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Research Article

Insects identified by unqualified scientists: multiple "new" records from the Murmansk oblast of Russia are dismissed as false

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Abstract

A recently published book authored by six botanists (Rak NS, Goncharova OA, Poloskova EY, Litvinova SV, Zotova OE, Lipponen IN. 2018. Bioecological analysis of introducents of the family Rosaceae Juss. Kola Science Centre, Apatity, 87 pp.) reports information on 19 species of insects that are declared to damage woody Rosaceae plants in the central part of the Murmansk oblast of Russia. Examination of photographs published in this book revealed that 15 of these 19 species were identified incorrectly and that several of the illustrated species are unlikely to damage woody Rosaceae plants. The most striking examples are errors in determination at the order level: a syrphid fly (Diptera) identified as a leafcutter bee (Hymenoptera), and a sawfly (Hymenoptera) identified as a psyllid (Hemiptera). I provide correct identifications of the insects illustrated in the cited book in order to prevent the spread of erroneous information across future publications and databases.

Keywords

Coleoptera, Diptera, insect misidentification, faunistic information, Hemiptera, Hymenoptera, Lepidoptera, research ethics

Introduction

The insect fauna of the Murmansk oblast of Russia is relatively well studied (Dmitriev 2002, Kozlov and Kullberg 2011, Blinova 2013, Paukkunen and Kozlov 2015, Stekolshchikov and Buga 2018); consequently, new faunistic records from this polar region immediately attract the attention of entomologists. This attraction especially concerns findings that extend the distribution range of certain species by some 1000–2000 km towards the Pole. Several records of this kind have been recently published in a book that describes some aspects of the ecology of woody Rosaceae species that were introduced to the central part of the Kola Peninsula (Rak et al. 2018). In particular, three moth species (*Archips crataegana*, *A. podana* and *Erannis defoliaria*) reported in this book to occur around Kirovsk have not yet been found either in the Murmansk oblast or in the more southern Karelia (Sinev 2008). In the neighbouring Finland, the northernmost records of these species are from locations some 1000 km to the south of Kirovsk (FinBIF 2019).

We entomologists frequently use faunistic data that were published by our colleagues decades and even centuries ago. The record of a species in a certain region has a cascading effect on subsequent publications, in particular through the checklists and identification keys that summarize distribution data (Kozlov 2018). Checking old faunistic records, and especially non-referenced ones, is often impossible, so we have no other option than to trust earlier publications. However, if the circumstances permit, 'suspicious' records should be controlled. This paper, by providing correct identifications of insects illustrated in the book by Rak et al. (2018), is aimed at preventing the spread of erroneous information across future publications and databases.

Materials and methods

All identifications were made from photographs published by Rak et al. (2018). Most of the species shown in these photographs are rather common; therefore, even small, low-resolution images allowed reliable identification of many of the illustrated insects. Identifications of several species were provided (or controlled) by experts in particular insect groups (see Acknowledgements). Within each section of the Results, the species are listed in alphabetical order according to their correct names, while the figure and page numbers refer to Rak et al. (2018).

Results

Correctly identified species

Lyonetia clerkella (Linnaeus) (Lepidoptera: Lyonetiidae). The mines caused by this species are shown in the unnumbered figure (p. 40, right panel) and in figs 11г (p. 42) and 33 (p. 55). The mines are very characteristic and allow unequivocal identification of *L. clerkella*, which is recorded for the first time from the Murmansk oblast. The northernmost records of this species in Russia were previously from Karelia (Sinev 2008) and the Arkhangelsk oblast (Kozlov et al. 2017).

Macrosiphum rosae (Linnaeus) (Hemiptera: Aphididae). Aphids are shown in the unnumbered figure (p. 38) and in fig. 7a, right panel (p. 40). This species is common across the Murmansk oblast (Stekolshchikov and Buga 2018).

Philaenus spumarius (Linnaeus) (Hemiptera: Aphrophoridae). Both adults and nymphs, within their nests, are shown in the unnumbered figure (p. 35) and in fig. 8 (p. 40). This polyphagous species is common in the central part of the Murmansk oblast (Dmitriev 2002).

Rhopalosiphum padi (Linnaeus) (Hemiptera: Aphididae). Both aphids and damaged leaves are shown in the unnumbered figure (p. 38) and in fig. 7a, left panel (p. 40). This species is common across the Murmansk oblast (Stekolshchikov and Buga 2018).

Incorrectly identified species

Callidium violaceum (Linnaeus) (Coleoptera: Cerambycidae). The beetle is shown in the unnumbered figure (p. 36) under the name *Ropalopus insubricus* (Germar). *C. violaceum* is widely distributed in northern Europe

(Silfverberg 2004) and reaches the extreme North of Finland (FinBIF 2019), whereas the northernmost record of *R. insubricus* is from Ukraine (Audisio 2019).

Epirrita autumnata (Borkhausen) (Lepidoptera: Geometridae). The larva of the autumnal moth is shown in the unnumbered figure (p. 37) under the name *Erannis defoliaria* Cl. This confusion is difficult to understand, because the green larva of *E. autumnata* differs strikingly from the colourful larva of *E. defoliaria*. *E. autumnata* is a well-known outbreaking species, which periodically defoliates birch forests in northern Fennoscandia; it is common across the Murmansk oblast (Kozlov and Jalava 1994). *Erannis defoliaria* has never been recorded from either the Murmansk oblast or from the more southern Karelia (Sinev 2008); in Finland, this species occurs in the southernmost regions only (FinBIF 2019).

Gonioctena pallida (Linnaeus) (Coleoptera: Chrysomelidae). This beetle is shown in two unnumbered figures under the names *Gonioctena viminalis* L. (p. 35) and *Melasoma lapponica* L. (p. 36). The larva named *Phytodecta quinguepunctatus* F. (p. 36) may also belong to *G. pallida*, but the quality of the photograph makes a definitive conclusion impossible. *Gonioctena pallida* reached extremely high densities in the early 2000s in some localities in the central part of the Murmansk oblast, where it caused severe defoliation of *Salix caprea* during two consecutive years. Since then, it has been rather infrequent (Zvereva et al. 2016). The leaf on which the "*Melasoma lapponica*" sits resembles a willow leaf more than a Rosaceae leaf; and I have never observed *G. pallida* feeding on woody Rosaceae plants (among which *Sorbus aucuparia* is most common) in the Murmansk oblast.

Parornix scoticella (Stainton) (Lepidoptera: Gracillariidae). The larvae and mined leaf of this easily recognizable species are shown in an unnumbered figure (p. 38) under the name *Caliroa cerasi* (L.) (Hymenoptera: Tenthredinidae). Note that sawflies never produce spun silk, which is clearly visible in the photograph; this spinning is typical of moth larvae.

Phratora sp. (Coleoptera: Chrysomelidae). The beetle is shown in an unnumbered figure (p. 35) under the name *Phyllodecta vulgatissima* L. Most likely, this figure illustrates *P. vitellinae* (Linnaeus), a willow-feeding species that is common in the Murmansk oblast (Zvereva et al. 2016).

Polydrusus pilosus (Gredler) (Coleoptera: Curculionidae). The beetle is shown in an unnumbered figure (p. 36) under the name *Furcipes rectirostris* L.

Swammerdamia compunctella Herrich-Schaeffer (Lepidoptera: Yponomeutidae). The larva of this species is shown in fig. 76, right panel (p. 40), under the name *Archips crataegana* (Hbn.) (Lepidoptera: Tortricidae). *Swammerdamia compunctella* was reported from the Murmansk oblast (Sinev 2008), whereas *A. crataegana* has never been recorded from either Murmansk oblast or from the more southern Karelia (Sinev 2008); in Finland, *A. crataegana* occurs in the southernmost regions only (FinBIF 2019).

Syrphus sp. (most likely, *S. torvus* Osten-Sacken) (Diptera: Syrphidae) is shown in an unnumbered figure (p. 37) under the name *Megachile rotundata* (F.) (Hymenoptera: Apidae). Neither the syrphid fly nor its predaceous larva damage plant leaves, and the leaf damage shown next to the syrphid fly photograph in no way can be seen as a proof of the existence of a leafcutter bee, *M. rotundata*, in the Murmansk oblast. The northernmost record of this bee species in Finland is ca. 700 km South of Kirovsk (FinBIF 2019).

Tenthredo olivacea Klug (Hymenoptera: Tenthredinidae). The adult sawfly is shown in an unnumbered figure (p. 39) and in fig. 43з (p. 59) under the name *Psylla mali* (Schmidberger) (Hemiptera: Psyllidae). Note that *Cacopsylla mali* (a currently accepted combination) is much smaller than the photographed *T. olivacea* (body length 2.5–3 and 8–14 mm, respectively).

An unknown aphid species (Hemiptera: Aphididae) is shown in unnumbered figure (p. 38) under the name *Dysaphis sorbi* Kaltenbach. Although *D. sorbi* occurs in the Murmansk oblast (Stekolshchikov and Buga 2018), the photographed nymphs certainly belong to another species, and the damaged leaves (p. 38) resemble plant disease more than aphid damage.

Unknown aphid species (Hemiptera: Aphididae, Drepanosiphidae) are shown in unnumbered figure (p. 38) under the name "*Macrosiphum crataegi* Mordv." No species with this or a similar name was found either in the Murmansk oblast (Stekolshchikov and Buga 2018) or in the entirety of Europe (Nieto Nafria

2019). Rak et al. (2018) may perhaps have attributed their record to *Macrosiphum crataegi* Nevsky, which is known from Central Asia only, or to *Utamphorophora crataegi* (Monell) from North America. The picture on the left shows, most likely, a nymph of a birch-feeding *Euceraphis* sp. (Drepanosiphidae).

Unknown fly larvae (Diptera) are shown in an unnumbered figure (p. 37) under the name *Archips podana* (Scop.) (Lepidoptera: Tortricidae). These fly larvae are definitely not capable of damaging plant leaves in the manner shown in the right panel of this figure. *Archips podana* has never been recorded from either the Murmansk oblast or from the more southern Karelia (Sinev 2008); in Finland, this species occurs in the southernmost regions only (FinBIF 2019).

An unknown gracillariid mine (Lepidoptera: Gracillariidae) is shown in fig. 43ж (p. 38) under the name *Caliroa cerasi* (L.) (Hymenoptera: Tenthredinidae), although this sawfly is an externally feeding defoliator which never produces leaf mines.

An unknown leafroller pupa (Lepidoptera: Tortricidae) is shown in an unnumbered figure (p. 37) under the name *Archips crataegana* (Hbn.). Given the host plant also shown in the photo, this pupa presumably belongs to *Pandemis* sp.

An unknown moth larva (Lepidoptera) is shown in an unnumbered figure (p. 36) under the name *Yponomeuta evonymella* (L.) (Lepidoptera: Yponomeutidae). Although *Y. evonymella* occurs in the Murmansk oblast (Sinev 2008), the photographed (light green, with small dark dots) larva does not belong to this species, as *Y. evonymella* larvae are yellowish white, with characteristic brown stripes. The plant damage shown also could not have been inflicted by this species, because the *Y. evonymella* larvae build a silken tent over their collective feeding sites.

Unknown sawfly larvae (Hymenoptera: Tenthredinidae) are shown in fig. 7b, left panel (p. 40) under the name *Archips podana* (Scop.) (Lepidoptera: Tortricidae).

Discussion

The revision of insect identifications published by Rak et al. (2018) yielded an astonishing conclusion: 15 of the 19 insect species illustrated in the cited book were incorrectly identified. Among these, Rak et al. (2018) failed to attribute six insects even to the correct order. The most striking examples are a fly (Diptera) identified as a leafcutter bee (Hymenoptera), and a sawfly (Hymenoptera) identified as a psyllid (Hemiptera). Furthermore, Rak et al. (2018), on three occasions, identified two different species, sometimes from different orders, as the same insect species. It seems that the authors of the cited book did not check their identifications (based on outdated or low quality publications) against multiple pictures available on the web and/or against the known distribution ranges of the species in question, although this action would have immediately revealed many of these errors. I appreciate that Rak et al. (2018) reported for the first time one moth species, *Lyonetia clerkella*, from the Murmansk oblast; however, this discovery in no way compensates for the multiple errors in their book.

More generally, I question the reliability of the methods used by Rak et al. (2018) to associate different types of leaf damage with certain insect species. This task requires the rearing of insects from larvae found on study plants, or at least the collection of insects that have been observed feeding on plants. Many insects shown in the photographs in the cited book (e.g. the syrphid fly and adult sawfly) were just resting on Rosaceae plants or (e.g. leaf beetles and moth larvae) were travelling across the Rosaceae leaves to their preferred host plants or to pupation sites. Some insects – for example, the last instar larvae of the autumnal moth – may occasionally consume leaves of almost any plant species in the absence of their main host plant. In total, about half of the insects reported by Rak et al. (2018) as pests of woody Rosaceae either do not feed on these plants or damage them only occasionally.

Neither I nor my colleagues with whom I have discussed the errors outlined above can understand why our fellow botanists decided to identify insects themselves. Misidentification of pest species can easily result in incorrect pest management and incur unnecessary costs (Pannkuk 2010), while publication of incorrect data distorts our knowledge of the distribution and biology of insects (Kozlov 2018). Therefore, insect identification for scientific, educational or pest

management purposes should always be performed by professionals (Schoelitsz et al. 2019) or by volunteers and students who have specific training for this purpose (Edwards 2004).

Obtaining a correct identification of insects illustrated by Rak et al. (2018) would only have required sending these insects, or their photographs, to relevant experts, whose names and addresses can be easily found by a web search and/or on the web site of the Zoological Institute of the Russian Academy of Sciences in St. Petersburg. This simple action would have saved the reputations of the authors and of the Polar-Alpine Botanical Garden and Institute with which they are affiliated. The publication of the book by Rak et al. (2018), which has the sign of the Russian Foundation for Basic Research on its cover, implies that the Kola Science Centre of the Russian Academy of Sciences needs to improve its system of quality control when accepting manuscripts for publication.

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