

New records of Lepidoptera from the Arkhangelsk oblast of Russia

Mikhail V. Kozlov, Jaakko Kullberg & Vitali E. Zverev

Kozlov, M. V., Kullberg, J. & Zverev, V. E. 2017: New records of Lepidoptera from the Arkhangelsk oblast of Russia. — Entomol. Fennica 28: 169–182.

Faunistic studies conducted in multiple localities across the Arkhangelsk oblast during 2014–2016 resulted in the discovery of 104 species of Lepidoptera not previously reported from this region. Especially noteworthy records include *Phyllocnistis saligna*, *Depressaria ultimella*, *Dichrorampha insperata*, *Eversmannia exornata* and *Eublemma amasina*. We also confirm records of 24 species which were known from old publications only, and we report new localities for 379 species. The known fauna of the Lepidoptera of the Arkhangelsk oblast now includes 1,140 species (604 species of microlepidoptera and 536 species of macrolepidoptera), which we presume to represent slightly more than a half of the potential diversity of Lepidoptera of the oblast.

M. V. Kozlov, Section of Ecology, Department of Biology, University of Turku, FI-20014 Turku, Finland; E-mail: mikoz@utu.fi

J. Kullberg, Finnish Museum of Natural History, Zoology Unit, University of Helsinki, P.O. Box 17, FI-00014 Helsinki, Finland; E-mail: jkullber@mappi.helsinki.fi

V. E. Zverev, Section of Ecology, Department of Biology, University of Turku, FI-20014 Turku, Finland; E-mail: vitzve@utu.fi

Received 23 February 2017, accepted 8 May 2017

1. Introduction

The first regional checklist of moths and butterflies of the Arkhangelsk oblast (excluding Nenets Autonomous Okrug) included 1,036 species (Kozlov *et al.* 2014). Both the comparison with the fauna of Finland, which now includes about 2,587 species (Aarvik *et al.* 2017), and the relatively low ratio between the numbers of reported micro- and macrolepidoptera (1.08) allowed us to suggest at that time that 500 to 800 species of Lepidoptera remained to be found in the Arkhangelsk oblast. In agreement with these expectations, intensive sampling during 2014–2016 brought a number of interesting findings. Although a relatively small number of species was

discovered as new for the region, several records are still important for understanding the biogeographical patterns and for monitoring effects of climate change on the distribution of Lepidoptera. We also feel that sharing our findings is timely for further use in the forthcoming second edition of the Catalogue of the Lepidoptera of Russia (Sinev 2008).

2. Materials and methods

This paper is primarily based on the materials (some 2,500 pinned specimens, selected from over 15,000 collected specimens) sampled primarily by M.V.K. and V.E.Z. from 59 localities in

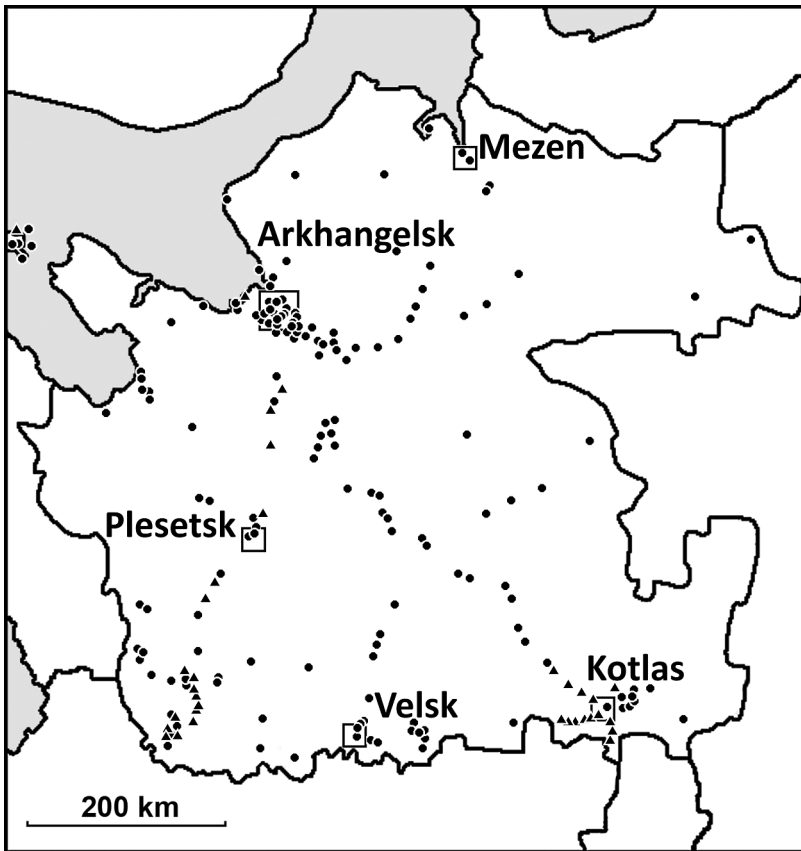


Fig. 1. Sampling localities in the Arkhangelsk oblast. Localities marked by triangles were sampled only in 2014–2016. Urban areas are shown by squares.

the Arkhangelsk oblast (Table 1). Among these, 34 localities have not been sampled previously (Fig. 1). The moths and butterflies were collected in different habitats (Fig. 2) in surroundings of Arkhangelsk (localities Pr1, Pr9 and Pr36) on 2.–6.VI.2014 and 25.–29.V.2015; between Arkhangelsk and Kargopol (localities Kh4, Kh18 and P111–15) and around Kargopol (localities Ka1, Ka10 and Ka12–26) on 21.–24.V.2015; on Bol'shoi Solovetskij and Muksalma Islands (localities So4–So6 and So8) on 3.–10.VIII.2015; and in surroundings of Kotlas (localities Kb4–5, Kt1, Kt4–5 and Kt9–22) on 1.–5.VIII.2016. The insects were mostly sampled by netting, and the total collecting time was ca. 180 person-hours. We also recorded easily identifiable species based on visual observations, and we searched for leaf mines and reared moths from field-collected larvae.

We performed light trapping while collecting in Kargopol, Bol'shoi Solovetsky Island and Kotlas, and we processed the samples collected

with a light trap operated by B. Filippov in Vilegodsk on 12.VI.–1.IX.2015. The materials are mostly deposited in the Zoological Museum, University of Helsinki (MZH). The samples from Solovetskie Islands were partially donated to the Natural History Museum in London (NHM), and mined plant leaves were donated to Naturalis Biodiversity Center in Leiden (RMNH).

In the following list, the order of families and genera follows our previous work (Kozlov *et al.* 2014). Species-level nomenclature follows that of Fauna Europaea (Karsholt *et al.* 2013) with a few current additions (Aarvik *et al.* 2017). Biogeographical provinces of Finland are given in italics; for a map of the provinces, see Haarto and Winqvist (2006). An asterisk (*) denotes species that are reported from the Arkhangelsk oblast for the first time. An exclamation mark (!) indicates records that confirm the occurrence of species that were included in our first list based on earlier publications only (Kozlov *et al.* 2014). Five of these confirmed records (*Alloclementia meso-*

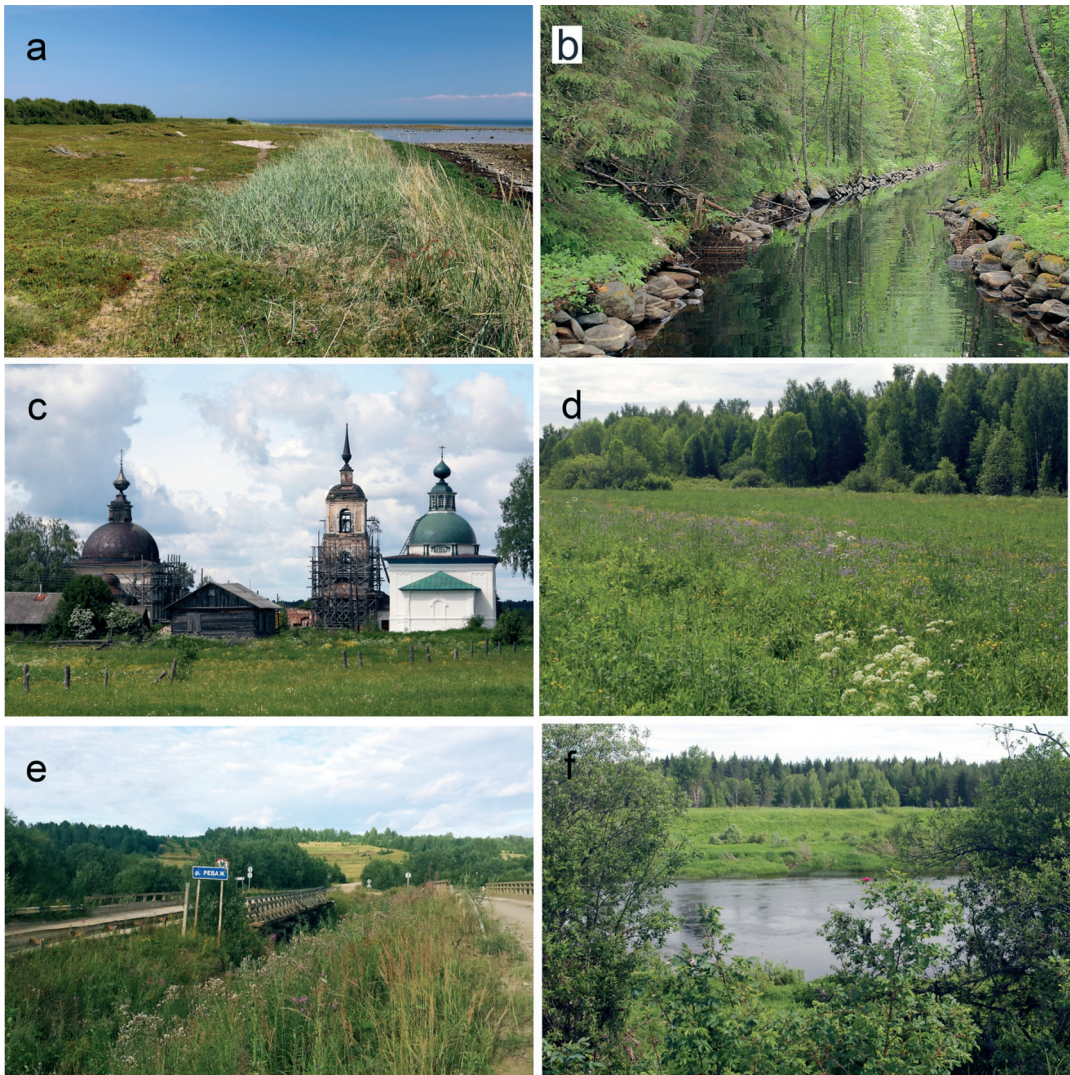


Fig. 2. Sampling habitats in the Arkhangelsk oblast. – a. Pechak Cape on Bol'shoi Solovetskij Island. – b. Mixed forest around a channel on Bol'shoi Solovetskij Island. – c. Ruderal habitat near Krechetovo village, 65 km SSW of Kargopol. – d. Forest meadow near Iksa, 20 km NNE of Kotlas. – e. Banks of the Revazh river, 18 km SE of Kotlas. – f. Banks of the small tributary of the Ustya river, 60 km E of Velsk.

spilella and four species of Sesiidae) were made on the basis of rediscovered specimens collected by L. F. Zelenova.

For each species, we provide a list of localities (Table 1); the data published earlier (Kozlov *et al.* 2014) are not repeated. Codes of the localities include two-letter abbreviations of the administrative units ("rayon", translated as district) within the Arkhangelsk oblast (for a map of administrative units, see Kozlov *et al.* 2014) and a numerical code. The only exception is the Solovetsky Is-

lands, for which we used the codes starting with "So", although this archipelago administratively belongs to the Primorsky district. A dash between the numerical codes indicates that the species was recorded in all localities whose numbers lie between those connected by the dash. The sampling dates of new species and of species that were previously known from earlier publications are only included in our list when those species were collected with the light trap in Vilegodsk (locality Vg1), where the sampling period spanned almost

Table 1. List of sampling localities in Arkhangelsk oblast*.

Code	Locality	Geographical co-ordinates**		No. of species***
		Latitude, N	Longitude, E	
Ka1	Kargopol	61°30'21"	38°56'56"	114/3
Ka10	3 km W Zhukovskaya	61°29'01"	38°38'36"	42/0
Ka12	Kononovo	61°07'01"	38°45'08"	40/0
Ka13	3 km N Svarozero	61°02'58"	38°32'37"	35/0
Ka14	1 km NW Dubrovo	60°58'26"	38°32'46"	76/0
Ka15	6 km E Stegneevskaya	61°28'32"	39°35'42"	43/0
Ka16	2 km S Skorykovo	61°04'41"	38°33'12"	6/0
Ka17	5 km E Skorykovo	61°05'45"	38°39'56"	11/0
Ka18	3 km N Skorykovo	61°07'25"	38°35'47"	4/0
Ka19	1 km NE Tobolkino	61°12'21"	38°34'58"	5/0
Ka20	6 km S Kargopol	61°26'46"	38°57'25"	11/0
Ka21	1 km N Kalitinka	61°24'27"	38°57'33"	3/0
Ka22	1 km N Lapinskaya	61°22'26"	38°55'46"	10/0
Ka23	5 km SW Lapinskaya	61°20'13"	38°51'29"	7/0
Ka24	Menshakovskaya	61°14'32"	38°53'13"	12/0
Ka25	Zelenyi Bor	61°33'13"	38°57'54"	13/0
Ka26	4 km NE Kargopol	61°32'31"	38°53'42"	4/0
Kb4	17 km NE Krasnoborsk	61°37'03"	45°39'16"	101/0
Kb5	Zavotezhitsa	61°31'28"	46°04'07"	17/0
Kh4	9 km NW Belogorsky	64°13'29"	42°09'52"	13/0
Kh18	10 km S Novaya Ilma	63°48'18"	40°48'45"	5/0
Kt1	Kotlas	61°15'	46°40'	77/247
Kt4	3 km E Solvychevodsk	61°19'43"	46°58'57"	53/0
Kt5	2 km N Koryazhma	61°19'53"	47°08'42"	41/0
Kt9	3 km N Osokorskaya	61°09'02"	46°38'52"	23/0
Kt10	Peschanitsa	61°06'18"	46°38'41"	16/0
Kt11	1 km NE Zaukhtomye	61°03'32"	46°36'53"	30/0
Kt12	Iksha	61°24'04"	46°50'41"	33/0
Kt13	Knyazhevo	61°18'34"	46°30'45"	22/0
Kt14	1 km NW Nosinki	61°19'41"	46°26'36"	22/0
Kt15	3 km NW Fedotovskaya	61°25'28"	46°14'47"	13/0
Kt16	2 km SE Yadrakha	61°11'22"	46°29'06"	18/0
Kt17	6 km SE Yadrakha	61°09'40"	46°26'26"	16/0
Kt18	1 km E Revazh	61°09'13"	46°23'29"	17/0
Kt19	2 km W Maminskaya	61°10'56"	46°16'46"	20/0
Kt20	5 km W Maminskaya	61°10'42"	46°13'48"	12/0
Kt21	5 km E Udinskij	61°09'12"	46°00'53"	8/0
Kt22	Udinskij	61°08'32"	45°56'07"	22/0
Pl2	Lomovoe	64°01'	40°39'	128/29
Pl3	Kholmogorskaya	63°48'	40°39'	123/6
Pl11	2 km E Bodukhino	62°24'01"	39°44'32"	10/0
Pl12	Podkarelskaya	62°13'25"	39°27'11"	6/0
Pl13	3 km S Sheleksa	62°52'03"	40°18'16"	12/0
Pl14	Malinovka	63°16'59"	40°33'37"	3/0
Pl15	7 km E Samoded	63°36'24"	40°40'28"	2/0
Pr1	Arkhangelsk	64°33'	40°33'	250/43
Pr9	Krasnoflotsky Island	64°29'22"	40°39'14"	43/4
Pr16	Malye Karely	64°27'	40°58'	332/54
Pr17	Babonegovo	64°26'	40°58'	19/10
Pr36	Zelenyi Bor	64°32'42"	39°37'10"	10/0
So4	Bolshaya Muksalma Is.	65°01'	35°54'	73/0
So5	Botanical Garden	65°03'09"	35°39'50"	42/0
So6	Near Solovetsky settlement	65°01'	35°45'	210/0

Table 1, continued

So8	Near the dam leading to So4	65°01'11"	35°52'24"	47/0
So10	Rebolda	65°08'39"	35°49'42"	1/0
Vg1	Vilegodsk	61°10'	48°17'	241/0
Vi3	Uyta	63°00'36"	42°31'36"	143/0
Vi8	Tulgas	62°35'32"	43°30'35"	42/0
Vt4	3 km W Verkhnyaya Toima	62°13'46"	44°57'04"	20/0

* Only those mentioned in the current paper. For other localities, see Kozlov *et al.* (2014).

** Geographical co-ordinates were rounded off to minutes when the sampled area exceeded 1 km² or when the extent of the historical sampling area cannot be recovered.

*** To the left of the slash: based on specimens that have been examined by us; to the right of the slash: based on unconfirmed published records. The total number of species reported from the locality equals the sum of these two values.

three months; sampling dates for other localities do not exceed one week (see above). We briefly comment the most interesting findings, primarily in terms of their distribution in Northern Europe.

3. List of species

Micropterigidae

Micropteryx calthella (L.). Ka17.

Eriocraniidae

**Eriocrania sangii* (Wood). Pr1.

E. semipurpurella (Steph.). Pr1.

E. sparrmannella (Bosc). Kb4, Kt12, Kt14, Kt18, Kt20, So6.

Hepialidae

!*Pharmacis fusconebulosa* (De Geer). So6.

Phymatopus hecta (L.). So6.

Nepticulidae

Stigmella anomalella (Goeze). Kt9.

S. confusella (Wood & Wals.). Kt10, Kt12, Kt17, Kt20, Pr1.

**S. continuella* (Stt.). Kt20.

S. lapponica (Wck.). Kb4, Kt9, Kt11–12, Kt14, Kt17–18, Kt20, Kt22.

S. luteella (Stt.). Pr17.

S. magdalenae (Klim.). Kt11–12, Kt14, Kt18, Kt22.

S. nylandriella (Tengstr.). Kt11, Kt18, Kt22.

S. sorbi (Stt.). Kt11–12, Kt14, So6.

**Ectoedemia minimella* (Zett.). Pr1.

E. occultella (L.). Pr1.

E. weaveri (Stt.). So6.

Opostegidae

Opostega salaciella (Tr.). Vg1.

Adelidae

**Nemophora metallica* (Poda). Kt10.

Adela cuprella (Den. & Schiff.). Ka14, P113.

**Nematopogon swammerdamella* (L.). Ka19–20, P113.

Incurvariidae

!*Alloclementia mesospilella* (H.-S.). Pr1.

Incurvaria praelatella (Den. & Schiff.). Pr16.

Phylloporia bistrigella (Haw.). Kb4, Kt17–18.

Prodoxidae

Lampronia rupella (Den. & Schiff.). So6.

Tischeriidae

Coptotriche angusticollella (Dup.). Kb4–5, Kt4, Kt11, Kt14, Kt18.

Psychidae

Taleporia tubulosa (Retz.). Vg1.

!*Psyche casta* (Pallas). Kt5, Vi8.

Psyche crassiorella (Bruand). Vi8.

Acanthopsyche atra (L.). Ka18.

Tineidae

**Nemapogon nigralbella* (Z.). So6.

**N. picarella* (Cl.). So6.

**N. variatella* (Clemens). Kt1.

Tinea pellionella L. Vg1.

Niditinea fuscella (L.). Kt1.

**Monopis monachella* (Hbn.). Vg1: 17.–26.VIII. 2015.

Bucculatricidae

**Bucculatrix bechsteinella* (Bechstein & Scharfenberg). Kt11, Kt16.

B. cristatella (Z.). Kb4.

B. demaryella (Dup.). Kt11–12, Kt14, Kt17–18, Pr17.

Gracillariidae

**Micrurapteryx caraganella* (Hering). Pr1, Kt1.

The mines of this recently redescribed (Kirichenko et al. 2016) Siberian species are common on leaves of introduced *Caragana arborescens*. These are the first records from Europe.

Gracillaria syringella (F.). Kt1.

Caloptilia elongella (L.). So6.

**C. populetorum* (Z.). So6.

C. stigmatella (F.). Kt22, Pl11.

Euspilapteryx auroguttella (Steph.). Pl11, Ka23.

**Calybites phasianipennella* (Hbn.). Vg1: 17.–26.VIII.2015.

**Callisto insperatella* (Nickerl). Ka14.

Phyllonorycter emberizaepennella (Bjerk.). Kt17.

**P. junoniella* (Z.). So6.

**P. nigrescentella* (Logan). Kt12, Kt15.

**P. populifoliella* (Tr.). Kt1, Pr1.

P. sorbi (Frey). So6.

P. strigulatella (Lienig & Z.). Ka10, Kb5, Kt17, So6.

P. ulmifoliella (Hbn.). Pl2.

Phyllocnistis labyrinthella (Bjerk.). Kb5, Kt9, Kt17–18, Kt22, So6.

**P. saligna* (Z.). Kt1, Kt12. This rather local and uncommon species has wide distribution range in Europe. It occurs in all Northern and Baltic countries, except for Iceland (Aarvik et al. 2017), but in Russia it was earlier reported only from Volga-Don region (Sinev 2008).

Yponomeutidae

Yponomeuta evonymella (L.). Kb4, Kt11.

**Y. padella* (L.). Kt1.

**Euhyponomeutoides ribesiella* (Joannis). Ka19.

Swammerdamia caesiella (Hbn.). So6.

S. compunctella H.-S. So6.

Paraswammerdamia conspersella (Tengstr.). So6.

Cedestis gysseleniella Z. Pr1.

**C. subfasciella* (Steph.). Kt19.

Argyresthiidae

**Argyresthia bergiella* (Ratz.). Kt19.

**A. goedartella* (L.). So8.

A. brockeella (Hbn.). Ka24, Kt1, So6, So8.

A. conjugella Z. So6.

A. pygmaeella (Den. & Schiff.). Ka24, So4, So6, So8.

!*A. retinella* Z. So4–5.

A. sorbiella (Tr.). So6.

Plutellidae

Plutella xylostella (L.). Kt1, Kt4, Kt9, Kt11–12, Kt21, Pr36, Vg1.

**Rhigognostis schmaltzella* (Zett.). Kt16.

Glyphipterigidae

Glyphipterix forsterella (F.). Pr1.

Ypsolophidae

**Ypsolopa horridella* (Tr.). Kt1.

Y. parenthesesella (L.). Kt5, Kt12.

Ochsenheimeria urella F. v. R. Kb4, Kt13, Kt15–16, Kt19.

Lyonetiidae

Leucoptera malifoliella (O. Costa). Kb5, Kt4, Kt11–12, Kt14–16, Kt18, Kt22.

**L. orobi* (Stt.). Kt9.

Lyonetia clerkella (L.). Kb5, Kt1, Kt9, Kt17–18.

Oecophoridae

Pleurota bicostella (Cl.). So6.

Lypusidae

Pseudatemelia josephinae (Toll). So5–6, Vg1.

Elachistidae

Exaeretia allisella Stt. Kt1.

E. ciniflonella (Lienig & Z.). Ka1, Kt11, Pl3, Vg1.

**Agonopterix arenella* (Den. & Schiff.). Kb5.

A. angelicella (Hbn.). Kt22, Vg1.

A. heracliana (L.). Kt11.

!*Depressaria pimpinellae* Z. Vg1: 17.–26.VIII.2015.

D. sordidatella Tengstr. Kt1, Vg1.

**D. ultimella* Stt. Ka1. This is the first record from northern Russia. This southern species, often confused with more common *D. daucella* (Den. & Schiff.), occurs in Sweden and in all Baltic countries, but is not found in Finland (Aarvik et al. 2017).

**Ethmia pusiella* (L.). Kt1.

Elachista apicipunctella Stt. Pr9, So6.

E. humilis Z. So6.

E. subalbidella Schläger. Vg1.

Batrachedridae

Batrachedra praeangusta (Haw.). Kt1, Vg1.

Coleophoridae

Coleophora serratella (L.). Ka19, Pr9.

**C. betulella* Hein. Pr1.

C. alcyonipennella (Koll.). Kt11, Kt13, Vg1.

C. deauratella Lienig & Z. Vg1.

C. frischella (L.). So4.

C. mayrella (Hbn.). Kt1, Kt20, So6.

C. alticolella Z. So6, Vg1.

C. striatipennella Nyl. Vg1.

C. atriplicis (Meyr.). So6.

C. sternipennella (Zett.). So6.

**C. vestianella* (L.). Vg1: 23.VI.–2.VII.2015.

Cosmopterigidae

**Limnaecia phragmitella* Stt. Vg1: 23.VI.–2.VII.2015.

Gelechiidae

Metzneria lappella (L.). Vg1.

!*Isophrictis striatella* (Den. & Schiff.). So4.

Argolamprotes micella (Den. & Schiff.). Vg1.

**Eulamprotes wilkella* (L.). Vg1: 23.VI.–2.VII.2015.

Bryotropha senectella (Z.). Kt9, So4, So6.

B. similis (Stt.). So6.

**Gelechia muscosella* Z. Kt1, So6.

**G. turpella* (Den. & Schiff.). Kt1.

**Psoricoptera speciosella* Teich. Kt1.

Chionodes continuella (Z.). Pr1.

Ch. fumatella (Douglas). Kt12, Vg1.

Ch. lugubrella (F.). So6.

Aroga velocella (Z.). Pr36.

**Neofriseria peliella* (Tr.). Vt4.

**Athrips pruinosa* (Lienig & Z.). Kt4.

**Gnorimoschema herbichii* (Nowicki). Kt1.

Klimeschiopsis kiningerella (Dup.). Vg1.

Caryocolum blandella (Douglas). Kt12.

**C. blandelloides* Karsholt. Kt9, Kt19. In Russia, the species was earlier reported only from Karelia and the north-western region (Sinev 2008). It has a generally southern distribution; the northernmost record is from White Sea coast near Kem' (Karelia). In Finland, this species is known from south-western provinces (*Al, Ab, N*).

C. cassella (Walk.). Kt1.

**C. fischerella* (Tr.). Kt1.

**Aproaerema anthyllidella* (Hbn.). Kt9.

A. cinctella (Cl.). Vg1.

Prolita sexpunctella (F.). P13.

**Brachmia blandella* (F.). Vg1: 2.–12.VII.2015.

**Helcystogramma lutatella* (H.-S.). Kt12. This is the northernmost and somewhat surprising record in Russia. In Finland, this species is having a strong expansion after its first record in 1999 (Kullberg 2000), spreading along the southern coast in the south-western regions (*Al, Ab, N*), and there is also a recent stand-alone record from *Ok*: Sotkamo in central Finland (Hyönteistietokanta 2017).

**H. rufescens* (Haw.). Vg1: 13.VI.–12.VII.2015.

Acompsia subpunctella Svensson. Kt12.

**Dichomeris limosellus* (Schläger). Vg1: 23.VI.–2.VII.2015.

**Neofaculta ericitella* (Geyer). Pr1.

Pterophoridae

Gillmeria pallidactyla (Haw.). Kt20, So4, So6, Vg1.

G. ochrodactyla (Den. & Schiff.). So4, So6.

Platyptilia calodactyla (Den. & Schiff.). So6.

P. gonodactyla (Den. & Schiff.). Kt21–22, Vg1.

Amblyptilia punctidactyla (Haw.). Ka10, Kb4, P114, Pr1.

Stenoptilia bipunctidactyla (Scop.). Kt12, Kt17.

S. pterodactyla (L.). Kt11–12, Kt19, So6, Vg1.

Hellinsia didactylites (Ström). Vg1.

H. osteodactylus (Z.). Vg1.

H. tephradactyla (Hbn.). So6, Vg1.

Epermeniidae

Epermenia chaerophyllella (Goeze). Ka10, Kt17, Kt22, P111.

Choreutidae

Anthophila fabriciana (L.). Kb4–5, Kt11, Kt13–16, So6.

Choreutis diana (Hbn.). Kb5, Kt14–17, Kt19–21.

Tortricidae

Acleris aspersana (Hbn.). Kt13–14, Kt22.

A. comariana (Lienig & Z.). Kt1.

A. effractana (Hbn.). Kb4.

A. hastiana (L.). Kt19.

A. laterana (F.). Kb4, Kt1, Kt4, Kt11, Kt14–16, Kt19, Kt 21–22, Vg1.

- A. lipsiana* (Den. & Schiff.). Vg1.
A. rufana (Den. & Schiff.). Vg1.
 **A. umbrana* (Hbn.). Ka17.
Phtheochroa inopiana (Haw.). Vg1.
 **Aethes margaritana* (Haw.). Vg1: 23.VI.–
 2.VII.2015.
A. smeathmanniana (F.). So8, Vg1.
Cochylidia subroseana (Haw.). Kt22, Vg1.
Cochylis dubitana (Hbn.). Vg1.
C. pallidana Z. Vg1.
Sparganothis rubicundana (H.-S.). So6, So8.
Eana argentana (Cl.). So4, So8, Vg1.
E. osseana (Scop.). Ka1.
Archips rosana (L.). Vg1.
Pandemis cerasana (Hbn.). Kb4, Kt1.
P. cinnamomeana (Tr.). Kt1.
Syndemis musculana (Hbn.). Ka10, Ka12.
Lozotaenia forsterana (F.). So6, Vg1.
Aphelia paleana (Hbn.). Vg1.
A. viburnana (Den. & Schiff.). Vg1.
Clepsis senecionana (Hbn.). Ka10, Ka12, Ka14,
 Ka16, Ka20, Pl11, Pl13, Pr36.
Adoxophyes orana (F. v. R.). Kt1.
Epagoge grotiana (F.). Vg1.
Philedone gerningana (Den. & Schiff.). So8.
Endothenia ericetana (Humph. & Westw.).
 Kt11–12.
E. quadrimaculana (Haw.). Vg1.
Bactra furfurana (Haw.). Vg1.
Apotomis betuletana (Haw.). Vg1.
A. capreana (Hbn.). So6, Vg1.
A. semifasciana (Haw.). Vg1.
A. sororculana (Zett.). So6.
A. turbidana Hbn. So6.
Orthotaenia undulana (Den. & Schiff.). So4,
 So6, Vg1.
Phiaris bipunctana (F.). Vg1.
Ph. micana (Den. & Schiff.). Pl2, So6.
Celypha rufana (Scop.). Kt12, Kt19.
C. lacunana (Den. & Schiff.). Kt4, Kt12, Kt16,
 Kt22, So6, Vg1.
C. rivulana (Scop.). Kt9, Kt22, Vg1.
Ancylis badiana (Den. & Schiff.). Kt19.
A. comptana (Frölich). So6.
A. subarcuana (Douglas). So6.
 **Gypsonoma dealbana* (Frölich). Kt1.
Epinotia brunnichiana (L.). Kb4, Kt1, Kt21.
E. caprana (F.). Vg1.
 **E. cinerea* (Haw.). Vg1: 17.–26.VIII.2015.
E. crenana (Hbn.). Kt19, Vg1.
E. cruciana (L.). So4–6, So8.
E. immundana (F. v. R.). Kh4.
 **E. indecorana* (Zett.). Vg1: 16.VIII.–
 1.IX.2015.
E. maculana (F.). Vg1.
E. nanana (Tr.). So6.
 **E. nemorivaga* (Tengst.). Kb4.
E. ramella (L.). Kb4, Kt1, Kt5, Kt12, Kt14, So6.
E. solandriana (L.). Kb4, Kt1, Kt16.
E. tedella (Cl.). So6.
E. tenerana (Den. & Schiff.). Kb4, Kt1, Kt11,
 Kt13–14, Kt19, So8.
Rhopobota naevana (Hbn.). Kt1, Kt11, Kt14,
 Kt19.
Retinia resinella (L.). Pr1.
Eriopsela quadrana (Hbn.). Pl13.
Thiodia citrana (Hbn.). So6, Vg1.
Notocelia incarnatana (Hbn.). Kt1, Pl3.
Epiblema foenella (L.). Kt12.
E. grandaevana (Lienig & Z.). Kt1, Vg1.
E. cana (Haw.). Vg1.
E. obumbratana (Lienig & Z.). So6.
Dichrorampha acuminatana (Lienig & Z.). Kt9,
 Kt20.
D. consortana (Steph.). Kb4.
D. flavidorsana Knaggs. So4, So6, So8.
 **D. insperata* (Danilevsky). Kt1, Kt4, Kt9, Kt12,
 Kt21. These are the most unexpected records
 made from Arkhangelsk oblast during the
 past years. The species was described from
 the Caucasus Mts., but recently reported from
 the south of European Russia (Sinev 2008).
 This species was abundant on meadows along
 Northern Dvina and Vychegda rivers, but we
 also collected it from roadside vegetation in a
 dark spruce forest and from a densely built
 area in the city of Kotlas.
D. petiverella (L.). Kb5, Kt9, Kt22, Pr1.
D. plumbagana (Tr.). So6.
 **D. simpliciana* (Hw.). Kt1, Kt12.
Grapholita compositella (F.). Kt9, Kt13, Kt19,
 Pl3.
G. jungiella (L.). Ka17, Ka26, Pl11, Pl14.
 **G. tenebrosana* (Dup.). So6.
Pammene gallicana (Guenée). So6, So8.
Cydia cornucopiae (Tengstr.). Pl2.
C. pactolana (Z.). Pl2.
C. pomonella (L.). Kt1.
Lathronympha strigana (F.). So6, Vg1.

Sesiidae

- !*Paranthrene tabaniformis* (Rott.). Pr1.
 !*Synanthedon scoliaeformis* (Borkh.). Pr1.
 !*S. sphecoformis* (Den. & Schiff.). Pr16.
 !*S. tipuliformis* (Cl.). Pr1, Pr16.

Papilionidae

- Papilio machaon* L. Ka22, Ka25.

Hesperiidae

- Pyrgus malvae* (L.). Ka14, Ka22, Ka25–26.
Thymelicus lineola (Ochs.). Kt19.

Pieridae

- Leptidea morsei* (Fenton). Ka17, Ka21, Ka24–25.
L. sinapis (L.). Ka12, Ka14, Ka16, Ka18–20, Ka22–23, Ka25, Kt10–11, Kt13, Pl12–14.
 **Leptidea juvernica* (Williams). Kb5, Kt10, Kt13, Kt15, Kt17, Kt19. In Russia, the nearest records are from the north-western region (Sinev 2008). This species is currently having a strong expansion in Eastern Finland.
Aporia crataegi (L.). Ka17, Ka25, Pl11.
P. napi (L.). Ka14, Ka17, Ka23–25, Kb4–5, Kt1, Kt3, Kt5, Kt10–11, Kt13, Kt16–20, Pr36, So10.
P. rapae (L.). Ka14–15.
Colias hyale (L.). Kt9–10.
Gonepteryx rhamni (L.). Ka12–14, Ka16, Ka20, Ka22–25, Kt13, Kt15, Pr36.

Lycaenidae

- Callophrys rubi* (L.). Ka20, Kh18, Pl13, Pl15, Pr9.
Lycaena phlaeas (L.). Kt4.
L. virgaureae (L.). Kb4, Kt12, Kt17, So4, So6.
 **L. dispar* (Haw.). Kb5. The species is considered endangered in Western Europe, but it has been expansive during the recent decades and has established new populations in Estonia, Finland and Karelia (Lindman *et al.* 2015).
Cupido argiades (Pallas). Ka18, Ka21–22, Kt10.
Celastrina argiolus (L.). Ka14, Ka16, Ka20, Ka23, Ka25–26, Pl13.
Plebeius argus (L.). So4, So8.
Polyommatus icarus (Rott.). Kt12, So5.

Nymphalidae

- Nymphalis antiopa* (L.). Kh18, Kt14, Pr36.

- Nymphalis xanthomelas* (Esp.). Kt13–14.

- Aglais urticae* (L.). Ka16, Kb5, Kt13, Kt15–18.
A. io (L.). Ka12, Ka16, Ka22–23, Ka25.
Polygonia c-album (L.). Ka12, Ka17, Ka22–25, Kh18, Kt13, Kt15, Vg1.
Vanessa atalanta (L.). Ka25, Kt11, Kt14.
V. cardui (L.). Kb5, Kt12–14, Kt16, Pr36.
Araschnia levana (L.). Ka20, Ka25, Pl12.
Boloria dia (L.). Ka22, Pl12.
B. aquilonaris (Stich.). So5–6, So8.
Argynnis adippe (Den. & Schiff.). Kt13, Kt16.
A. aglaja (L.). Kb5, Kt10, Kt13.
Lasiommata petropolitana (F.). Pr36.
Hyponephele lycaon (Rott.). Kt4–5, Kt9–12.

Pyralidae

- Pyla fusca* (Haw.). Kt1.
Oncocera semirubella (Scop.). Kt10, Kt12.
Hypochoalcia ahenella (Den. & Schiff.). Vg1.
 **Trachycera advenella* (Zinck.). Kt1.
 **Myelois circumvoluta* (Fourcroy). Vg1: 23.VI.–2.VII.2015.
 **Zophodia grossulariella* (Hbn.). Ka1.
Phycitodes binaevella (Hbn.). Vg1.
Eudonia murana (Curt.). So6.
 **E. sudetica* (Z.). So4, So6.
 **E. truncicolella* (Stt.). So6.
Donacaula mucronella (Den. & Schiff.). Vg1.
Elophila nymphaeata (L.). So5, Vg1.
 **Acentria ephemerella* (Den. & Schiff.). Kt1.
Nymphula nitidulata (Hufn.). Kt20–21, Vg1.
Evergestis extimalis (Scop.). Vg1.
E. pallidata (Hufn.). Vg1.
Udea hamalis (Thnbg.). So8.
U. lutealis (Hbn.). Kb5, Kt1, Kt4, Kt9–13, Kt15–20, So5–6, Vg1.
U. prunalis (Den. & Schiff.). Vg1.
Anania fuscalis (Den. & Schiff.). Vg1.
A. perlucidalis (Hbn.). Vg1.
A. terrealis (Tr.). So4.
Pyrausta porphyralis (Den. & Schiff.). Kb4, Kt1, Kt9, Kt19.
P. purpuralis (L.). Vg1.
Sitochroa verticalis (L.). Vg1.
Psammotis pulveralis (Hbn.). Vg1.
 **Paratalanta hyalinalis* (Hbn.). Vg1: 13.VI.–22.VII.2015.
Pleuroptya ruralis (Scop.). Kt1, Kt10.
 **Mecyna flavalis* (Den. & Schiff.). Kt10.
Diasemia reticularis (L.). Vg1.

Crambidae

- Chrysoteuchia culmella* (L.). Kt5.
Crambus lathoniellus (Zinck.). Vg1.
 !*C. pascuella* (L.). So4.
C. perlella (Scop.). So4, So8, Vg1.
Agriphila inquinatella (Den. & Schiff.). Kt4, Kt9, Kt12.
A. selasella (Hbn.). Kb4, Kt1, Kt4–5, Kt9, Kt11–14, Kt16, So5–6.
A. straminella (Den. & Schiff.). So4, So6, So8.
A. tristella (Den. & Schiff.). Kt4, Kt10, Kt12.
 **Pediasia aridella* (Thnbg.). So6.
 **Platytes cerussella* (Den. & Schiff.). Vg1: 13.–22.VI.2015.
Catoptria margaritella (Den. & Schiff.). So6, So8.
C. pinella (L.). Kt1.

Drepanidae

- Falcaria lacertinaria* (L.). Kt1.

Lasiocampidae

- Gastropacha quercifolia* (L.). Vg1.

Sphingidae

- Sphinx pinastri* (L.). Kt14.
Smerinthus caecus Ménériés. Vg1. This is the first georeferenced record from Arkhangelsk oblast. This Euro-Siberian species occurs almost thorough the entire Russian mainland in the south boreal forest zone, but is not found in any other European country. Earlier it was reported for the study region on the basis of non-labelled student's samples.
Deilephila elpenor (L.). Vg1.

Uraniidae

- **Eversmannia exornata* (Ev.). Vg1: 13.VI.–12.VII.2015. This eastern species is currently expanding towards the west: it is already present in Estonia and Latvia (Aarvik et al. 2017) and also found once in Finland, *Ka*: Virolahti in 2014 (Hyönteistietokanta 2017). The discovery of this species in the Arkhangelsk oblast questions the conclusion by Solovyev et al. (2015) on the existence of a gap in its distribution range between East European and West Siberian populations.

Geometridae

- **Abraxas grossulariata* (L.). Ka14, Ka17.
A. sylvata (Scop.). Vg1.
Lomaspilis marginata (L.). Vg1.
L. opis Butler. Vg1.
Cabera exanthemata (Scop.). Vg1.
C. pusaria (L.). So8, Vg1.
Ennomos autumnaria (Werneburg). Vg1.
Crocallis elinguarua (L.). Vg1.
Epione repandaria (Hufn.). Kt22, Vg1.
E. vespertaria (L.). Kt22.
 **Apeira syringaria* (L.). Vg1: 13.–22.VI.2015.
Macaria alternata (Den. & Schiff.). Vg1.
M. brunneata (Thnbg.). So4–6, So8, Vg1.
M. loricaria (Ev.). Vg1.
M. wauaria (L.). Vg1.
Chiasmia clathrata (L.). Ka20, Ka26, Kt15, Vg1.
 !*Hypoxystis pluviaria* (F.). Ka12, Ka14, Ka18, Ka20–22, Ka24, Pl11–13.
Siona lineata (Scop.). Vg1.
Ematurga atomaria (L.). Ka20, Ka22, Ka24–25, Pl12–13, Pr36.
Angerona prunaria (L.). Pl11.
Arichanna melanaria (L.). So6.
Alcis repandata (L.). Kh18, Pl12–13, So6, Vg1.
 **Cleora cinctaria* (Den. & Schiff.). Ka1.
 **Aethalura punctulata* (Den. & Schiff.). Ka10, Ka17, Ka19, Pl11.
Ectropis crepuscularia (Den. & Schiff.). Pl15.
Geometra papilionaria (L.). So6, Vg1.
Thetidia smaragdaria (F.). Vg1.
 **Thalera fimbrialis* (Scop.). Vg1: 23.VI.–2.VII.2015.
 !*Idaea aversata* (L.). So6, So8.
I. biselata (Hufn.). Vg1.
 **I. dimidiata* (Hufn.). Vg1: 3.–12.VII.2015.
 **I. straminata* (Borkh.). So4, So6, So8, Vg1: 13.–22.VII.2015.
Scopula immorata (L.). Vg1.
S. immutata (L.). Vg1.
S. rubiginata (Hufn.). Kt4, Vg1.
Timandra griseata W. Petersen. Vg1.
Scotopteryx chenopodiata (L.). Kb4, Kt4–5, Kt10–12, Kt16, Kt18, Kt20, So5–6, So8, Vg1.
Xanthorhoe decoloraria (Esp.). So6.
X. designata (Hufn.). Kt1, Vg1.
X. ferrugata (Cl.). Vg1.
X. montanata (Den. & Schiff.). Vg1.

- Epirrhoe alternata* (Müller). Ka22, Kb4, Kt4–5, Kt12, Kt22, So8, Vg1.
E. tristata (L.). Vg1.
Entephria caesiata (Den. & Schiff.). So5–6.
Hydriomena furcata (Thnbg.). So6.
 !*Colostygia aptata* (Hbn.). Vg1: 23.VI.–22.VII.2015.
Dysstroma citrata (L.). Kb4, Kt11, Kt14, Kt21, So4, So6, So8, Vg1.
D. truncata (Hufn.). So6, So8, Vg1.
Plemyria rubiginata (Den. & Schiff.). Kb4–5, Kt14, So6.
 !*Eulithis mellinata* (F.). Vg1: 23.VI.–22.VII.2015.
E. populata (L.). Kt11, So4–6, So8.
E. prunata (L.). Kt11, Kt18.
E. testata (L.). Kt4, So6, Vg1.
 !*Cosmorhoe ocellata* (L.). Vg1: 13.–22.VI.2015.
Epirrita autumnata (Borkh.). Vg1.
Mesotype didymata (L.). Pl11, So6, So8.
 !*M. parallelolineata* (Retz.). Kt22.
Perizoma albulata (Den. & Schiff.). Kb4, Kt1, Kt9–11, Kt13, Vg1.
 **P. bifasciata* (Haw.). Kt1.
Pasiphila debiliata (Hbn.). So6.
 !*Eupithecia absinthiata* (Cl.). Vg1: 23.VI.–2.VII.2015.
E. pusillata (Den. & Schiff.). So8, Vg1.
E. satyrata (Hbn.). Vg1.
E. succenturiata (L.). Vg1.
E. tenuiata (Hbn.). Kt1, So8.
 **E. tripunctaria* H.-S. Vg1: 3.–12.VII.2015.
E. virgureata Doubleday. Ka20.
E. vulgata (Haw.). Pr9.
Odezia atrata (L.). Vg1.
Carsia sororiata (Hbn.). So6, So8.
Aplocera praeformata (Hbn.). Vg1.
 !*Lobophora halterata* (Hufn.). Ka17.
 **Acasis appensata* (Ev.). Ka10.
Trichopteryx carpinata (Borkh.). Ka17.
- Notodontidae
Notodonta dromedarius (L.). Kt1.
N. ziczac (L.). Vg1.
Ptilodon capucina (L.). Vg1.
Phalera bucephala (L.). Vg1.
- Erebidae
Scoliopteryx libatrix (L.). So6.
Rivula sericealis (Scop.). So6, Vg1.
Hypena proboscidalis (L.). Kt1, So6, Vg1.
- Orgyia antiqua* (L.). Kb4, Kt11, Kt19, Vg1.
Spilosoma lubricipeda (L.). Vg1.
S. lutea (Hufn.). Vg1.
Diacrisia sannio (L.). Vg1.
Arctia caja (L.). So6, Vg1.
 **Rhyparia purpurata* (L.). Vg1: 13.VI.–2.VII.2015.
 **Thumatha senex* (Hbn.). Vg1: 23.VI.–12.VII.2015.
Miltochrista miniata (Forster). Vg1.
Cybosia mesomella (L.). Vg1.
 **Eilema lurideola* (Zincken). Vg1: 13.VI.–12.VII.2015.
E. lutarella (L.). Vg1.
Hypenodes humidalis Doubleday. So6, So8, Vg1.
 **Eublemma amasina* (Ev.). Vg1: 13.–22.VI.2015. This is an unexpected record of a species, which so far had been found only from more southern regions of European Russia and thorough southern Siberia to Russian Far East (Sinev 2008).
Polypogon tentacularia (L.). Kt9, Vg1.
Calyptra thalictri (Borkh.). Vg1.
Lygephila pastinum (Tr.). So6, Vg1.
Catocala fraxini (L.). Vg1.
Euclidia mi (Cl.). Pr36.
E. glyphica (L.). Ka24, Kh18, Pl13.
- Nolidae
Nycteola degenerana (Hbn.). Ka24, Pl11.
- Noctuidae
Macdunnoughia confusa (Steph.). Kt1.
Diachrysis stenochrysis (Warr.). Vg1.
Autographa bractea (Den. & Schiff.). Vg1.
 **A. buratetica* (Stgr.). Vg1: 13.–22.VI.2015.
A. excelsa (Kretschmar). Vg1.
A. gamma (L.). Kb4, Kt1, Vg1.
 **A. mandarina* (Freyer). Kt1, Vg1: 22.VII.–26.VIII.2015.
A. pulchrina (Haw.). So6.
Syngrapha interrogationis (L.). So6, Vg1.
Plusia festucae (L.). Pr1, Vg1.
P. putnami (Grote). Vg1.
Deltote bankiana (F.). Vg1.
 **Acronicta cinerea* (Hufn.). Kt22.
A. rumicis (L.). Kb4, Vg1.
A. strigosa (Den. & Schiff.). Vg1.
Amphipyra tragopoginis (Cl.). Vg1.

- **Allophyes oxyacanthae* (L.). Vg1: 17.VIII.–1.IX.2015.
- **Pseudeustrotia candidula* (Den. & Schiff.). Vg1: 13.–22.VI.2015.
- **Elaphria venustula* (Hbn.). Vg1: 13.VI.–2.VII.2015.
- Caradrina morpheus* (Hufn.). Vg1.
- !*C. petraea* Tengstr. Kt1, Vi3.
- **Charanyca ferruginea* (Esp.). Vg1: 13.VI.–22.VII.2015.
- **Athetis gluteosa* (Tr.). Vg1: 13.VI.–12.VII.2015.
- Enargia paleacea* (Esp.). Kb4, Kt1, Kt9, Vg1.
- Ipimorpha retusa* (L.). Kt1.
- **I. subtusa* (Den. & Schiff.). Kt1.
- Dypterygia scabriuscula* (L.). Vg1.
- **Actinotia polyodon* (Cl.). Kt1.
- Crypsedra gemmea* (Tr.). Vg1.
- Staurophora celsia* (L.). Vg1.
- Celaena haworthii* (Curt.). Kt1, Vg1.
- Helotropha leucostigma* (Hbn.). Kt1, Vg1.
- Gortyna flavago* (Den. & Schiff.). Vg1.
- Hydraecia micacea* (Esp.). Vg1.
- **H. petasitis* Doubleday. Vg1: 17.–26.VIII.2015.
- H. ultima* Holst. Kt1, Vg1.
- **Amphipoea crinanensis* (Burrows). Kt13, Vg1: 23.VII.–2.VIII.2015.
- A. fucosa* (Freyer). Kt1, Kt13, Vg1.
- A. lucens* (Freyer). Kt1.
- A. oculea* (L.). Vg1.
- **Nonagria typhae* (Thunbg.). Kt1.
- Phragmatiphila nexa* (Hbn.). Vg1.
- Denticucullus pygmina* (Haw.). Vg1.
- **Photedes fluxa* (Hbn.). Vg1: 23.VI.–22.VII.2015.
- **Apamea furva* (Den. & Schiff.). Vg1: 23.VI.–22.VII.2015.
- A. remissa* (Hbn.). So6.
- !*A. sordens* (Hufn.). Vg1: 23.VI.–2.VII.2015.
- **Resapamea hedeni* (Graeser). Vg1: 23.VII.–2.VIII.2015. This is one of the westernmost records of this species, which is distributed from Western Caucasus to Central Ural region and thorough southern parts of European Russia to Japan (Sinev 2008). In Finland, it has been found only from *Ka*: Virolahti in 2011 (Hyönteistietokanta 2017). Seemingly, the species is expanding towards the west.
- Mesapamea secalis* (L.). Kt1, Vg1.
- Mesoligia furuncula* (Den. & Schiff.). Kt1.
- Parastichtis suspecta* (Hbn.). *Ka*24, Kt16, Vg1.
- Xanthia togata* (Esp.). Vg1.
- X. icteritia* (Hufn.). Kt1, *Ka*24, Vg1.
- **Conistra vaccinii* (L.). *Ka*10.
- Lithophane consocia* (Borkh.). Vg1.
- Xylena solidaginis* (Hbn.). Vg1.
- **Aporophyla lutulenta* (Den. & Schiff.). Vg1: 17.VIII.–1.IX.2015. This is a surprisingly northern record as the nearest finding is from Yaroslavl, Russia (T. Tammaru, pers. comm.). The distribution of this species is not completely clear yet, and some of the earlier records of *A. lutulenta* (e.g. from Kaliningrad, Russia: Sinev 2008) should be attributed to *A. lueneburgensis* (Frey.), because *A. lutulenta* does not occur in Nordic and Baltic countries (Aarvik et al. 2017). Our specimen looks a typical eastern one and fits better geographically to the known distribution of *A. lutulenta* (Ronkay et al. 2001) rather than of *A. lueneburgensis*.
- Blepharita amica* (Tr.). Vg1.
- **Mniotype adusta* (Esp.). So6.
- Tholera cespitis* (Den. & Schiff.). Vg1.
- !*Th. decimalis* (Poda). Vg1: 7.–16.VIII.2015.
- Cerapteryx graminis* (L.). So6, Vg1.
- Lacanobia oleracea* (L.). Vg1.
- L. suasa* (Den. & Schiff.). Vg1.
- L. thalassina* (Hufn.). Vg1.
- Ceramica pisi* (L.). Vg1.
- Sideridis reticulata* (Goeze). Vg1.
- Mythimna conigera* (Den. & Schiff.). Kt18, Vg1.
- M. impura* (Hbn.). Vg1.
- Lasionycta imbecilla* (F.). Vg1.
- !*Euxoa nigricans* (L.). Kt1.
- !*E. tritici* (L.). Kt1. We accept the current (Aarvik et al. 2017) understanding of this variable species, which is based on the detailed study by Mutanen (2005). However, based on the diagnostic traits outlined by Fibiger (1990, 1997), our specimens belong to *E. nigrofusca* (Esp.).
- Agrotis exclamationis* (L.). Vg1.
- Ochropleura plecta* (L.). Vg1.
- Diarsia dahlia* (Hbn.). Vg1.
- D. mendica* (F.). Vg1.
- D. rubi* (Vieweg). Vg1.
- **Cerastis leucographa* (Den. & Schiff.). *Ka*10.
- **Paradiarsia punicea* (Hbn.). Vg1: 23.VI.–22.VII.2015.

Chersotis cuprea (Den. & Schiff.). Kb4, Kt15–16, Kt18–19, Vg1.

Eurois occulta (L.). Kt13, Vg1.

Graphiphora augur (F.). Vg1.

Anaplectoides prasina (Den. & Schiff.). So6.

Xestia baja (Den. & Schiff.). Kt22, So6, P113, Vg1.

X. ditrapezium (Den. & Schiff.). Vg1.

X. sexstrigata (Haw.). Vg1.

X. speciosa (Hbn.). So6.

Protolampra sobrina (Dup.). Kt1, So4.

4. Discussion

The records of 104 species new for the regional fauna increased the total number of Lepidoptera found in the Arkhangelsk oblast to 1,140. However, 83 of these species are included on this list based on earlier publications only, and their occurrence in the study region remains to be confirmed.

Our previous experience in collecting across the entire Arkhangelsk oblast demonstrated that the fauna of the northern part of this oblast does not contain species that are restricted to Arctic and alpine regions. Therefore, we concentrated our sampling efforts on the southern parts, where the occurrence of many of the newly reported species was indeed predictable. However, we also collected some species that were thought to have a much more southern distribution, such as *Helcystogramma lutatella*, *Eublemma amasina* and, especially, *Dichrorampha insperata*. In addition, a Siberian species, *Micrurapteryx caraganella*, was for the first time recorded from Europe.

Sinev (2008) used the ratio between the numbers of “micros” and “macros” as an index that reflected the level of knowledge of a regional lepidopteran fauna. Our additions of new species increases the value of this index for the Arkhangelsk oblast to 1.13, which is still far from the highest value of 1.52 reported for the Murmansk oblast (Kozlov & Kullberg 2010). Thus, the fauna of moths and butterflies of the Arkhangelsk oblast remains imperfectly studied. However, judging from the values of this index reported by Sinev (2008), the lepidopteran fauna of 35 of 40 regions of Russia is even more poorly explored than that of the Arkhangelsk oblast. Within this

oblast, the fauna of the Solovetsky Islands, with 311 species, seems to be better explored (index 1.32) when compared to the faunas of the surroundings of Arkhangelsk (554 species, index 1.20), and especially of Kotlas (461 species, index 1.05). Therefore, taking into account the composition of species currently added to the regional fauna, we conclude that the Lepidoptera fauna of the Arkhangelsk oblast of Russia includes at least 2,000 species of Lepidoptera.

Acknowledgements. We are thankful to B. Filippov for operating a light trap in Vilegodsk and for numerous practical arrangements, and to A. Popova for fieldwork assistance. We are indebted to L. Kaila, V. Mironov, A. Matov and E. J. van Nieukerken for identification of difficult taxa, to M. Mutanen and T. Tammara for providing additional information, and to K. Nupponen for insightful comments to an earlier version of the manuscript. This work was supported by travel grants received from the Academy of Finland, European Union (Erasmus Mundus Programme), Percy Sladen Memorial Fund, and Societas pro Fauna et Flora Fennica.

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