ISRAEL JOURNAL OF ENTOMOLOGY, Vol. 51, pp. 43–46 (30 April 2021)

On the recent Northern European dispersion of *Zelus renardii* Kolenati (Hemiptera: Heteroptera: Reduviidae) via human activity

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ABSTRACT

Recently, single specimens of the Nearctic bug species *Zelus renardii* Kolenati, 1856 were found in Denmark, Germany and the United Kingdom. Very likely, these specimens were introduced via human activity, especially the transport of fruits from the Mediterranean Region.

KEYWORDS: Reduviidae, assassin bugs, distribution, international commerce, invasive, Europe.

ZUSAMMENFASSUNG

Kürzlich wurden einzelne Exemplare der nearktischen Wanzenart *Zelus renardii* Kolenati, 1856 in Dänemark, Deutschland und dem Vereinigten Königreich gefunden. Sehr wahrscheinlich wurden diese Exemplare durch menschliche Aktivität eingeführt, insbesondere den Transport von Obst aus dem Mittelmeerraum.

SCHLÜSSELWÖRTER: Reduviidae, Raubwanzen, invasiv, internationaler Handel, Verbreitung, Europa.

INTRODUCTION

Zelus Fabricius, 1803 (Reduviidae: Harpactorinae) is one of the largest assassin bug genera with over 70 species confined to the New World (Zhang *et al.* 2016). The invasive Nearctic *Zelus renardii* Kolenati, 1856 (Fig. 1) is the only species of the genus that has been introduced to Europe (Zhang *et al*. 2016; van der Heyden & Grosso-Silva 2020).

In Europe, *Z. renardii* was first detected in Greece (Davranoglou 2011; Petrakis & Moulet 2011). Since then, the species was reported from Albania, France, additional locations in mainland Greece and Crete, Italy (including Sardinia and Sicily), Portugal, Spain and Turkey (Baena & Torres 2012; Vivas 2012; Dioli 2013; van der Heyden 2015, 2017; Çerçi & Koçak 2016; Zhang *et al.* 2016; Simov *et al.* 2017; Pinzari *et al.* 2018; Rodríguez Lozano *et al.* 2018; Garrouste 2019; Goula *et al.* 2019; Bella 2020; Pérez-Gómez *et al.* 2020; Rattu & Dioli 2020; van der Heyden & Grosso-Silva 2020). Furthermore, *Z. renardii* was found in northern Israel (van der Heyden 2018).

Very recently, a single specimen of *Z. renardii* was found in the city of Teningen, located in Baden-Württemberg in the south-western part of Germany (van der Heyden 2021).

DOI: 10.5281/zenodo.4730423; ISSN (online) 2224-6304
Received: 3 March 2021 / Revised: 25 April 2021 / Accepted: 27 April 2021
urn:lsid:zoobank.org:pub:D742ADB6-8E7C-4D78-ADC5-9178F1061319

Fig. 1: Specimen of *Zelus renardii*, Pitsidia, Crete, Greece, 28.vii.2015. (Photo: T. van der Heyden)

MATERIALS AND METHODS

The material was examined from photographs uploaded to the online database iNaturalist.org:

(1) 1 ex., found in a house, Teningen, Germany, 23.x.2020. (https://www.inaturalist.org/observations/63327091).
(2) 1 ex., found in a house, Jerup, Denmark, 31.x.2020. (https://www.inaturalist.org/observations/63871842).
(3) 1 ex., found in a house, Low Lorton, England/United Kingdom, 27.xi.2020. (https://www.inaturalist.org/observations/65713488).

RESULTS AND DISCUSSION

The findings of single specimens of *Z. renardii* in Denmark, Germany and England mentioned in this paper are the first ones for the respective countries. They have to be considered isolated records, found more or less far away from other European records of the species: Jerup is located in northern Denmark, Teningen in southwest Germany (van der Heyden 2021), Low Lorton in the north-western part of England, near the Scottish border. All three specimens were found indoors. Very likely, two of them were introduced via the transport of grapes from Italy and Greece, respectively, as they were found on grapes imported from these countries

and bought in supermarkets (van der Heyden 2021; P. Williams, pers. comm.). The specimen found in Low Lorton had accidentally been placed with the grapes in a refrigerator for several days before it was discovered alive on the stalk (P. Williams, pers. comm.)

As long as only single specimens of *Z. renardii* are introduced to regions located in the northern part of Western Europe or in Northern Europe via human activity, it is unlikely that the species will be able to establish itself in these regions. On the other hand, the climate conditions, for example in Denmark, Germany and the United Kingdom, might be suitable for the species to spread from the Mediterranean Region, its main European distribution area, northwards. The optimal temperature for the larval development is about 25–30 °C (Pinzari *et al*. 2018), but it might be possible that nymphs reach the adult stage at lower temperatures (Rattu & Dioli 2020). Further research on the distribution of *Z. renardii* in European regions north of the Mediterranean Region might lead to more knowledge on the issue.

ACKNOWLEDGEMENTS

I like to thank the photographers of the above-mentioned photographs for making their findings available to the public. Many thanks to Cornelia Bauser (Teningen, Germany) and Patricia Williams (Low Lorton, United Kingdom) for additional information about their findings. Special thanks are due to Leonidas-Romanos Davranoglou (University of Oxford, United Kingdom) for his comments on an earlier draft of the manuscript.

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