

First Record in Southeastern Anatolia of *Zelus (Diplodacus) renardii* (Kolenati, 1856) (Hemiptera: Reduviidae) and his New Prey *Allantus (s.str.) viennensis* (Schrank, 1781) (Hymenoptera: Tenthredinidae: Allantinae)

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ABSTRACT: The present study was carried out in Diyarbakır (Kayapınar district) province in Southeastern Anatolia Region of Turkey in 2020. Reduviidae adults and larvae Tenthredinidae family was collected on *Rose* spp in Diyarbakır province of Turkey in November and brought to the laboratory for rearing. The larvae were reared at the temperature of 26±1°C, relative humidity of 65±5, and illumination of 3500 lux for 16 hours per day. As a result of this study, *Allantus (s.str.) viennensis* belonging to Tenthredinidae family and *Zelus (Diplodacus) renardii* belonging to Reduviidae family were obtained. It was determined for the first time that *Z. renardii*, a polyphagous predator, fed on *A. viennensis*. In addition, *Z. renardii* is the first record for Diyarbakır insect fauna.

KEYWORDS: *Zelus (Diplodacus) renardii*, new host record, *Allantus (s.str.) viennensis*, Turkey.

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INTRODUCTION

Heteroptera (Hemiptera), or true bugs, is the most diverse group of paurometabolous insects with incomplete metamorphosis. There are about 40,000 described species worldwide and many more await description (Schuh & Slater, 1995).

The recent Catalogue of the Heteroptera of the Palaearctic Region lists approximately 3000 species for Europe (Aukema & Rieger, 1995-2006). Heteroptera have sucking mouthparts and feed depending on the species-as parasites, predators, or herbivores on different food sources, from blood or

haemolymph to plant sap or the cytoplasm of fungi. Heteroptera -unique among insects- colonize almost the entire planet, including the surface of the ocean and Antarctica (Schuh & Slater, 1995).

Heteroptera includes 9365 species belonging to 1632 genera in Palaearctic Region (Aukema et al., 2013).

The endemic and largest genus *Zelus* Fabricius, 1803 of the New World belongs to the tribe Harpactorini (Reduviidae: Harpactorinae) and is widely distributed from Nearctic and Neotropic Regions.

The genus *Zelus* is represented by 71 species on the New World (Maldonado Capriles, 1990; Zhang et al., 2016). Between these species, *Zelus renardii* (Kolenati) and *Z. tetracanthus* Stål have an high potential for dispersal, expansion and adaptation in various areas of the World with climate similar to that of the areas of origin (Weirauch et al., 2012).

Zelus renardii, in particular, is considered an "alien species" in Europe and Asia where arrived after the beginning of the present Century.

This assassin bug is native in North and Central America and introduced into Hawaii, Midway Atoll, Philippines, Samoa (Weirauch et al., 2012) and Chile (Faúndez, 2015). It has recently arrived, probably by passive transport, also in Europe and the Middle East, in particular, in Albania, Crete, European Turkey, France, Greece, Italy, Sardinia, Portugal, Spain, Asian Turkey and Israel (Davranoglou, 2011; Petrakis & Moulet, 2011; Vivas, 2012; Dioli, 2013; Aukema et al., 2013; Çerçi & Koçak, 2016; van der Heyden, 2015, 2017, 2018; Pinzari et al., 2018; Garrouste, 2019; Dursun & Fent, 2020; Kiyak, 2020; van der Heyden & Grosso-Silva, 2020; Rattu & Dioli, 2020).

The causes of the dispersal of *Zelus renardii* to non-native areas (Hawaii, Chile, Asia and Europe) from the New World are unknown; it is also not clear whether the Greek, Italian and Spanish populations followed independent invasions or were based on a single introduction

into Europe (Weirauch et al., 2012). According to these authors. it is more likely that the populations established in the tropical areas of the Pacific may have originated from Central America, while the Chilean and European populations could derive from merchant transport and consequent adaptations to the Mediterranean and Middle Eastern climate, very similar to that of California (Weirauch et al., 2012; Pinzari et al., 2018).

Distribution in Turkey: *Z. renardii* was previously found in İstanbul and İzmir (Çerçi & Koçak, 2016), Ankara province (Kiyak, 2020) and Black Sea Region (Dursun & Fent, 2020). The present finding is new for Diyarbakır (Kayapınar district).

MATERIAL AND METHODS

Zoophag predator insect: *Zelus (Diplodacus) renardii* (Kolenati, 1856)

Material examined: 1♀, 2♂♂; 20.11.2020, Locality: Diyarbakır (Kayapınar district) (37°57.13'N, 40°10.36'E, at altitude of about 744 m), (Figures. 1-4).

The present study was carried out in Diyarbakır (Sur district) province in Southeastern Anatolia Region of Turkey in 2020. Reduviidae adults and larvae Tenthredinidae family were collected on *Rosa* spp in Diyarbakır province of Turkey in November 2020 and brought to the laboratory for rearing.

The larvae were reared at the temperature of 26±1°C, relative humidity of 65±5, and illumination of 3500 lux for 16 hours per day.

Zelus renardii identification was made by the second Author using the dichotomous keys of the genus *Zelus* (Zhang et al., 2016) and the direct comparison with the specimens of the entomological Collections of Milan Museum of Natural History (Italy). *Allantus viennensis* identification was made by Dr. Önder Çalmaşur (Atatürk University, Faculty of Agriculture, Department of Plant Protection, Erzurum,

Turkey).

Phytophag Host insect: *Allantus (Allantus) viennensis* (Schrank, 1781) (Hymenoptera: Tenthredinidae: Allantinae), (Fig. 5).

Material examined: Larvae number multiple samples 20.11.2020, Locality: Diyarbakır (Kayapınar district) (37°57.13'N, 40°10.36'E, at altitude of about 744 m).

Host plant: *Rosa* spp.

General Distribution: Native species in Europe: Austria, Belgium Croatia, Czech Republic, French mainland, Germany, Hungary, Italian mainland, Luxembourg, Romania, Sicily, Slovakia, Switzerland, The Netherlands (Fauna europaea, 2020), Records also in the Nearctic region (Fauna europaea, 2020), and Asia: Turkey (Çalmaşur & Özbek, 2003).

Distribution in Turkey: Erzincan: Avcılar, Erzurum: Dutçu, İspir, Çayırözü, Gümüşhane: Vauk Geçidi, Kars: Sarıkamış, Karakurt (Çalmaşur & Özbek, 2003). *Allantus (Allantus) viennensis* is the first record for Diyarbakır insect fauna. In addition, it was observed that the larval stage of this species feeds intensively on the leaves, buds and stems of the rose plant.

RESULTS

As a result of this study, *Allantus viennensis* belonging to Tenthredinidae family and *Zelus renardii* belonging to Reduviidae family were obtained. It was observed, for the first time, that *Zelus renardii*, a general hunter, fed on *A. viennensis*.

In addition, this prey is the first record for Diyarbakır insect fauna.

This fact, related to a generalist predator like *Z. renardii*, presupposes that it can also attack larvae of other species of Tenthredinidae like a wide range of insects, such Lepidoptera eggs and larvae (Noctuidae) including *Helicoverpa* spp., and Coleoptera (Coccinellidae and larvae; Curculionidae adults as *Anthonomus grandis* Boheman) (Dress & Jackman,

1999) and Homoptera as *Aphis gossypii* Glover (Hemiptera: Aphididae) (Kessing & Mau, 1991).

Attacks are recorded also on *Glycaspis brimblecombei* Moore (Hemiptera: Psyllidae) (Garrison, 2001).

Also feeds on Geocoridae (Heteroptera) (Drees & Jackman, 1999), *Chrysoperla carnea* Stephen (Neuroptera: Chrysopidae) (Hodge, 1999) and *Aphytis* spp. (Hymenoptera: Aphelinidae) (Heimpel et al., 1997).

DISCUSSION

By analogy with the cases mentioned above, the intense predatory action of *Z. renardii* on *Allantus viennensis*, cannot be emphasized without calculating the risks associated with the fact that *Z. renardii* is a randomly introduced alien insect.

In fact, people could think to use this species of assassin bug to combat this or other pests harmful to cultivated or forest plants.

Instead *Z. renardii* is a generalist predator which can also damage other predatory insects and auxiliary spiders such as "chrysopes" or "ladybirds" ("intra-guild predation"), as well illustrated by various researches (Cisneros & Rosenheim, 1997; Weirauch et al., 2012; Pinzari et al., 2018).

Furthermore, it is always advisable to be wary of alien species, accidentally introduced with the goods, because they can exert a strong competition with local assassin bugs. In this sense, the presence of sticky bristles on the anterior tibia, absent in European and Asian species, is eloquent. It could favor *Z. renardii* in the competition for food, thus interfering with the edaphic population dynamics of other assassin bugs (Pinzari et al., 2018).

Therefore, it is also important to control this alien predator population so that it does not constitute a dangerous disturbance of the ecosystem and human health, due to its painful stings.



Figure 1. *Zelus renardii* feeding on *Allantus viennensis* larvae



Figure 2. Female of *Zelus renardii* feeding on male specimen.



Figure 3. View of female specimens from dorsal and ventral parts



Figure 4. View of male specimens from dorsal and ventral parts



Figure 5. Damage of the larval stage of *Allantus viennensis* on the leaves

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