119, 139, 161, 169, 187, 188, 240), including a polyphagous *Lyonetia clerkella* reported from 24 sites. As many as 66 species were found at single sites.

Twenty-four species of leaf-mining moths were reported for the first time from Greater Poland Voivodeship. Some of them were reported in a distributional checklist by Buszko & Nowacki (2000) on the basis of my unpublished data. However, these authors gave only the information on the presence of particular species in particular voivodeships (administration districts in Poland), with no data on the sites of collection.

REVIEW OF THE RARE SPECIES NEWLY FOUND TO GREATER POLAND

Trifurcula cryptella (Stainton, 1856)

XU 22 (25): xerothermic grassland: 21 IX 1997, several empty mines; 3 VIII 1998, numerous tenanted mines. Host plant: *Coronilla varia* L.

In Poland, the species so far has been recorded from the Beskid Śląski Mts. (Toll 1947a, b), Sudety Mts. (Borkowski 1969a), Świętokrzyskie Mts. (Michalska 1988) and voivodeships: Lublin and Lesser Poland (Buszko 2000a)

Ectoedemia angulifasciella (Stainton, 1849)

XU 22 (41): thickets, 26 X 1996, several empty mines; XU 31 (10): 26 X 1997, several empty mines and mines with larvae. Host plant: *Rosa canina* L. Mines were found on well insolated shrubs.

The species previously reported from Beskid Śląski Mts. (Toll 1947a, 1950), Bielinek Reserve (Buszko & Baraniak 1989), Ojców National Park (Buszko 1993) and Lower Silesia Voivodeship (Buszko 2000a).

Bucculatrix humiliella Herrich-Schäffer, 1855

XU 22 (25): semi-moist purple moor-grass meadow, 29 III 1998, one specimen.

Apart from the above record, this very rare species has been found in Poland also in Czarny Dunajec, Nowy Sącz, Kraków (Schille 1931) and Glińsk (Mleczak 2004).

Bucculatrix cristatella (Zeller, 1839)

XU 31 (6), XU 21 (14): xerothermic grasslands and XU 22 (25), XU32 (27): meadows, IV–V and 3/VI–VII externally feeding larvae and white pupal cocoons. Host plant: *Achillea millefolium* L.

Table 1. The leaf-mining species found in particular types of vegetation over the area of the military grounds in Biedrusko, in the years 1997–2008. Abbreviations: * – species newly found in Greater Poland Voivodeship, em – empty mine, i - imago, c – cocoon, l – larva, p – pupa, 3/V - decade/month, V – month (1–3 decade)

No.	Species	Time of appearance	Aquatic and rush communities	Meadows	Willow thickets	Alder forests	Riparian forests	Oak-hornbeam forest	Oak forests	Pine forest	Psammophilous grasslands	Xerothermic grasslands	Heath communities	Common broom thickets	Blackthorn and hawthorn thickets	Synanthropic communities	Other habitats	Study sites
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*
	Eriocraniidae																	
1.	*Dyseriocrania subpurpurella* (Haw.)	3/V–1/VI V							l i								l i	10, 24, 34, 36
2.	*Heringocrania unimaculella* (Zett.)	3/III–IV															i	18, 25
3.	*Eriocrania semipurpurella* (Steph.)	V															i	36
	Nepticulidae																	
4.	*Enteucha acetosae* (Stt.)	VI, VII, IX										l				l	l	6, 28, 29, 36, 41, 47
5.	*Stigmella confusella* (Wood et Wals.)	24 VI 1998															em	35
6.	*Stigmella freyella* (Heyd.)	VII														l		29
7.	*Stigmella tiliae* (Frey)	VII, IX–X						l	l							l		1, 12, 29, 34
8.	*Stigmella betulicola* (Stt.)	3/VI–VII, IX–X				l			l				l	l		l	l	2, 5, 7, 15, 18, 22, 24, 28, 29, 31, 32, 33, 34, 35, 36, 41, 42, 46, 47
9.	*Stigmella luteella* (Stt.)	VI, X							em								em	7, 33, 36
10.	*Stigmella glutinosae* (Stt.)	VII, IX–X				l	l											3, 11, 13, 15
11.	*Stigmella alnetella* (Stt.)	IX				l	l											3, 11, 15
12.	*Stigmella microtheriella* (Stt.)	VII, IX–X					l	l	l								l	3, 12, 32, 34
13.	*Stigmella prunetorum* (Stt.)	3/VI–VII, IX–X							l			l			l	l	l	1, 5, 9, 10, 13, 19, 20, 24, 28, 29, 32, 34, 36, 39, 41, 42, 47
14.	*Stigmella aceris* (Frey)	VI, IX					l		l							l	l	1, 3, 9, 24, 28, 29, 32, 34, 47

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
15.	*Stigmella malella* (Stt.)	VI, IX–X														1	1	5, 10, 24
16.	*Stigmella catharticella* (Stt.)	3/VI–VII, IX–X															l, em	28, 30, 35
17.	*Stigmella anomalella* (Goeze)	IX–X														1	1	9, 28, 47
18.	*Stigmella ulmivora* (Fol.)	VI, IX–X		`			1											3, 45
19.	*Stigmella crataegella* (Klim.)	VII		1					1						1	1	1	9, 20, 23, 24, 28, 34, 38, 39, 40, 41, 47
20.	*Stigmella magdalenae* (Klim.)	VII				1	1		1								1	3, 11, 30, 33, 34
21.	*Stigmella nylandriella* (Tgstr.)	VII				1	1		1								1	3, 11, 24, 31, 33, 34
22.	*Stigmella oxyacanthella* (Stt.)	IX–X		1			1								1	1	1	10, 20, 23, 24, 28, 30, 32, 34, 38, 39, 40, 47
23.	*Stigmella pyri* (Glitz)	VIII–2/IX		1					1						1	1	1	9, 20, 23, 29, 34, 39, 40, 41
24.	*Stigmella minusculella* (H.–S.)	VI–1/VII, IX		1											1	1	1	24, 29, 30, 32, 39, 40, 41, 47
25.	*Stigmella hybnerella* (Hbn.)	VI, VIII–IX		1					1						1	1	1	10, 20, 23, 24, 28, 39, 40, 47
26.	*Stigmella floslactella* (Haw.)	3/VI–2/VII, IX–2/X					1		1								1	3, 24, 32, 34
27.	*Stigmella carpinella* Hein.	3/VI–VII, IX						1									1	12, 32
28.	*Stigmella tityrella* (Stt.)	VII, IX															1	24
29.	*Stigmella salicis* (Stt.)	3/VI–VII, IX–X		1	1	1											1	10, 11, 15, 16, 21, 25, 27, 28, 37, 40, 41, 47
30.	*Stigmella myrtillella* (Stt.)	VI, IX							1									33
31.	*Stigmella obliquella* (Hein.)	VII, IX–X			1		1									1		7, 10, 27, 30, 47
32.	*Stigmella trimaculella* (Haw.)	VII, IX–X														1	1	28, 29
33.	*Stigmella assimilella* (Zell.)	IX															1	36
34.	*Stigmella plagicolella* (Stt.)	VI, IX–X							1			1			1	1	1	1, 5, 6, 9, 13, 19, 20, 24, 28, 29, 32, 34, 36, 39, 47
35.	*Stigmella lemniscella* (Zell.)	VI, IX–X					1									1		3, 29, 45
36.	*Stigmella continuella* (Stt.)	16–17 X 1998				em										em		15, 29

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
37.	*Stigmella splendidissimella* (H.–S.)	3/VI–VII, IX–X				1	1	1	1							1	1	3, 9, 10, 11, 12, 22, 24, 28, 30, 32, 34, 35, 41, 46, 47
38.	*Stigmella aeneofasciella* (H.–S.)	X										1		1	1	1	1	6, 9, 10, 13, 14, 19, 20, 22, 23, 28, 29, 35, 36, 41
39.	*Stigmella incognitella* (H.–S.)	17 X 1998														1		24
40.	*Stigmella hemargyrella* (Koll.)	VI, 3/VIII–IX															1	24
41.	*Stigmella speciosa* (Frey)	VI, VIII						1									1	12, 24, 32
42.	*Stigmella basiguttella* (Hein.)	VI, IX–X					1		1								1	10, 24, 28, 31, 32, 33, 34, 35, 36, 45, 47
43.	*Stigmella ruficapitella* (Haw.)	VI, IX					1		1									33, 34, 45
44.	*Stigmella roborella* (Joh.)	3/VI–2/VII							1									34
45.	**Trifurcula cryptella* (Stt.)	21 IX 1997 3 VIII 1998										em 1						25
46.	*Bohemannia pulverosella* (Stt.)	VI–1/VII														1		10, 24
47.	*Ectoedemia sericopeza* (Zell.)	V							i							i		1, 34
48.	*Ectoedemia weaveri* (Stt.)	11 III 2001								1								44
49.	*Ectoedemia septembrella* (Stt.)	VII, IX							1			1			1		1	6, 20, 23, 28, 34, 35, 36, 39, 41
50.	*Ectoedemia intimella* (Zell.)	3/IX–X			1	1												11, 15, 16, 21, 25, 27
51.	*Ectoedemia hannoverella* (Glitz)	IX–XI														1	1	28, 29
52.	*Ectoedemia turbidella* (Zell.)	IX–X					1									1	1	29, 30, 32
53.	*Ectoedemia argyropeza* (Zell.)	IX–XI															1	28, 32, 36, 41
54.	*Ectoedemia albifasciella* (Hein.)	3/VIII–IX							1								1	10, 24, 28, 31, 32, 33, 34, 36, 47
55.	Ectoedemia subbimaculella (*Haw.*)	IX–X							1								1	24, 31, 32, 33, 34
56.	**Ectoedemia angulifasciella* (Stt.)	26 X 1996 26 X 1997															l, em	10, 41
57.	*Ectoedemia atricollis* (Stt.)	IX		1					1						1		1	10, 24, 28, 34, 39, 40
58.	*Ectoedemia rubivora* (Wck.)	IX–X														1	1	10, 24, 28, 29, 32, 41, 46, 47

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
59.	*Ectoedemia occultella* (L.)	IX–X														1	1	2, 5, 7, 10, 18, 24, 28, 29, 31, 32, 33, 34, 35, 36, 41, 46, 47
	Heliozelidae																	
60.	*Antispila metallella* (Den. et Schiff.)	VI 27 IV 1998						1									1 i	12, 32, 37
61.	*Heliozela sericiella* (Haw.)	1/IX							em									33, 34
62.	*Heliozela resplendella* (Stt.)	VII, X				em												11, 13, 15
63.	*Heliozela hammoniella* Sorh.	3/IX–2/X				em											em	7, 15
	Incurvariidae																	
64.	*Incurvaria pectinea* Haw.	VII															em	7, 18
65.	*Incurvaria masculella* (Den. et Schiff.)	V						i										12
66.	*Phylloporia bistrigella* (Haw.)	2/VII 2/VII, 1/IX				1 em							em				em	15, 18, 47
	Tischeriidae																	
67.	*Tischeria ekebladella* (Bjerk.)	VII–IX					1		1								1	5, 10, 24, 28, 31, 32, 33, 34, 35, 36, 41, 45, 46, 47
68.	*Tischeria dodonaea* Stt.	IX–X							1								1	10, 24, 33, 34, 36, 47
69.	*Tischeria decidua*s Wck.	2/IX							em								em	24, 33
70.	*Coptotriche marginea* (Haw.)	IX–X							1								1	28, 32, 34, 47
71.	*Coptotriche heinemanni* (Wck.)	IX–X															1	28, 32, 46
72.	*Coptotriche angusticolella* (Dup.)	IX–X														1	1	9, 10, 24, 27, 28, 29, 37, 47
	Roeslerstammiidae																	
73.	*Roeslerstammia erxlebella* (F.)	VII						i										12
	Bucculatricidae																	
74.	*Bucculatrix nigricomella* (Zell.)	III–1/V, 3/VI–VII		1														41
75.	*Bucculatrix gnaphaliella* (Treit.)	V VI									1 i							4, 7, 8, 17
76.	*Bucculatrix artemisiella* H.–S.	IV–V, 3/VI–VII									1	1						4, 7, 8, 10, 14, 17, 19
77.	*Bucculatrix noltei* Petry	3/VI–VII, IX VIII														1	1 i	5, 9, 10, 13, 28, 29, 32, 35, 47

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
78.	**Bucculatrix humiliella* H.–S.	29 III 1998		i														25
79.	**Bucculatrix cristatella* (Zell.)	IV–V, 3/VI–VII		l, c								l, c						6, 14, 25, 27, 41
80.	*Bucculatrix frangutella* (Goeze)	IX VI							l i								l	28, 32, 33, 34, 35
81.	*Bucculatrix demaryella* (Dup.)	VIII															em	28
82.	*Bucculatrix bechsteinella* (Bechs. et Scharf.)	VI–VII, IX		l		em			l, em						l, em	l, em	l, em	5, 9, 10, 11, 20, 23, 24, 25, 28, 29, 34, 38, 39, 40, 47
83.	*Bucculatrix ulmella* Zell.	2/VI–1/VII, IX							l								l	10, 24, 31, 32, 33, 34, 46, 47
84.	*Bucculatrix cidarella* (Zell.)	IX X 2/VII				em i											l em	7, 10, 11, 15
85.	*Bucculatrix thoracella* (Thnbg.)	VII, IX V						l i	l							l	l	1, 9, 10, 12, 13, 28, 30, 34
	Gracillariidae																	
86.	*Parectopa ononidis* (Zell.)	V, VII										l						6
87.	**Parectopa robiniella* Clem.	21 IX 1997															em	32
88.	*Micrurapteryx kollariella* (Zell.)	VI VIII		l i													i	36, 40
89.	*Caloptilia elongella* (L.)	3/V–1/VII, IX				l												3, 11, 13, 15
90.	*Caloptilia betulicola* (M. Her.)	IX–X															c	7, 28, 34, 41, 47
91.	*Caloptilia rufipennella* (Hbn.)	VI–1/VII															c	10, 24, 32
92.	*Caloptilia alchimiella* (Scop.)	V–VI, VIII							i								i	31, 33, 34, 36
93.	*Caloptilia stigmatella* (F.)	VIII–X IV, VI, VIII		i	l i	i	i											3, 7, 11, 21, 25, 36, 37, 40, 41, 42, 47
94.	*Caloptilia falconipennella* (Hbn.)	9 VII 1997															i	36
95.	**Caloptilia fidella* (Rtt.)	IX 2007–2008															l	28
96.	*Gracillaria syringella* (F.)	VI, VIII–IX					l		l							l	l	1, 3, 10, 29, 34
97.	*Aspilapteryx tringipennella* (Zell.)	VII, IX–X										l					l	6, 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
98.	*Euspilapteryx auroguttella* (Steph.)	VII, IX–X IV–V, VII		1 i					1 i			1 i		1	1	1		6, 14, 19, 20, 22, 23, 25, 28, 29, 34, 35, 36, 37, 39, 40, 41, 42, 47
99.	*Calybites phasianipennella* (Hbn.)	VII–IX VIII		1 i	1	1											1 i	5,11, 21, 23, 25, 27, 30, 36, 37, 41
100.	*Calybites quadrisignella* (Zell.)	3/VI–VII															1	32, 35
101.	*Acrocercops brongniardella* (F.)	VI							em								em	10, 34, 35
102.	*Leucospilapteryx omissella* (Stt.)	VII–IX															1	28, 32
103.	*Callisto denticulella* (Thnbg.)	VII														1	1	10, 24, 28, 47
104.	*Parornix fagivora* (Frey)	IX															em	24
105.	*Parornix carpinella* (Frey)	VII, IX						1									1	12, 32
106.	*Parornix anglicella* (Stt.)	VII, IX		1		1			1						1		1	9, 10, 11, 20, 23, 24, 25, 28, 30, 32, 34, 38, 39, 40, 41, 47
107.	*Parornix devoniella* (Stt.)	3/VI–VII, IX					1		1								1	3, 32, 34
108.	*Parornix betulae* (Stt.)	VII, IX							1							1	1	2, 7, 18, 24, 28, 29, 31, 32, 33, 34, 35, 36, 41, 46, 47
109.	*Parornix scoticella* (Stt.)	VII, IX				1	1		1									3, 11, 24, 30, 31, 32, 33, 34
110.	*Parornix finitimella* (Zell.)	VII, IX										1			1		1	6, 9, 19, 20, 25, 28, 36, 39
111.	*Parornix torquillella* (Zell.)	VII, IX V										1			1 i		1	19, 20, 28, 36, 39
112.	*Parornix anguliferella* (Zell.)	VI															1	24, 36
113.	*Phyllonorycter harrisella* (L.)	2/VI–VII, IX–X V							1 i								1	5, 10, 24, 31, 32, 33, 34, 36, 46, 47
114.	*Phyllonorycter roboris* (Zell.)	2/VI–VII, IX–X 3/IV–V							1 i								i	5, 10, 24, 31, 32, 33, 34, 36, 46, 47
115.	*Phyllonorycter heegeriella* (Zell.)	2/VI–VII, IX–X							1								1	10, 24, 31, 32, 33, 34, 36, 46, 47

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
116.	*Phyllonorycter tenerella* (Joann.)	VII, IX–X						1										12
117.	*Phyllonorycter kuhlweiniella* (Zell.)	8 V 1999							i									34
118.	*Phyllonorycter quercifoliella* (Zell.)	3/VI–VII, IX–X V							1 i								i	10, 24, 31, 32, 33, 34, 36, 46, 47
119.	*Phyllonorycter oxyacanthae* (Frey)	2/VI–VII, IX–X		1		1			1						1		1	9, 10, 11, 20, 23, 24, 28, 30, 32, 34, 38, 39, 40, 41, 47
120.	*Phyllonorycter sorbi* (Frey)	3/VI–VII, IX–X				1	1		1									3, 11, 30, 33, 34
121.	*Phyllonorycter blancardella* (F.)	VII, IX–X														1	1	10, 13, 24
122.	*Phyllonorycter junoniella* (Zell.)	11 III 2001								1								44
123.	*Phyllonorycter spinicolella* (Zell.)	3/VI–VII, IX–X										1			1		1	6, 9, 13, 19, 39, 41, 47
124.	*Phyllonorycter lantanella* (Schr.)	IX															1	9, 10
125.	*Phyllonorycter dubitella* (H.–S.)	3/VI–VII, IX–X															1	28, 32
126.	*Phyllonorycter salictella* (Zell.)	3/VI–VII, IX–X			1		1									1	1	7, 28, 29, 30, 37, 47
127.	*Phyllonorycter salicicolella* (Sirc.)	3/VI–VII, IX–X		1	1	1												11, 15, 16, 21, 25, 27, 30, 40
128.	*Phyllonorycter cavella* (Zell.)	15–27 X 1997															1	28, 47
129.	*Phyllonorycter maestingella* (Müll.)	VII, IX–X															1	24
130.	*Phyllonorycter coryli* (Nicelli)	3/VI–VII, IX–X					1		1								1	3, 32, 34
131.	*Phyllonorycter esperella* (Goeze)	VII, IX						1										12
132.	*Phyllonorycter strigulatella* (Lien. et Zell.)	IX–X															1	43
133.	*Phyllonorycter rajella* (L.)	VII, IX–X				1	1											3, 10, 11, 13, 15

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
134.	*Phyllonorycter nigrescentella* (Logan)	VII							1								1	34, 35
135.	*Phyllonorycter medicaginella* (Ger.)	3/VI–IX										1				1	1	6, 7, 19, 28, 29
136.	*Phyllonorycter lautella* (Zell.)	VII, IX–X							1								1	10, 24, 33, 34, 35, 46
137.	**Phyllonorycter robiniella* (Clem.)	VII, IX, X 2002–2008															l, p	1, 28, 29
138.	*Phyllonorycter schreberella* (F.)	3/VI–VII, IX–X					1											3, 45
139.	*Phyllonorycter ulmifoliella* (Hbn.)	VII, IX–X				1			1					1		1	1	2, 7, 15, 18, 22, 24, 28, 29, 32, 33, 34, 35, 36, 41, 42, 46, 47
140.	*Phyllonorycter emberizaepennella* (Bouché)	3/VI–VII, IX–X					1	1	1							1	1	3, 12, 13, 29, 30, 34
141.	*Phyllonorycter stettinensis* (Nic.)	VII, IX–X				1	1										1	3, 11, 13, 15, 37
142.	*Phyllonorycter froelichiella* (Zell.)	VII, IX–X				1	1										1	3, 11, 13, 15, 37
143.	*Phyllonorycter nicellii* (Stt.)	VII, IX–X					1		1								1	3, 32, 34
144.	*Phyllonorycter kleemannella* (F.)	VII, IX–X				1	1											3, 11, 15
145.	*Phyllonorycter agilella* (Zell.)	VII														1		29
146.	*Phyllonorycter acerifoliella* (Zell.)	VII, IX–X					1									1		29, 45
147.	*Phyllonorycter joannisi* (Le Marchand)	3/VI–VII, IX–X V					1		1 i							1 i	1	1, 3, 5, 9, 24, 34, 47
148.	*Phyllonorycter geniculella* (Rag.)	3/VI–VII, IX–X						1									1	12, 24, 32
149.	**Phyllonorycter issikii* (Kum.)	VII, VIII, IX 2003–2008						l, p									l, p	1, 12, 29
150.	*Phyllonorycter connexella* (Zell.)	VII, IX														1	1	28, 29
151.	*Phyllonorycter sagitella* (Bjerk.)	3/VI–VII, IX							1								1	7, 24, 33, 36, 41, 42
152.	*Phyllonorycter comparella* (Dup.)	VII, IX–X					1									1	1	29, 30, 32
153.	*Cameraria ohridella* Deschka et Dimić	VI, VIII, IX														1	1	29, 32

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
154.	*Phyllocnistis saligna* (Zell.)	3/VI–IX X			1 p												1	7, 10, 28, 37, 41, 42, 47
155.	*Phyllocnistis unipunctella* (Steph.)	VII, IX														1	1	28,29
156.	*Phyllocnistis xenia* M. Her.	VI, IX 1/VII, X															1 p	32
	Yponomeutidae																	
157.	*Scythropia crataegella* (L.)	VI													1			28, 39
158.	*Ocnerostoma piniariella* Zell.	III															1	36
159.	*Ocnerostoma friesei* Sv.	VI															1	36
160.	*Atemelia torquatella* (Lien. et Zell.)	X															1	7
161.	*Prays fraxinella* (Bjerk.)	26 VI 1998					i											3
	Plutellidae																	
162.	*Plutella xylostella* (L.)	V–X		i					i			i				i	i	1, 2, 5, 6, 9, 10, 20, 23, 28, 29, 34, 36, 37, 40, 41
	Acrolepiidae																	
163.	*Acrolepia autumnitella* Curt.	VI, IX				1												11
	Glyphipterigidae																	
164.	*Glyphipterix equitella* (Scop.)	V V, VIII									1 i							4, 8
	Lyonetiidae																	
165.	*Leucoptera lotella* (Hbn.)	VII–IX		1	1													21
166.	*Leucoptera lustratella* (H.–S.)	VI–VII, IX–X										1		1	1	1	1	6, 19, 20, 22, 25, 29, 39, 41, 47
167.	*Leucoptera laburnella* (Stt.)	VI–X		1					1									25, 34, 36, 40, 41, 42
168.	*Leucoptera spartifoliella* (Hbn.)	V									c			c				8, 20, 22
169.	*Leucoptera malifoliella* (O. Costa)	VI–IX														1	1	10, 13, 24
170.	*Lyonetia clerkella* (L.)	V, VII, IX–X		1		1	1		1			1		1	1	1	1	1, 3, 5, 7, 9, 10, 11, 15, 18, 20, 22, 23, 24, 28, 29, 30, 32, 33, 34, 38, 39, 40, 41, 47
171.	*Lyonetia prunifoliella* (Hbn.)	VIII–IX											1				1	18, 32, 47
	Elachistidae																	
172.	*Perittia farinella* (Thnbg.)	19 V 1997		i														42
173.	**Perittia herrichiella* (H.–S.)	3/VI–VII					1	1	1								1	3, 12, 32, 34

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
174.	**Stephensia brunnichella* (L.)	VI							1									34
175.	*Elachista freyerella* (Hbn.)	IV–V V		 i		1											1	11, 27, 32
176.	*Elachista utonella* Frey	IV–1/VI VI	 i	 i	 i	1						 i						6, 15, 21, 26, 27
177.	*Elachista poae* Stt.	IV	1															26
178.	*Elachista alpinella* Stt.	V–VII				1												15
179.	**Elachista elegans* Frey	18 V 1998							1									33
180.	*Elachista luticomella* Zell.	III–V					1	1										12, 45
181.	*Elachista albifrontella* (Hbn.)	IV–V		1													1	5, 32, 38, 40, 41
182.	*Elachista apicipunctella* Stt.	1 XII 2000						1										12
183.	**Elachista subnigrella* Dougl.	IV–1/V V		1								 i						6, 14, 38, 40
184.	*Elachista humilis* Zell.	1 V 1998		1														38
185.	*Elachista canapennella* (Hbn.)	V		i								i						6, 38, 40, 41
186.	*Elachista anserinella* Zell.	16 VI 1997, 13–27 V 1998										i						6
187.	*Elachista maculicerusella* (Bruand)	2/V	i		i													21, 26
188.	*Elachista argentella* (Cl.)	IV–V V–VI		1 i	 i				 i			1 i		1	1		1	5, 6, 14, 19, 20, 21, 22, 23, 25, 27, 34, 36, 38, 39, 40, 41, 42
189.	*Elachista pollinariella* Zell.	IV–2/V V–VI		1					 i			1 i		1			1 i	2, 5, 6, 10, 14, 22, 23, 32, 34, 35, 38, 40, 41
190.	*Elachista griseella* (Dup.)	IV–1/V															1	10, 13, 37
191.	**Elachista unifasciella* (Haw.)	IV					1	1										12, 45
192.	**Elachista gangabella* Zell.	12 IX 2000							1									34
193.	*Elachista adscitella* Stt.	V–VI				1	1											11, 41
194.	*Elachista bisulcella* (Dup.)	14 VIII 1998 1 VIII 2000		 i													i	36, 40, 42
195.	*Elachista pullicomella* Zell.	V, VII									i	i						6, 8, 14, 19, 27
196.	**Elachista bedellella* (Sirc.)	V, VIII		i							i	i						6, 8, 40

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Batrachedridae																	
197.	*Batrachedra pinicolella* (Zell.)	VII															i	36
	Coleophoridae																	
198.	*Coleophora lutipennella* (Zell.)	V–1/VI VII							1 i								 i	31, 33, 34, 36
199.	*Coleophora gryphipennella* (Hbn.)	V															1	10
200.	*Coleophora flavipennella* (Dup.)	V VI–VII							1 i								 i	31, 33, 34, 36
201.	*Coleophora milvipennis* Zell.	VI–VII				i		i										11, 12
202.	*Coleophora alnifoliae* Barasch	VII					i											3
203.	*Coleophora badiipennella* (Dup.)	V VI					1 i		 i									3, 34
204.	*Coleophora serratella* (L.)	V VI–VII				1 i	1 i		1					1		1	1 i	3, 11, 15, 22, 29, 33, 34, 41
205.	*Coleophora spinella* (Schr.)	VI 3/VI–VII					 i	 i							1	1	 i	3, 12, 24, 29, 36, 39
206.	*Coleophora prunifoliae* Doets	IX													1		1	39, 41
207.	*Coleophora fuscocuprella* H.–S.	IX							1									34
208.	*Coleophora lusciniaepennella* (Treit.)	V, X			1	1												11, 15, 16, 21, 25, 27
209.	*Coleophora vitisella* Gregs.	11 IV 1999								1								44
210.	*Coleophora juncicolella* Stt.	25 IV 1999											1					18
211.	*Coleophora orbitella* Zell.	IX–X				1	1									1		3, 11, 13, 15, 29
212.	*Coleophora binderella* (Koll.)	V VI					1 i										1 i	3, 36
213.	*Coleophora ahenella* Hein.	IX				1		1								1	1	10, 12, 24, 29
214.	*Coleophora albitarsella* Zell.	IV–V, IX–X							1			1					1	6, 19, 34, 35
215.	**Coleophora conyzae* Zell.	V		1								1						6, 40, 41, 42
216.	*Coleophora lineolea* (Haw.)	V–1/VI, 3/IX														1	1	1, 10
217.	*Coleophora hemerobiella* (Scop.)	VI VII													1	1	1 i	9, 20, 23, 28, 29, 36, 39, 47
218.	*Coleophora colutella* (F.)	V–VI												1			1	22, 35, 41, 42
219.	*Coleophora saturatella* Stt.	1/VI															1	20

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
220.	*Coleophora albicostella* (Dup.)	IV, X									l	l						6, 8, 14, 19
221.	*Coleophora discordella* Zell.	IX–X										l						6
222.	*Coleophora ballotella* (F. v R.)	V–1/VI														l		1
223.	*Coleophora albidella* (Den. et Schiff.)	V			l												l	16, 32
224.	*Coleophora kuehnella* (Goeze)	VI VII							l i								l	31, 33, 34, 35, 36
225.	*Coleophora ibipennella* Zell.	VI VII							l i									31, 33, 34, 35
226.	**Coleophora brevipalpella* Wck.	V															l	23
227.	*Coleophora auricella* (F.)	IV–V, X VI		l i														38
228.	*Coleophora vibicigerella* Zell.	17 V 1997									l							7
229.	**Coleophora conspicuella* Zell.	V–1/VI VII		l i								l					l i	6, 14, 20, 23, 38, 40, 41, 42
230.	*Coleophora fuscociliella* Zell.	V										l				l	l	19, 28, 29
231.	*Coleophora caelebipennella* Zell.	V										l						19
232.	*Coleophora vibicella* (Hbn.)	V–VI 3/VI–VII		l i								l					l	20, 23, 25, 27, 36, 40, 41, 42
233.	**Coleophora lixella* Zell.	IV–V VI–1/VIII		l i								l i					l	6, 14, 22, 23, 25, 40, 41, 42
234.	*Coleophora pennella* (Den. et Schiff.)	V										p					p	7, 19
235.	*Coleophora laricella* (Hbn.)	V															l	9
236.	*Coleophora gnaphalii* Zell.	V 3/V–VI									l i							4, 8, 17
237.	*Coleophora galbulipennella* Zell.	1/VI									l							17
238.	**Coleophora millefolii* Zell.	V–1/VI VI–VII										l i					l	23, 25, 35
239.	**Coleophora peribenanderi* Toll	VIII–IX V–VII															l i	28, 29, 47
240.	**Coleophora ramosella* Zell.	3/IV–V										l						41
241.	*Coleophora trochilella* (Dup.)	V–1/VI		l								l		l	l	l	l	6, 9, 10, 14, 20, 22, 23, 25, 35, 36, 38, 39, 40, 41, 42

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
242.	**Coleophora directella* Zell.	3/IV–1/VI VII									l i	l						6, 8, 14, 17, 19
243.	*Coleophora expressella* Klem.	V–1/VI VI–VII										l i					1	23, 25, 35, 41
244.	*Coleophora saponariella* Heeg.	VII–IX														1	1	9, 29
	Momphidae																	
245.	*Mompha langiella* (Hbn.)	VI–2/VII	l		l	l												11, 21, 26
246.	*Mompha raschkiella* (Zell.)	VI 1/VIII															l i	36
247.	*Mompha epilobiella* (Den. et Schiff.)	VII VIII	l	i													1	26, 27, 41
	Cosmopterigidae																	
248.	*Vulcaniella pomposella* (Zell.)	4 V 1997 16 VI 1997									l i							4, 8
249.	*Cosmopterix zieglerella* (Hbn.)	VIII				1											1	10, 11, 32
250.	*Cosmopterix scribaiella* Zell.	IX–X	l															16, 26
	Gelechiidae																	
251.	*Chrysoesthia drurella* (F.)	V														i		29
252.	*Chrysoesthia sexguttella* (Thnbg.)	VII–VIII														1		29
253.	*Scrobipalpa acuminatella* (Sirc.)	VIII, X		1										l		1	1	20, 22, 23, 25, 28, 29, 36
254.	**Syncopacma ochrofasciella* (Toll)	VI		1													1	35, 40, 41
	Crambidae																	
255.	*Elophila nympheata* (L.)	VIII	i															26
256.	*Cataclysta lemnata* (L.)	27 V 2002	i															26
257.	*Cynaeda dentalis* (Den. et Schiff.)	VI–VIII															i	36
258.	*Epascestria pustulalis* (Hbn.)	VI															i	36
	Total number of recorded species		8	42	15	40	45	22	73	3	12	42	4	13	25	64	164	

The moth previously reported from Lower Silesia and Greater Poland voivodeships, and after 1960 found in Kuyavian-Pomeranian and Lubusz voivodeships (Buszko 2000b). Recently reported from Stary Załom Reserve (Baraniak & Walczak 2000) and S-E Poland (Baran 2003).

***Parectopa robiniella* Clemens, 1863**

XU 32 (32): forest road: 21 IX 1997, several empty mines. Host plant: *Robinia pseudacacia* L.

This invasive species is native to North America and was accidentally introduced to Europe. For the first time it was found near Milan, northern Italy, in 1970 (Vidano & Marletto 1971). At present, the species is known from western, southern and central parts of Europe. In Poland, has been so far recorded from S-E part of the country and Kuyavian-Pomeranian Voivodeship (Buszko 2000c).

***Caloptilia fidella* (Reutti, 1853)**

XU 32 (28): shrub communities along road, IX 2007 and 2008, empty mines and older larvae under an rolled leaf margin. Host plant: *Humulus lupulus* L.

The south European species which expanding its range to the north. In Poland, it has been found for the first time in 2003. Recently recorded from Glińsk (Mleczak 2004) and Skarpa Ursynowska Reserve in Warsaw (Jaworski 2009)

***Elachista elegans* Frey, 1859**

XU 22 (33): acidophilous oak wood, one adult specimen has been reared from tenanted mines collected 18 V 1998 on *Calamagrostis arundinacea* (L.) Roth.

In Poland, the species has been so far known only from West Pomeranian (Hering 1891) and Warmian-Masurian vivodeships (Buszko 2000d).

***Elachista unifasciella* (Haworth, 1828)**

XU 21 (12): oak-hornbeam forest, one specimen has been reared from larvae collected 21 IV 1999: XU 31 (45), ash-alder forest, 12 specimens have been reared from larvae collected 15 IV 1999. Host plant: *Dactylis glomerata* L. subsp. *aschersoniana* (Graebn.) Thell..

The species has been hitherto reported from Bielinek Reserve (Buszko & Baraniak 1989), Las Piwnicki Reserve and NE Poland (Buszko 1990b).

***Elachista gangabella* Zeller, 1850**

XU 32 (34): sub-xerothermophilous oak wood, one specimen has been reared from the larvae collected 12 IX 2000 on *Melica nutans* L.

In Poland, this elachistid moth has been so far known from West Pomeranian, Kuyavian-Pomeranian, Łódź and Lesser Poland voivodeships (Buszko 2000d).

***Coleophora conyzae* Zeller, 1868**

XU 31 (6): xerothermic grassland: few cases were found in May 1997–1999 on *Inula salicina* L.; XU 22 (40, 41, 42): semi-moist purple moor-grass meadows, numerous cases were collected in May 1997–2000 on *I. salicina*. 20 adult specimens has been reared from the larvae collected 19 V 1997.

The first notice on the occurrence of the species in Poland was mentioned in a genital apparatuses description (Toll 1962). The data refer to two specimens collected 10 VII 1877 in the vicinities of Wroclaw. Microscopic slides of the female and male genitals are deposited in the Humboldt Museum of Berlin (Germany). However, the species was omitted in the monograph on Coleophoridae (Razowski 1990) and in later checklist of the Polish Lepidoptera

(Rynarzewski 2000). Recently, the moth has been collected in the Brzeźno Reserve (Buszko et al. 1996).

***Coleophora brevipalpella* Wocke, 1874**

XU 22 (23): herb communities at the edge of small pond: 14 adult specimens have been reared from larvae collected 26 V 1997. Host plant: *Serratula tinctoria* L.

This very rare species has been so far recorded only from Wrocław vicinities (Wocke 1874), Kuyavian-Pomeranian and Lubusz voivodeships (Rynarzewski 2000).

***Syncopacma ochrofasciella* (Toll, 1936)**

XU 22 (40): semi-moist purple moor-grass meadow, XU 22 (41): roadside; XU 32 (35): thermophilous forest edge communities larvae mining the leaves of *Astragalus glycyphyllos* L. were found in June, July and September on all mentioned localities, at well insolated places. Ten specimens have been reared from larvae collected 30 VI 1998, four from larvae collected 24 VI 1999 and twelve from larvae collected 01 VII 2008.

This very rare species is known only from the Zbocza Płutowskie Reserve (Elsner et al. 1999), where it was collected in 1988. In the monograph on Middle European Gelechiidae (Elsner et al. 1999) the moth has not been included to leaf-miners. Whereas during the studies it was observed, the larva mines the leaves of the host plant. At first it makes small, full depth mines. Then larva spun the leaflets together and continues mining. There is no frass in the mines which is deposited between spun leaflets. The larvae are capable to move to another leaf and start a new mine.

Discussion

Taking up the studies in the military grounds Biedrusko in 1997, it was assumed that the richness and diversity of the flora in this area would be accompanied by high diversity of leaf-mining moths. The number of species of such moths found in the area reached 258, which makes 47% of this fauna reported from Poland. Some of them occurred at very sparse sites, and 24 of the species were reported for the first time from Greater Poland Voivodeship. The species composition presented in this paper should not be treated as final and it is reasonable to expect its enrichment.

The high diversity of leaf-mining species established over the area of the military grounds in Biedrusko is a consequence of a few factors, of which the most important are the richness of the flora and heterogeneity of the space. The diversity of moth species is correlated with the diversity of plants because of the close trophic relation of the moths and the host (the majority of the leaf-mining moths are monophagous or oligophagous). Rich and diverse flora offers the conditions for existence of many species of moths. The area of the military grounds is characterised by mosaic type of vegetation structure developed as a result of deforestation of a large section of the area for the needs of army training. With time over the deforested area some interesting types of semi-natural vegetation developed, including psammophilous grasslands, xerothermic grasslands, meadows (among others the thermophilous *Molinia* meadows), common broom thickets, shrubs with blackthorn and hawthorn, initial forms of forests, thermophilous forest edge herb communities. These and the other plant communities developed into a mosaic structure of habitats which among other factors determined the species richness of the moth over this area. The spatial mosaic structure of vegetation is one of the factors favourable for preservation and increase in the diversity of the fauna species (Trojan & Wytwer 1995). The effect of ecotone phenomena manifested at the borders of different habitats must be also of significance. In the thermophilous open communities such as the above-mentioned grasslands, *Molinia* meadows or forest edge communities the fauna, including moths, was very rich. Xerothermic communities were originally related to the sloping banks of

river valleys and occupied a small percent of the area of the Wielkopolska region (Wojterski et al. 1981). Thus, the moth species living in this type of habitat were probably not numerous. In forest habitats the species richness of fauna has been suggested to depend on the vertical structure of vegetation (Krebs 1996), besides the floristic composition. However, no direct evidence of this influence has been presented.

The results of the study of the Lepidoptera in the area of the military ground in Biedrusko showed the role of the military used areas for protection of species diversity. This phenomenon has been observed in this area for the butterflies (Walczak 2002). Also other military grounds in Europe have been indicated as playing a significant role in protection of the fauna and flora (Toro 1993, IUCN 1995, Klapkarek & Beutler 1999, Beutler 2000, Eisermann 2000). Because of the character of their use, the military grounds are isolated from some negative forms of human activity related to agriculture, settlements and industry. Nevertheless, the total abandonment of the area can be threatening to some species because of the progressing succession of vegetation. Therefore, it would be recommended to actively protect at least some of the open communities, while preserving the military use of the area.

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STRESZCZENIE

[Motyle minujące (Lepidoptera) poligonu wojskowego "Biedrusko" (zachodnia Polska)]

Poligon wojskowy „Biedrusko" położony jest w bliskim sąsiedztwie Poznania (na północ od miasta) w zachodniej Polsce. Obszar ten od ponad stu lat wykorzystywany jest do celów militarnych. Teren poligonu jest w nieznacznym stopniu przekształcony przez człowieka, a dominującą rolę na tym obszarze odgrywa roślinność naturalna i seminaturalna. Z uwagi na duże walory przyrodnicze poligon wojskowy w Biedrusku został włączony do europejskiej sieci ekologicznej Natura 2000 jako specjalny obszar ochrony siedlisk (PLH300001).

Podczas badań prowadzonych w latach 1997–2008 na terenie poligonu wojskowego "Biedrusko" stwierdzono 258 gatunków motyli minujących, co stanowi około 47% krajowej fauny tej grupy. Pod względem systematycznym należą one do 20 rodzin, z których najliczniejsze były Gracillariidae, Nepticulidae, Coleophoridae i Elachistidae. Po raz pierwszy wykazano z województwa wielkopolskiego 24 gatunki motyli minujących. Duże bogactwo gatunkowe motyli minujących stwierdzone na poligonie w Biedrusku jest skutkiem oddziaływania kilku czynników, z których najważniejszą rolę odgrywają bogactwo florystyczne terenu i heterogenność przestrzeni.

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