



## New records of the migratory locust *Locusta migratoria* (Linnaeus, 1758) (Orthoptera: Acrididae) in Poland

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**Abstract:** In this study, we present new data on the occurrence of the migratory locust, *Locusta migratoria*, in Poland from 2002 to 2023. Since the year 2000, the frequency of locust sightings has increased, with 21 records documented. Both the gregarious and solitary forms were observed, although no regular patterns of occurrence were noted, suggesting the formation of new populations in Poland. Most sightings were reported from the southern and eastern regions, likely due to their proximity to the regular range of this. The rise in observations appears to be influenced by climatic and habitat changes, as well as an increase in active field observers, partly due to the "Orthoptera Project of Poland" initiated in 2018.

**Key words:** climate, habitat, polymorphism, faunistics

### INTRODUCTION

The migratory locust, *Locusta migratoria* (Linnaeus, 1758), is a widely distributed member of the Orthoptera order. It inhabits regions ranging from the Canary Islands, through the Mediterranean, Central and Eastern Europe, Africa, Madagascar, much of Asia, to Papua New Guinea, Australia, and New Zealand (Sergeev 2017). Its populations fluctuate in response to rainfall and flooding, and it can form large swarms that migrate over great distances. Such swarms are significant agricultural pests in many parts of the world, with their destructive potential arising from their gregariousness, mobility, voracity, and the sheer size of the swarms (Lecoq 2023).

The migratory locust exhibits polymorphism, with both solitary and gregarious forms. The transition from the solitary phase to the gregarious phase occurs when the density of young individuals in a population exceeds the ecosystem's threshold capacity. Increased nymph density raises the frequency of physical contact among individuals, triggering a series of morphological and behavioural changes (Uvarov 1977).

In the past, records of migratory locust were reported from many European countries (Waloff 1940, Harz 1962, Brázdil et al. 2014). In Hungary, the gregarious form was still present in the marshy valley of the Cisa River until the early 20th century. However, after the area was drained, the species is now found only rarely in Hungary (Nagy et al. 2009). In Germany, the species was last recorded in a natural habitat in 1949 (Maas et al. 2012). New data from various European countries show that this species is currently reappearing more frequently, for example in Finland (Karjalainen 2008), Lithuania (Ūsaitis & Bumbulytė 2011), Estonia (Roasto 2015), Serbia (Ivković 2017) and Belarus (Sergeeva et al. 2017).

In Poland, swarms of the gregarious form of this species were recorded as early as the 11th century. After 1800, the migratory locust was reported in varying numbers across different parts of the country, mainly in the southern and southeastern regions (Waloff 1940, Bazyluk & Liana 2000). Recently, there have been more observations (Żurawlew et al. 2019), which here we supplement and summarise as well as discuss the most complete geographical distribution of observations of both forms of the migratory locust and the prospects for its occurrence in Poland.

#### OBSERVATIONS AND RESULTS

In Poland, the number of sites where the solitary form of the migratory locust was observed began to decrease significantly after 1940. The species persisted the longest in the Masovian Lowland and was last recorded in 1967 near Kozienice (Bazyluk & Liana 2000). Consequently, it was classified as probably extinct in Poland (Liana 2002). However, after many decades without observations, the species was reported again in 14 locations between 2001 and 2017 (Żurawlew et al. 2019). The results presented here (Table 1 & Figs 1–6), divided according to the faunal regions in Poland as per the "Catalogue of Polish Fauna" (Bazyluk & Liana 2000), increase the number of records of this species in Poland from 2001 to 2023 to 21 records, accounting for 45 individuals over 11 years.

Table 1. A set of new records of *Locusta migratoria* in Poland in 2002–2023 as a supplement to the occurrence given by Żurawlew et al. (2019).

Site	Date	No of ind.	Form	Circumstances	Observer
Mazovian Lowland - Warszawa, Wyględów [DC98]	21 Aug 2002	1	unknown	fallow lands with dominance of <i>Solidago Solidago</i> L.	A. Woźniak
Kraków-Wieluń Upland - Kraków, Stare Miasto [DA24], Świętego Krzyża Street	1 Aug 2008	1	gregarious	on the building wall	T. Jeziereczuk
Mazovian Lowland - Warszawa [EC07], Wiedeńska Street	27 Aug 2016	1	solitary	on the sand way	D. Sikora
Upper Silesia - Zabrze [CA47], Mikołaja Kopernika residential	2 Aug 2022	1	gregarious	on the grapevine <i>Vitis</i> L.	Ł. Cudziło
Eastern Beskid Mts - [EA50], Prezydent Ryszard Kaczorowski Street	16 Aug 2023	1	gregarious	on the outside of a third-floor window of the building	D. Stasiowski
Podlasie Lowland - Huszlew [FC27]	16 Aug 2023	1	gregarious	an individual arrived at the illuminated entomological screen during the night	D. Wasiluk
Podlasie Lowland - Szostakowo village [FD64]	3 Sep 2023	1	gregarious	in a plowed field after rapeseed <i>Brassica napus</i> L.	M. Polakowski

#### DISCUSSION

The migratory locust is found worldwide, primarily in temperate, tropical, and subtropical regions, with its native range in Africa, the Arabian Peninsula, and parts of Asia. It has expanded to other parts of Asia, Australia, and New Zealand due to its migratory and adaptive abilities (Tanaka & Zhu 2005, Malakhov et al. 2018, Sergeev 2021). Factors like climate, vegetation, and habitat availability influence its distribution and population dynamics. Rainfall and increased vegetation can spur rapid population growth and swarm formation (Jyoti et al. 2020). Climate change significantly impacts its global distribution, with GIS and MaxEnt modelling indicating potential future expansion into new regions, particularly Europe (Hosni et al. 2024).



Figs 1–6. *Locusta migratoria*: 1 – gregarious form, Kraków, Kraków-Wieluń Upland, 1 Aug 2008 (Photo by T. Jezierczuk); 2 – solitary form, Warszawa, Mazovian Lowland, 27 Aug 2016 (Photo by D. Sikora); 3 – gregarious form, Zabrze, Upper Silesia, 2 Aug 2022 (Photo by Ł. Cudziło); 4 – gregarious form, Krosno, Eastern Beskid Mts, 16 Aug 2023 (Photo by D. Stasiowski); 5 – gregarious form, Huszlew, Podlasie Lowland, 16 Aug 2023 (Photo by D. Wasiluk); 6 – gregarious form, Szostakowo, Podlasie Lowland, 3 Sep 2023 (Photo by M. Polakowski).

From 2001 to 2023, in 18 cases, the classification of these insects to a form was determined, of which 13 records pertained the gregarious form, and 5 of the solitary form. *L. migratoria* were documented in Poland primarily between 2011 and 2020. Most sightings were in August, followed by September, with a few in July and October (Fig. 7). Records were concentrated in the southern and eastern parts of Poland (Fig. 8) what can be explained as found nearer to the native regions.

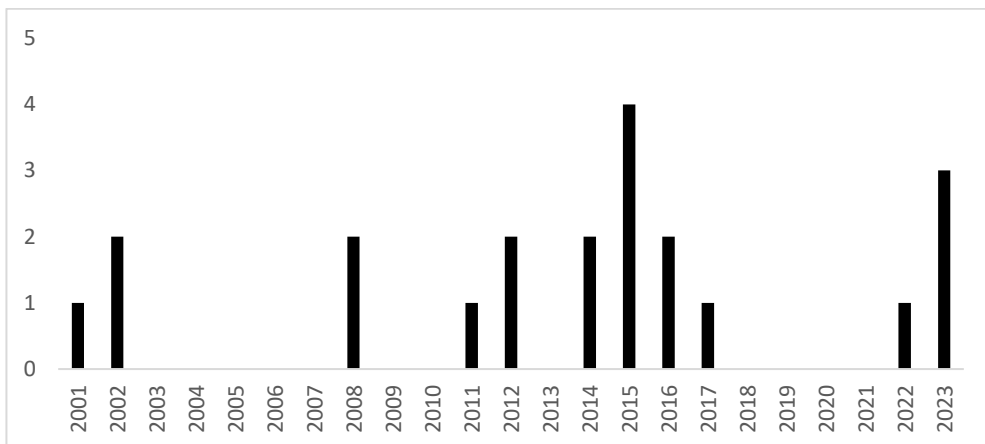


Fig. 7. Dynamics of the records of *Locusta migratoria* (N=21) in Poland in 2001–2023.

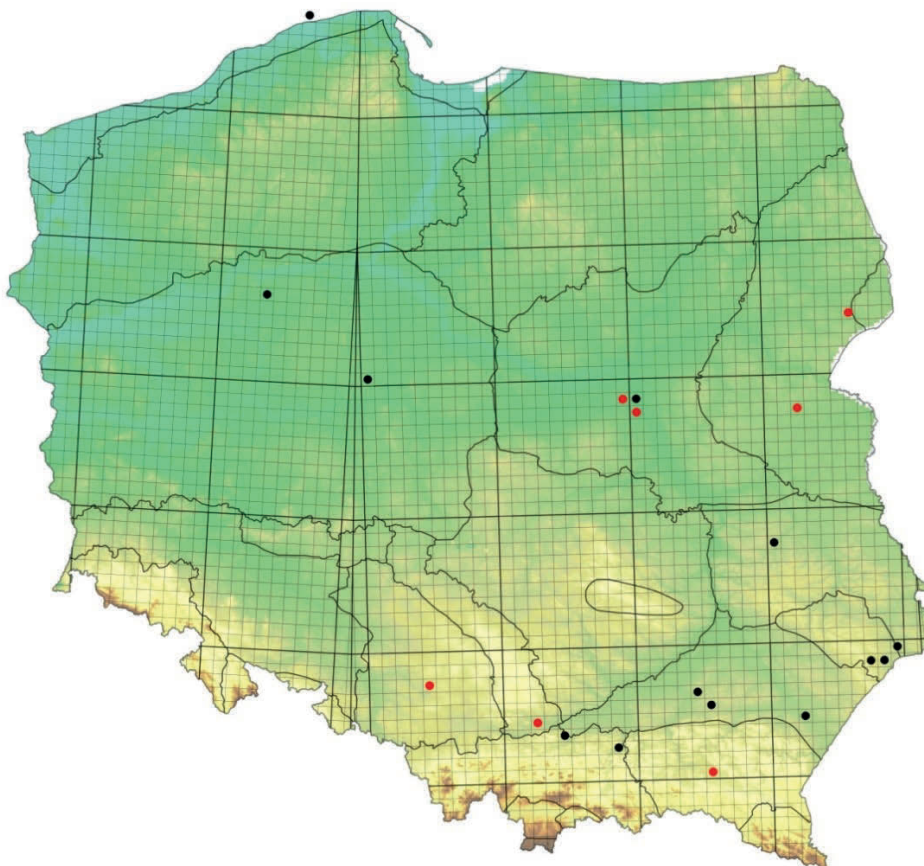


Fig. 8. Geographical distribution of records of *Locusta migratoria* in Poland in the UTM (Universal Transverse Mercator coordinate system) in 2001–2023. Grid: black circles – published records, red circles – new records.

There has been an increase in the number of occurrences of this locust in Poland, what may increase over years while the climatic and habitat change. In the latter case, there is currently greater availability of reed beds in direct proximity to sandy areas, where the species has suitable habitats for laying eggs (Żurawlew et al. 2019). Besides climatic changes, which obviously affect the spread of animals typical of warmer regions into cooler areas (e.g., Żurawlew et al. 2017), the increase in the number of records of this species is also likely influenced by the growing number of observers, related to the operation of the "Orthoptera Project of Poland" (Żurawlew et al. 2024). More observations in the following years can be expected from both reasons, the environmental changes as well as the larger activity of observers. Furthermore, due to the wide availability of knowledge and the possibility of consultations through online sources, even people unfamiliar with the subject can provide new materials that complement existing knowledge.

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#### STRESZCZENIE

#### [**Nowe stwierdzenia szarańczy wędrownej *Locusta migratoria* (Linnaeus, 1758) (Orthoptera: Acrididae) w Polsce**]

W doniesieniu przedstawiono nowe dane o szarańczy wędrownej *Locusta migratoria* w Polsce z lat 2002-2023. Podane informacje (7 niepublikowanych stwierdzeń), zwiększają liczbę obserwacji gatunku w Polsce w XXI. wieku do 21 stwierdzeń. Wykazano zarówno formę samotną, jak i gromadną. Najwięcej stwierdzeń miało miejsce w sierpniu (13). W latach 2001-2010 odnotowano ten gatunek 5 razy, w latach 2011-2020 – 12 razy, a w latach 2021-2023 – czterokrotnie. Dominowały stwierdzenia z południowej i wschodniej części Polski, prawdopodobnie z uwagi na bliskość regularnego zasięgu występowania. Wzrost liczby pojawów może być wynikiem zmian klimatycznych i siedliskowych, nie bez wpływu jest także coraz większa liczba obserwatorów, co związane jest z funkcjonowaniem od roku 2018 „Projekt Orthoptera Polski”.

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