УДК 595.78

New information on the Asian walnut moth *Garella musculana* (Erschov, 1874) (Insecta: Lepidoptera) spreading in the Rostov Region (South of European Russia)

DOI: 10.18522/2308-9709-2024-48-2

Romanchuk Roman Viktorovich

Department of Zoology, Academy of Biology and Biotechnology, Southern Federal University, Rostov-on-Don 344090, Russia, romanchuk@sfedu.ru

Abstract

In 2018, a serious walnut pest, *Garella musculana* (Erschov, 1874), was noted in the Rostov Region. After several years of no records, the pest's activity has increased noticeably. Since 2022, adult individuals began to fly actively and almost regularly in light traps; not only non-specific damage, but also damaged branches and fruits with pest caterpillars inside began to be registered at monitoring sites. In 2023, the activity of the Asian walnut moth in the Rostov Region decreased, probably due to local weather fluctuations. Meanwhile, in recent years, the pest has been observed in the Donbass and Krasnodar Krai. Now, one can observe the establishment of the Asian walnut moth in a new territory and the expansion of its range in the south of the European part of Russia.

Keywords: Noctuoidea, Nolidae, Garella musculana, agricultural pests, Juglans regia, Rostov Region.

Новые сведения о распространении челночницы ореховой *Garella musculana* (Erschov, 1874) (Insecta: Lepidoptera) в Ростовской области (Юг Европейской части России)

DOI: 10.18522/2308-9709-2024-48-2

Романчук Роман Викторович

Кафедра зоологии Академии биологии и биотехнологии им. Д.И. Ивановского, Южный федеральный университет, Ростов-на-Дону 344090, Россия, romanchuk@sfedu.ru

Аннотация

В 2018 году на территории Ростовской области был отмечен серьезный вредитель грецкого ореха – челночница ореховая *Garella musculana* (Erschov, 1874). После нескольких лет затишья активность вредителя заметно возросла. С 2022 года взрослые особи стали активно и почти регулярно лететь на светоловушки. На участках мониторинга стали отмечаться не только неспецифичные повреждения, но и поврежденные ветви и плоды с гусеницами вредителя внутри. В 2023 году активность челночницы ореховой в Ростовской области снизилась, вероятно, из-за локальных погодных флуктуаций. Между тем, в последние годы вредитель отмечается на Донбассе и в Краснодарском крае. В настоящий момент можно наблюдать закрепление ореховой челночницы на новой территории и расширение ее ареала на Юге Европейской части России.

Ключевые слова: Noctuoidea, Nolidae, Garella musculana, сельскохозяйственные вредители, Juglans regia, Ростовская область.

Introduction

The Asian walnut moth *Garella musculana* (Erschov, 1874) (Lepidoptera: Noctuoidea: Nolidae) is one of the most serious pests of fruit and young shoots of walnut (*Juglans regia* L.) (Yoğurtçu, 2018; Yıldız et al., 2018; Zanolli et al., 2022). It is found in India (Khan et al., 2011), Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan (EPPO, 2023a). Then Europe, this species is known from Bulgaria (Beaumont, 2018), Romania (Bostancı et al., 2021), Turkey (Yıldız et al., 2018), Italy, and Ukraine (Sviridov, 2008; EPPO, 2023a). In the South of

European Russia, it was first recorded in the Rostov Region (Romanchuk, Kolesnikov, 2021; EPPO, 2023b): in 2018, only one specimen was collected on a light trap. The host plant of the Asian walnut moth is widely represented in the Rostov Region. In the past, walnuts were grown in forestry nurseries; currently they are often planted in private farmsteads and gardens in the central and northern parts of the region.

The arrival and spreading of a new pest in the Rostov Region raise concerns, since many species of Lepidoptera invaders are already known in the region, which are of great economic importance not only at the regional level, but also on the scale of the European part of Russia (Romanchuk, 2020). Some of them are quarantine pests with limited distribution in Russia, posing a serious phytosanitary risk (Romanchuk et al., 2020). *G. musculana* itself is included in the A2 list of the European and Mediterranean Plant Protection Organization (EPPO) and is recommended for regulation as a quarantine pest (EPPO, 2023c). Contrary to expectations (Romanchuk, Kolesnikov, 2021), the danger of increasing the number of local populations of the Asian walnut moth for walnut plantings is increasing. Based on the above, the **aim of this study** is to summarize the data of five years of *Garella musculana* observations in the Rostov Region.

Materials and Methods

To record the Asian walnut moth, 12 monitoring sites were deployed, located on the Myasnikovsky and Neklinovsky municipal district (Fig. 1, Table 1): 1) «1300 km» Station within the Morskoy Chulek Village boundaries, residential sector (47°17'22.3" N, 39°10'50.2"E); 2) Pyatikhatki Village, residential sector (47°17'49.8"N, 39°13'0.9"E); 3) Morskoy Chulek Village, residential sector (47°17'29.4"N, 39°12'52.2"E); 4) Forbs and steppe balka within the Morskoy Chulek Village boundaries (47°17'22.1"N, 39°12'59.1"E); 5) Forest belt and cultivated fields between the Morskoy Chulek Village and the Sinyavskoye Village (47°16'57.5"N, 39°14'0.5"E); 6) Sinyavskoye Village, residential sector

(47°16'34.1", 39°18'50.0"E); 7) North-eastern outskirts of the Sinyavskoye Village, balka of the Donskoy Chulek River (47°16'49.9"N, 39°19'4.6"E); 8) Southern outskirts of the Sinyavskoye Village, terrace (47°16'28.2", 39°18'49.9"E); 9) «Nedvigovka» Educational and Experimental Farm of the Southern Federal University (47°16'18.9"N, 39°19'20.2"E); 10) «Chulekskaya Balka» Protected Landscape (47°17'42.5"N, 39°20'13.1"E); 11) Nedvigovka Village, residential sector (47°16'4.3"N, 39°20'55.9"E); 12) «Kamennaya Balka» Protected Natural Object (47°16'28.0"N, 39°22'23.3"E).

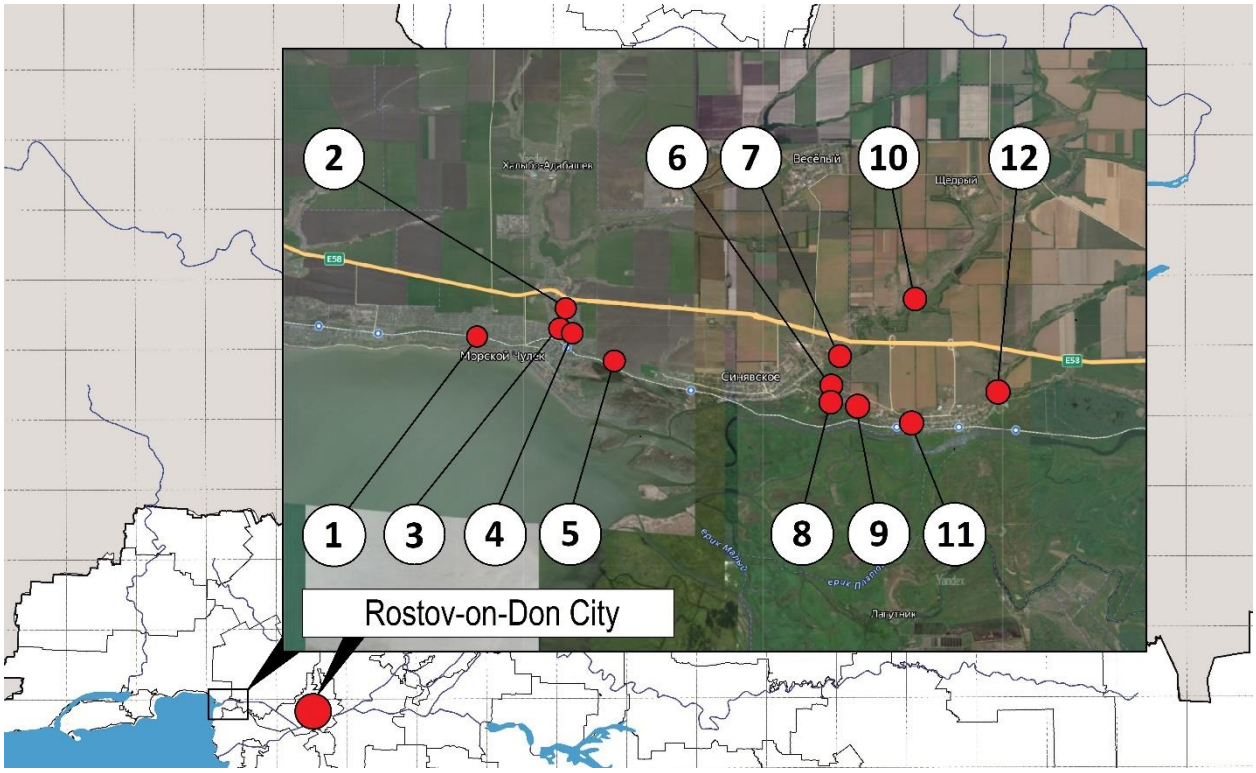

Fig. 1 – The territory of the suspected outbreak of G. musculana in the Rostov Region with indicated monitoring sites (see explanations in the text)

To collect adults, an automatic light trap equipped with a DRV 250 W HWL E40 «Osram» mercury-wolfram lamp was used. To increase the efficiency of accounting, the device was combined with a white reflective screen, from which adults were collected into specialized killing bottle. Collected adults were mounted to dry collection.

Results and Discussion

G. musculana was collected for the first time in the Rostov Region in 2018 (Fig. 2). However, until 2022, no new records: not a single specimen on light traps was collected. Meanwhile, isolated cases of nonspecific damage to walnut branches and fruits in the Nedvigovka Village and its environs were noted. But since not a single caterpillar was found it was not correct to attribute this damage to the Asian walnut moth (especially considering the similarity with the signs of the life activity of *Zeuzera pyrina* (Linnaeus, 1761)).

Romanchuk, R. V., New information on the Asian walnut moth Garella musculana (Erschov, 1874) (Insecta: Lepidoptera) spreading in the Rostov Region (South of European Russia) // «Живые и биокосные системы». – 2024. – № 48; URL: https://jbks.ru/archive/issue-48/article-2; DOI: 10.18522/2308-9709-2024-48-2

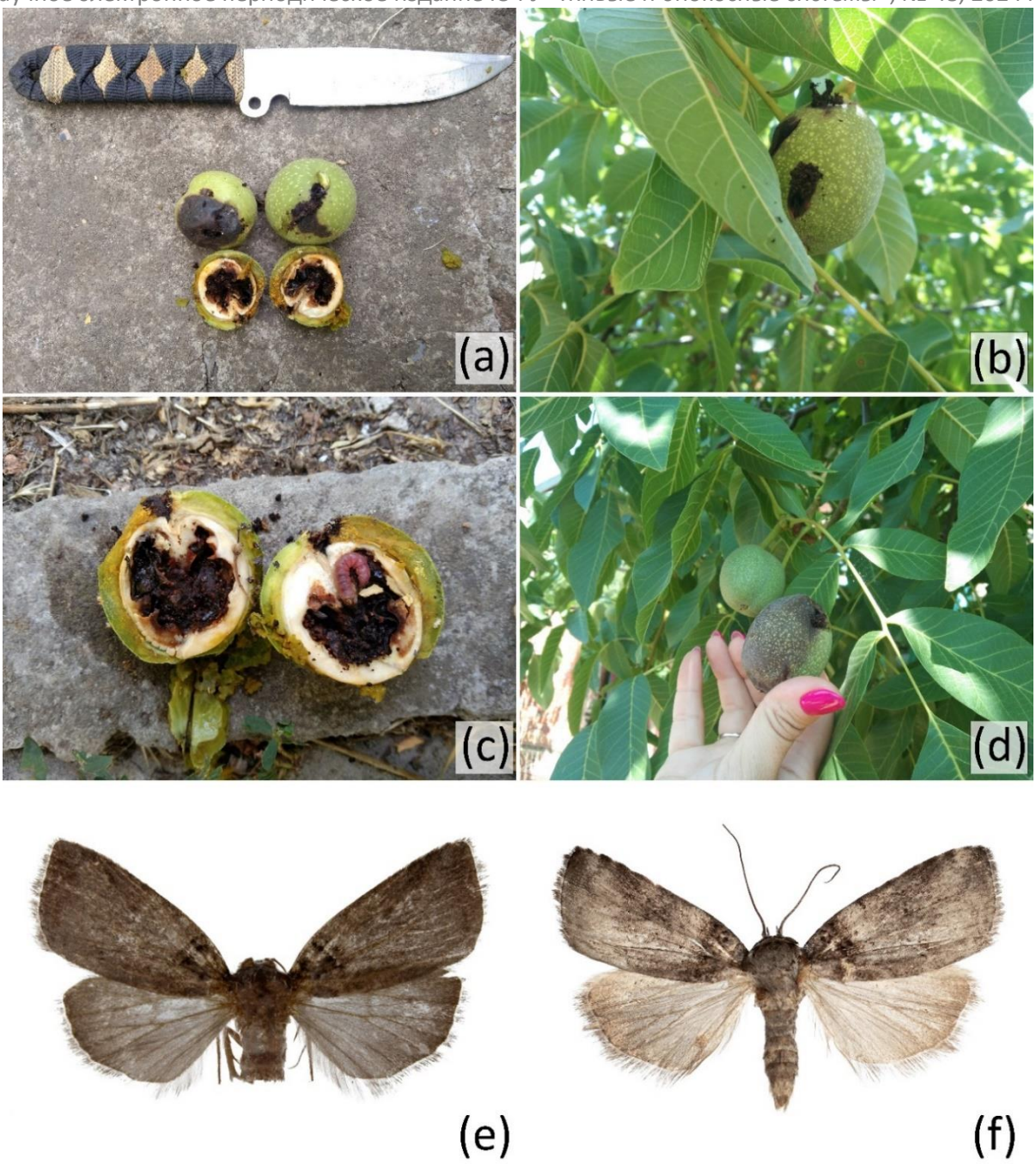

Fig. 2 – Recorded damage to Juglans regia at monitoring sites: Nedvigovka Village (a) (photo by R. Romanchuk); «1300 km» Station within the Morskoy Chulek Village boundaries (b) (photo by R. Romanchuk); «Nedvigovka» Educational and Experimental Farm of the Southern Federal University (c) (photo by R. Romanchuk); Southern outskirts of the Sinyavskoye Village (d) (photo by E. Bogaeva); general view of Garella musculana adult collected on 5 May 2018 (the first record) (e) and summer 2022 (f) (photo by N. Elfimova)

Romanchuk, R. V., New information on the Asian walnut moth Garella musculana (Erschov, 1874) (Insecta: Lepidoptera) spreading in the Rostov Region (South of European Russia) // «Живые и биокосные системы». – 2024. – № 48; URL: https://jbks.ru/archive/issue-48/article-2; DOI: 10.18522/2308-9709-2024-48-2

Table 1 – The results of G. musculana observations at monitoring sites

Date	Records of *G. musculana* at monitoring sites											
	1	2	3	4	5	6	7	8	9	10	11	12
5 May 2018	N	N	N	N	N	N	N	N	N	**	N	N
Aug 2019	N	N	N	N	N	N	N	N	N	N	***	N
Aug 2020	N	N	N	N	N	N	N	N	N	N	***	N
Jul 2021	N	N	N	N	N	N	N	N	***	N	***	N
3 June 2022	***	***	***	N	N	N	N	N	N	N	N	N
05–06 Jul 2022	N	N	N	N	N	***	N	***	* ** ***	N	N	N
05–06 Aug 2022	N	N	N	N	N	N	***	***	* ** ***	N	***	N
09 Jul 2022	N	***	N	N	N	N	N	N	N	N	N	N
30 Jul 2022	N	N	N	N	N	N	N	N	* ** ***	N	N	N
31 Jul 2022	N	N	***	N	N	N	N	N	* ** *** ****	N	N	N
1 Aug 2022	N	N	***	N	N	N	N	N	* ** *** ****	N	N	N
19 Aug 2022	N	N	N	N	N	N	N	N	* **	N	N	N
26 Aug 2022	N	N	N	N	N	N	N	N	* **	N	N	N
30–31 Aug 2022	N	N	N	N	N	N	***	***	* ** ***	N	*** ****	N
3 Sept 2022	N	N	N	N	N	***	N	N	* ** ***	N	***	N
1 June 2023	N	N	N	N	N	N	N	N	**	N	N	N
29 June 2023	N	N	N	N	N	N	N	N	** ***	N	N	N
03 Aug 2023	N	N	N	N	N	N	N	N	**	N	N	N
12 Aug 2023	N	N	N	N	N	N	N	N	**	N	N	N
18 Aug 2023	N	N	N	N	N	N	N	N	**	N	N	N

*Explanations to the table: N – Not detected; * – observation of adults; ** – observation and capture of adults; *** – recording the presence of nonspecific damage; **** – recording the presence of damage and caterpillars of the pest.*

Numerous records of *G. musculana* began in 2022 and continues to nowadays. The reason was the increased activity of the pest after several years of no new records is adult individuals began to fly actively and almost regularly to light traps. Not only nonspecific damage, but also damaged branches and fruits with pest caterpillars inside at monitoring sites began to be observed (Fig. 2).

Five years after the first reliable record, we can conclude that the Asian walnut moth has noticeably increased its numbers. When all types of direct and indirect signs of the pest's activity were recorded (including an outbreak in the number of adults) at individual monitoring sites (Table 1), the highest activity was noted in 2022 (Fig. 3).

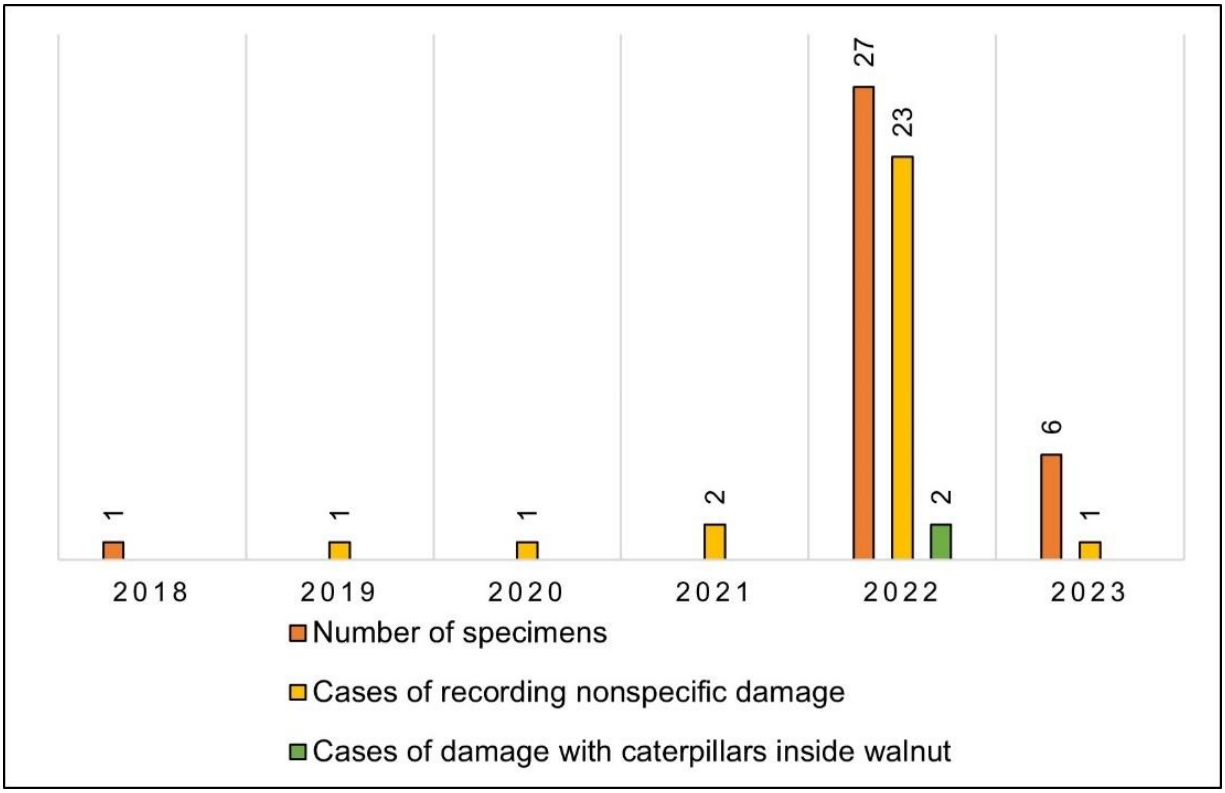

Fig. 3 – Cases of detection of direct and indirect signs of G. musculana life activity

The activity of the Asian walnut moth in the Rostov Region decreased in 2023. One of the reasons could be local fluctuations in weather conditions (cold rainy spring and the first half of summer). Meanwhile, recent years the pest has been found in the Donbass and Krasnodar Krai indicating an expansion of its range, according to reports from social networks and citizen science tools (iNaturalist, 2023).

Conclusion

The presence of *G. musculana* in the Rostov Region continues to be considered a problem because walnuts are quite widely represented in the region. The observed local population of the pest is in the vicinity of populated areas that have a lot of host plants for the caterpillars. According to previous assumption a single introduction of the pest either with nut seedlings or by nature dispersal from the nearest parts of the range was not excluded (Romanchuk, Kolesnikov, 2021). Now the establishment of the Asian walnut moth in a new territory and the expansion of its range in the south of the European part of Russia can observe. That suggests the pest may soon enter the Republic of Adygea. In addition, *G. musculana* will obviously expand its range in the Donbass.

Based on the available data, we can preliminarily conclude that *G. musculana* is increasing its importance for local walnut plantings in the Rostov Region. However, given the fluctuations in pest numbers, further monitoring is required.

Acknowledgements

The author expresses his gratitude to his colleagues E. A. Bogaeva, N. S. Elfimova, O. A. Kladkovaya, E. A. Khachikov, D. P. Kupryushkin, who helped during the research.

References

1. Beaumont, H. (2018). The occurrence of *Garella musculana* (Erschov, 1874) (Lep.: Nolidae) in eastern Bulgaria. *Entomologist's Records and Journal of Variation* 130 (6), 315–316.

2. Bostancı, C., Yıldırım, İ., Aydoğan, O., Yıldız, Y., Karoly Kiss, I., & Albas E. (2021). First report of walnut (*Juglans regia*) pest *Garella musculana* in Romania. *OEPP/EPPO Bulletin* 51, 293–295. https://doi.org/10.1111/epp.12753
3. EPPO. (2023a). EPPO Global Database (available online). https://gd.eppo.int. EPPO. *Garella musculana* (ERSHMU). Distribution. https://gd.eppo.int/taxon/ERSHMU/distribution [accessed on 31 August 2023].
4. EPPO. (2023b). EPPO Global Database (available online). https://gd.eppo.int. EPPO. *Garella musculana* (ERSHMU). Distribution details in Russia (Southern Russia). https://gd.eppo.int/taxon/ERSHMU/distribution/RU_sr [accessed on 31 August 2023].
5. EPPO. (2023c). EPPO A2 List of pests recommended for regulation as quarantine pests. Version 2020-09. URL: https://www.eppo.int/ACTIVITIES/plant_quarantine/A2_list [accessed on 31 August 2023].
6. iNaturalist. (2023). iNaturalist (available online). https://www.inaturalist.org. Asian walnut moth (*Garella musculana*). https://www.inaturalist.org/taxa/875916-Garella-musculana [accessed on 10 October 2023].
7. Khan, Z. H., Ramamurthy, V. V., Dar, M. A., & Raina, R. H. (2011). The Asian walnut moth *Erschoviella musculana* Erschoff, 1874 (Nolidae: Lepidoptera): a new pest of walnut for Kashmir Valley of J&K, India. *Indian Horticulture Journal* 1, 55–56.
8. Romanchuk, R. V. (2020). [Invasive species of Lepidoptera (Insecta: Lepidoptera) in the South of Russia]. *Proceedings of the IInd International Scientific Conference «Dangerous phenomena-II»*. Rostov-on-Don (Russia). 6–10 July 2020.

https://elibrary.ru/download/elibrary_43912149_73815133.pdf [accessed on 10 October 2023] (in Russian).

9. Romanchuk, R. V., Zhmyrko, A. M., & Shishkanova, L. V. (2020). [Pheromonitoring as a modern and effective method of phytoprotection]. *Proceedings of the IInd All-Russian Conference (with international participation) of young scientists of the Agro-industrial Complex «Actual issues of development of branches of agriculture: theory and practice»*. Rostov-on-Don, Taganrog (Russia). 12–15 May 2020. https://elibrary.ru/download/elibrary_43050760_89846932.pdf [accessed on 10 October 2023] (in Russian).
10. Romanchuk, R. V., & Kolesnikov, S. I. (2021). [Report on the detection of *Garella musculana* (Erschov, 1874) (Lepidoptera: Nolidae) – a new pest species for the Rostov Region from the Chulekskaya Balka Specially Protected Natural Area]. *Scientific Notes of V. I. Vernadsky Crimean Federal University. Biology. Chemistry* 7(2), 145–157 (in Russian).
11. Sviridov, A. V. (2008). [Species of Noctuidae, new to the fauna of Europe and Ukraine – Nut nycteolin (*Erschoviella musculana* Erschov) (Lepidoptera: Noctuidae)]. *Bulletin of the Moscow Society of Nature Testers. Biology Department* 113, 60 (in Russian).
12. Yoğurtçu, A., & Kaçar, G. (2018). Morphological characters of the Walnut moth *Garella musculana* (Erschov, 1874) (Lepidoptera: Nolidae), distribution areas and damage rate in Bartın province. *Turk. Entomol. Bult* 8(4), 101. http://dx.doi.org/10.16969/entoteb.564898
13. Yıldız, Y., Yıldırım, İ., Bostancı, C., & Aydoğan, O. (2018). *Erschoviella musculana* Erschoff, 1874, a new record and a new walnut pest in Turkey. *Journal of Bartin Faculty of Forestry* 20(2), 296.
14. Zanolli, P., Scaccini, D., & Pozzebon, A. (2023). New insights into the distribution and spreading of the Asian walnut moth, *Garella musculana*

(Erschov, 1874) (Lepidoptera, Nolidae) in Europe with a focus on the Italian range. *Biodiversity Data Journal* 11, e107609. https://doi.org/10.3897/BDJ.11.e107609

Статья поступила в редакцию 16 июня 2024 г.

Поступила после доработки 27 июня 2024 г.

Принята к печати 2 июля 2024 г.

Received 16, June, 2024

Revised 27, June, 2024

Accepted 2, July, 2024