



Distribution of *Xylomoia graminea* (Graeser, 1889) (Lepidoptera: Noctuidae) in Poland

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Abstract: A review of distribution and new data on the occurrence of the noctuid moth *Xylomoia graminea* (Graeser, 1889) in Poland are given. The new material includes observations collected from 2005 to 2010 in Małopolska, Podkarpacie and Podlasie regions. *Xylomoia graminea* (Graeser, 1889) is observed for the first time in Pogórze Dynowskie, Kotlina Jasielsko-Krośnieńska, Pogórze Wiśnickie and Garb Tenczyński in south-eastern and southern Poland.

Key words: Lepidoptera, Noctuidae, Noctuinae, *Xylomoia graminea*, Poland, expansion, faunistics

INTRODUCTION

Xylomoia graminea (Graeser, 1889) is a lepidopteran species of the family Noctuidae, Latreille, 1809, subfamily Noctuinae, Latreille, 1809 and genus *Xylomoia* Staudinger, 1892.

The genus *Xylomoia* Staudinger, 1892 is represented world-wide by 8 lepidopteran species, six of which have been reported from the Palaearctic (*Xylomoia fusei* Sugi, 1976, found in Japan; *Xylomoia apameoides* Hacker, 1989, found in Turkey; two species known from Europe and Asia: *Xylomoia retinax* Mikkola, 1998 and *Xylomoia graminea* (Graeser, 1889), and two species occurring only in Europe: *Xylomoia stangelmaieri* Mikkola, 1998 and *Xylomoia strix* Mikkola, 1980), and the other two have been found in the Nearctic (*Xylomoia indirecta* (Grote, 1875) and *Xylomoia chagnoni* Barnes et Benjamin, 1917) (Mikkola 1998, Lafontaine & Schmidt 2010, Karsholt & Nieuwerkerken 2011).

X. graminea is a species with a Euro-Siberian distribution whose current range includes a large part of the Palaearctic, extending from Japan, Korea, northern China and the Russian Far East to eastern regions of Poland (Fig. 1.) (Graeser 1889, Herz 1904, Sugi 1982, Sviridov 1985, Mikkola 1998). For almost 100 years, this species was only known from eastern Asia. It was first reported in Europe from the southern European part of Russia, near Rostov-on-Don, in 1981 (Poltavsky & Artohin 2000), and subsequently from Poland in 1988 (Nowacki 1989). It has also been recorded in Ukraine (Klyuchko 1995, Klyuchko et al., 2001) and Lithuania (Švitra et al., 2011). It has not been reported from any other country in Europe to date (Zilli et al. 2005, Karsholt & Nieuwerkerken 2011).

In Poland, the species had previously only been found in north-eastern and eastern regions. Its southernmost localities were two sites within one 10 x 10 km UTM square in Roztocze Południowe. The eastern regions of Poland were considered the western boundary of its global range (Fig. 1.) (Nowacki 1989, 1992, 1993, Kokot 1995, Łupiński 1996, Nowacki & Hołowiński 1999, Buszko & Nowacki 2000, Waśala 2001, Łupiński & Wasiluk 2002, Nowacki & Wasiluk 2004, European Biodiversity Survey 2008, Nowacki & Frąckiel 2010).

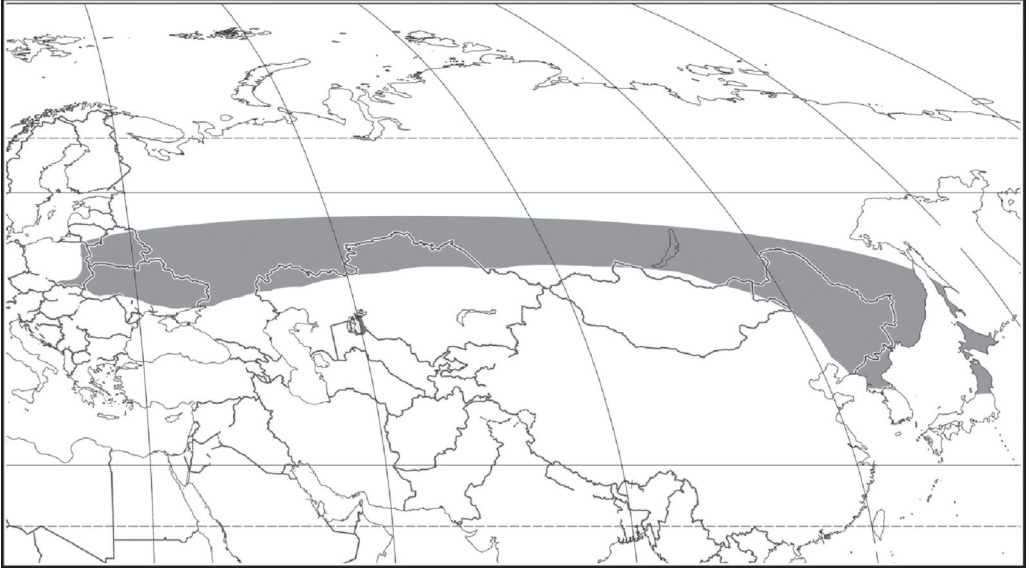


Fig. 1. Distribution range of *Xylomoia graminea* based on the literature and own observations. No data from Belarus, Kazakhstan and Mongolia.



Fig. 2. *Xylomoia graminea* – Poland, Pogórze Dynowskie, Tamawka, 09 VI 2010, Photo by J. Bury.

X. graminea are small moths of a stout body build that is typical of most representatives of the family Noctuidae. The wing span is 28–31 mm. The basic colouration of the fore wings is brown with a yellowish tinge. The central field is bordered by whitish, slightly dentate stripes. There is a narrow elongated black band in the inferior part of the central field. The hind wing is light in colour, grey-brown with a rather indistinct dark stripe (Fig. 2). The structure of the copulatory apparatus of the male and female is described in Nowacki (1989).

Just like its cognate species (Buszko 2004, 2010), *X. graminea* is associated with primeval moist habitats, predominantly lush sedge meadows, transitory bogs and rush communities. In the western part of the range, the moths occur from the end of May until early July, while in the east they can be observed even in mid-August (Nowacki & Hołowiński 1999, Mikkola 1980, 1998, Sviridov 1985).

The biology of the species is not well known. Caterpillar is described by Ahola & Silvonen (2008). There is no known host plants for the caterpillars and there is no description of overwintering stage in nature. In laboratory conditions, caterpillars have been reared on *Phragmites* sp. in an *ex ovo* rearing (Ahola & Silvonen 2008).

This paper aims to present the current knowledge on the distribution of *X. graminea* in Poland.

METHODS

All specimens were captured by being attracted to 250–500 W mercury vapour lamps. The moths were preserved in a manner typical for Macrolepidoptera. Evidence specimens are stored in the authors' private collections. Some specimens were followed without harvesting them and photographs were taken.

Mesoregion names are given according to (Kondracki 2002). UTM (Universal Transverse Mercator) co-ordinates (10x10 km grid) are also given for each locality.

Table 1.. Chronological review of the literature data on the occurrence of *Xylomoia graminea* in Poland

First reported	Name of locality	Mesoregion	UTM	Reference
1988	Siedliska	Roztocze Wschodnie	FA87	Nowacki 1989, Nowacki 1992
	Obroc	Roztocze Środkowe	FB40	Nowacki 1989, Nowacki 1992
1988–1990	Hrebenne	Roztocze Wschodnie	FA87	Nowacki 1992
	Kąty Drugie	Roztocze Środkowe	FB41	Nowacki 1992
1992	Rygoł	Równina Augustowska	FE57	Kokot 1995
1993	Kosyń	Równina Łęczyńsko-Włodawska	FB79	Nowacki 1993, Nowacki & Hołowiński 1999
1996	Losice	Wysoczyzna Siedlecka	FC18	Łupiński 1996
1993–1998	Podlaski, Macoszyn, Stulno	Równina Łęczyńsko-Włodawska	FC70, FB79, FB89	Nowacki & Hołowiński 1999
1996–2000	Serpelice	Podlaski Przełom Bugu	FC49	Łupiński & Wasiluk 2002
1996	Woźniki	Wysoczyzna Siedlecka	FC28	Nowacki & Wasiluk 2004
1999	Zaborze	Wysoczyzna Siedlecka	FC19	Nowacki & Wasiluk 2004
2000	Pogorzelce	Równina Bielska	FD94	Wąsala 2001
2002	Mielnik	Podlaski Przełom Bugu/ Wysoczyzna Drohiczyńska	FD30	Nowacki & Wasiluk 2004
2007	Dolina Rospudy	Równina Augustowska	FE27	European Biodiversity Survey 2008
1996–2008	Grzędy	Kotlina Biebrzańska	FE14	Nowacki & Frąckiel 2010
2008	Chelmowa Góra, Dąbrowa	Góry Świętokrzyskie	EB03, DB93	Nowacki & Nowacka 2012

RESULTS

Data from literature

New and previously unpublished data collected by observers between 2005 and 2011 are ordered chronologically in the Table 1.

Newly discovered sites

1. Równina Augustowska: Mołowiste [FE47], 25 VI 2005, 1 ex., leg. R. Słodzinka & Ł. Matuszewski, coll. R. Słodzinka, a small elevation at the edge of a mesic coniferous forest and farm buildings, along the bank of Lake Serwy.

2. Pogórze Dynowskie: Zabratówka [EA83], 31 V 2010, 1 ex., leg. J. Bury, a clearing in a moist mixed forest.

3. Garb Tenczyński: Brzoskwinia [DA04], 07 VI 2010, 1 ex., male, leg. W. Zajda, a specimen collected in a dry locality in the immediate vicinity of a motorway.

4. Pogórze Dynowskie: Tarnawka [EA93], 09 VI 2010, 1 ex., phot. J. Bury, (Fig. 3.), a forest meadow in a mixed forest, a wet area periodically waterlogged because of obstruction of water flow by beavers' dams; there are a few artificial reservoirs nearby.

5. Pogórze Dynowskie: Jawornik Polski [EA92], 10 VI 2010, 1 ex., leg. J. Bury, a moist forest meadow in the valley of a small creek.

6. Kotlina Jasielsko-Krośnieńska: Krosno [EA50], 10 VI 2010, 1 ex., leg. W. Guzik, a built-up area on the outskirts of a town.

7. Pogórze Wiśnickie: Sobolów [DA52], 11 VI 2010, 1 ex., female, leg. W. Zajda, a wet meadow in the valley of a rivulet.

Distribution in Poland

In 1988–2010 *X. graminea* was recorded in Poland from 17 different 10 x 10 km UTM squares [FA87, FB40, FB41, FE57, FB79, FC18, FC70, FC49, FC19, FC28, FD30, FE27, FE14, EB03, DB93] – literature data. Additionally, between 2005 and 2010, *X. graminea* was first reported from 7 UTM squares located in north-eastern, south-eastern and southern Poland: [DA04, DA52, EA50, EA83, EA92, EA93, FE47] – new data. Most of the new records described in the present paper come from southern and south-eastern Poland, where the species was first reported from Pogórze Dynowskie, Kotlina Jasielsko-Krośnieńska, Pogórze Wiśnickie and Garb Tenczyński in 2010.

Thus, *X. graminea* has been recorded in Poland at a total of 26 localities situated in 24 different UTM squares in the eastern and southern parts of the country. (Fig.3).

DISCUSSION

For almost 100 years, *X. graminea* was only known from a limited number of reports from Asia (Far East and East and Central Siberia). The first European records of this species were published in the 1980's and 1990's, indicating an on-going westward expansion.

In Poland, *X. graminea* was first recorded in 1988 at a few sites in Roztocze Środkowe and Roztocze Południowe (Nowacki 1989). Almost simultaneously, in 1992, it was encountered in Równina Augustowska in north-eastern Poland (Kokot 1995). By 2000, the species had been seen in a few other localities in the east of Poland: in Równina Łęczyńsko-Włodawska, Wysoczyzna Siedlecka, within Podlaski Przełom Bugu and in Równina Bielska (Nowacki 1993, Łupiński 1996, Nowacki & Hołowiński 1999, Waśala 2001, Łupiński & Wasiluk 2002) (Fig. 3). Until 2007, *X. graminea* was only known from localities in eastern Poland, which might be taken to indicate a halting or slowing-down of the expansion. The previously known westernmost sites in Roztocze Środkowe and Wysoczyzna Siedlecka marked the western limit of the global range of the species, in some extreme cases for nearly 20 years. The few newly

discovered sites in Równina Augustowska and Kotlina Biebrzańska (European Biodiversity Survey 2008, Nowacki & Frackiel 2010) testified only to a minor westward expansion of *X. graminea* in north-eastern Poland. At the same time, there was a rise in the number of colonies in areas known to be within its range, the species being relatively frequently encountered at some of these localities (Nowacki & Wasiluk 2004, European Biodiversity Survey 2008).

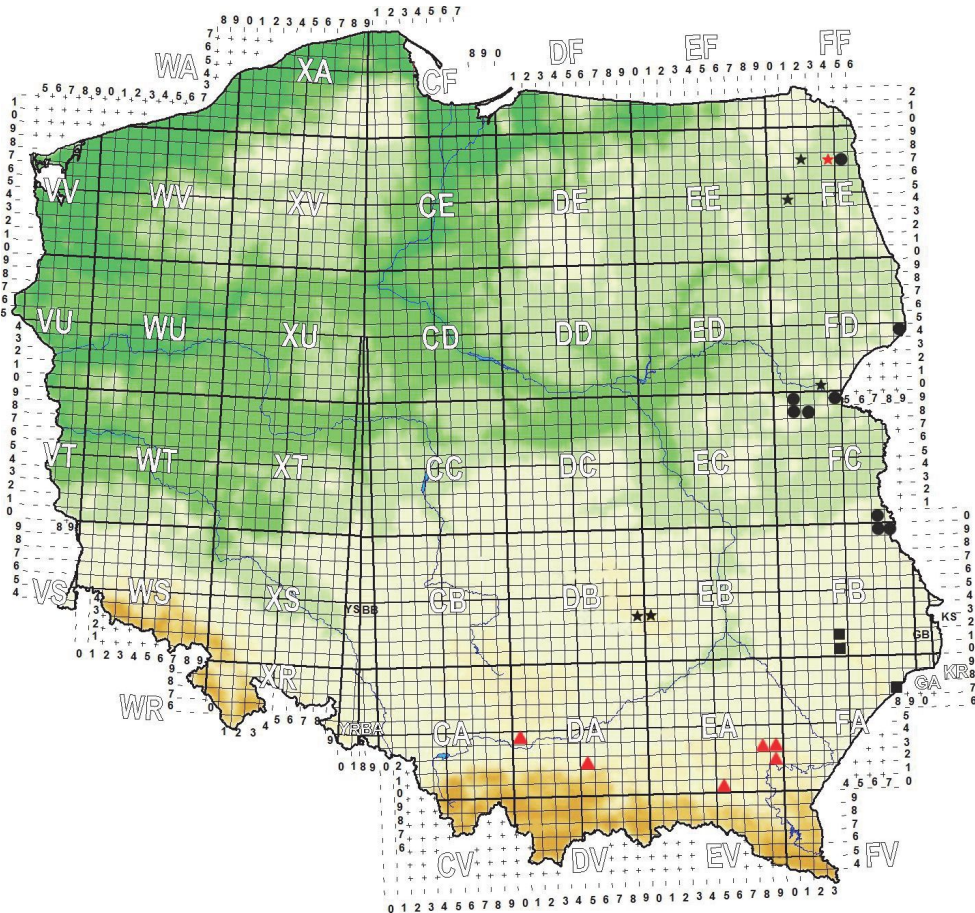


Fig. 3. Change of distribution of *Xylomoia graminea* in Poland. ■ – localities discovered between 1988 and 1991 (Nowacki 1989, 1992), ● – localities discovered between 1992 and 2000 (Kokot 1995, Nowacki 1993, Lupiński 1996, Nowacki & Hołowiński 1999, Waśala 2001, Lupiński & Wasiluk 2002, Nowacki & Wasiluk 2004), ★ – localities discovered between 2001 and 2009 (Nowacki & Wasiluk 2004, European Biodiversity Survey 2008, Nowacki & Frackiel 2010, Nowacki & Nowacka 2012 and a new locality discovered in 2005), ▲ – new localities discovered in 2010. Black symbols – data from literature, red symbols – new data.

The situation changed radically in 2008, when species was found for the first time in Góry Świętokrzyskie, to the west beyond the Wisła River Valley (Nowacki & Nowacka 2012). The next records were noted during observations in Małopolska and Podkarpacie in 2010, when *X. graminea* was found for the first time on Pogórze Dynowskie, Kotlina Jasielsko-Krośnińska, Pogórze Wiśnickie and Garb Tenczyński, at a considerable distance from previously known sites in the east of Poland.

The new data provided in this paper furnish definite proof of a continuing expansion of *X. graminea* westwards, although its causes and current pace are difficult to determine unequivocally. At this junction, it is legitimate to mark the western limit of the range of *X. graminea* approximately 250 km west of the current limit in the south-east. This is an important update on the distribution of *X. graminea* both in Poland and globally (Fig. 1 and 3).

The finding of *X. graminea* in south-eastern Poland indicates that it may be possible to find the species, in suitable habitat conditions, also outside its current range, and should encourage targeted searches for *X. graminea* also in other parts of Poland. Moreover, since most domestic localities of *X. graminea* are very close to the eastern state border, it is worthwhile to search for this moth in the neighbouring countries of Belarus, or even Latvia and Estonia, where it has not been reported to date. It would be advisable to conduct regular observations at the new localities of *X. graminea* in southern Poland to determine whether these sites are occupied permanently or the sightings were actually ephemeral. Detailed studies of the biology of the species, which is not sufficiently recognised, should also be initiated.

At the same time, it is worth pointing out that the occurrence of *X. graminea* is associated with the presence of suitable habitats, which are often found within protected areas, as is the case with all new localities in Pogórze Dynowskie, situated within the special habitat protection area "Nad Husowem", part of the Nature 2000 network. Protection is afforded there for well-preserved communities of fertile beech forest (Dentario glandulosae-Fagenion, Galio odorati-Fagenion), Central European and subcontinental linden-oak forest (Galio-Carpinetum, Tilio-Carpinetum) and non-forested areas with fragments of biologically valuable meadow ecosystems and a large complex of ponds (Olbrycht & Bury 2011). The occurrence of *X. graminea* in this area confirms the necessity of preserving such habitats in intact form.

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STRESZCZENIE

[Rozmieszczenie *Xylomoia graminea* (Graeser, 1889) (Lepidoptera: Noctuidae) w Polsce]

W pracy zebrano dostępne w literaturze oraz niepublikowane informacje dotyczące stwierdzeń *X. graminea* na terenie Polski. Do roku 2007 na podstawie obserwacji z 15 kwadratów UTM uważano, że *X. graminea* zasiedla wyspowo wschodnią część Polski, gdzie osiąga zachodnią granicę swego globalnego areалу występowania. W roku 2008 gatunek został stwierdzony po raz pierwszy na dwóch stanowiskach w Górach Świętokrzyskich, na zachód od doliny Wisły. W latach 2005–2010 dodatkowo stwierdzono 7 nowych stanowisk tego gatunku w Polsce. Większość nowych stanowisk zlokalizowanych jest w południowo-wschodniej i południowej części kraju, gdzie w 2010 roku gatunek ten został po raz pierwszy wykazany z Pogórza Dynowskiego, Kotliny Jasielsko-Krośnieńskiej, Pogórza Wiśnickiego oraz Garbu Tenczyńskiego. Stwierdzenie nowych stanowisk *X. graminea* w znacznej odległości od znanych dotychczas lokalizacji świadczy o zachodzącej obecnie ekspansji tego gatunku w kierunku południowym i zachodnim, i skłania do podjęcia dalszych badań, w celu monitorowania zmian rozmieszczenia tego motyla na terenie naszego kraju.