

Olive Pests Members of the Lygaeoidea Schilling, 1829 (Hemiptera: Heteroptera)

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ABSTRACT: In this study, information about the harmful Lygaeoidea Schilling, 1829 (Hemiptera) superfamily species and their effects on olive plants in olive (*Olea europaea*, Linnaeus, 1758) which contains various vitamins and minerals with high economic value, which are cultivated efficiently in the Marmara, Aegean and Mediterranean regions rich in antioxidant and anti-inflammatory nutrients that remain green in all seasons, specific to the Mediterranean climate, whose homeland is Anatolia, was compiled by making use of related studies. As a result of the researches, 20 species (*Aphanus rolandri* (Linnaeus, 1758), *Geocoris lineola* (Rambur, 1839), *Graptostethus servus* (Fabricius, 1787), *Geocoris megacephalus* (Rossi, 1790), *Heterogaster urticae* (Fabricius, 1775), *Horvathiolus superbus* (Pollich, 1781), *Lamprodema maura* (Fabricius, 1803), *Lygaeus creticus* (Lucas, 1854), *Microplax albofasciata* (A. Costa, 1847), *Nysius cymoides* (Spinola, 1837), *Oxycarenus pallens* (Herrich-Schaeffer, 1850), *Peritrechus meridionalis* Puton, 1877, *Plinthisus longicollis* Fieber, 1861, *Proderus belloveyei* Puton, 1874, *Raglius alboacuminatus* (Goeze, 1778), *Paromius gracilis* (Rambur, 1839), *Remaudiereana annulipes* (Baerensprung, 1859), *Xanthochilus quadratus* (Fabricius, 1798), *Scolopostethus pictus* (Schilling, 1829), *Spilostethus pandurus* (Scopoli, 1763) from the Lygaeoidea superfamily are observed as olive pests in Türkiye.

KEY WORDS: Heteroptera, *Olea europaea*, Lygaeoidea, pest, Türkiye .

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INTRODUCTION

Olive, whose homeland is Anatolia, is a very important food source for the world and Türkiye (Canözer, 1991). Ecologically, olives, which find a habitat in certain regions of the world, are cultivated between 300-450 latitudes of the Southern and Northern hemispheres. Olive production is carried out economically in 38 countries in the world and there are about 900 million olive trees on approximately 10 million hectares (FAO, 2017).

According to FAO's 2016 data, 82.4% of the world's olive production is produced in Mediterranean countries, with Spain and Italy being the main producers (FAOSTAT, 2018). Türkiye is among the world's leading olive and olive oil producers along with other Mediterranean countries such as Spain, Italy, Tunisia and Greece due to its geographical location and Mediterranean climate characteristics (Karabulut, 2013).

Although Türkiye ranks fifth in the world in terms of olive production with a share of 8% in terms of area, it ranks fourth in terms of production with a share of 8.2% (FAOSTAT, 2018). Olive production areas in Türkiye are concentrated especially in coastal regions.

The Aegean Region ranks first with a 53% share. The Aegean region is followed by the Marmara Region with 19% and the Mediterranean Region with 16.7% (TUIK, 2017).

As there are many pest species that cause product losses in all fruits, there are many pest species that cause significant quality and quantity losses in olives. Attractive nutrient traps (McPhail) were among the first biotechnical control methods applied against olive pests, and in the following years, sexually attractive pheromone traps and visual sticky yellow traps were also introduced. Recently, it has been observed that studies on combined traps (combination of attractive food odor, pheromone, color and insecticide), some repellent substances

(repellent, deterrent) and natural substances that can be used in direct control have increased and successful results have been obtained. While the search for alternative methods continues, it has been noted that combined traps and mass trapping methods have come to the fore (Kılınç, 2019).

The Heteropteran species present the largest and most varied group of hemimetabolous bugs, containing about 50,000 species in over 5800 genera worldwide, with over 1500 species belonging to 470 genera in Türkiye (Henry, 2009; Önder et al., 2006; Çerçi and Koçak, 2016; Dursun and Fent, 2017). Species of this suborder have the sucking mouthparts, evolved into a long, thin beak that feeds on liquids from plants and animals (Weber, 1930; Dolling, 1991; Schuh and Slater, 1995). The species of Heteroptera in the olive groves are monophagous, oligophagous, phytophagous and polyphagous.

Data revealed a the presence of a total of 1268 specimens of Heteroptera collected from the olive groves, belonged to 99 species, 12 families and 70 genera. The majority of these specimens belonged to Miridae, Anthocoridae, Lygaeidae and Pentatomidae (Kaçar & Dursun, 2015, 2022).

In the studies conducted, Lygaeidae, Pentatomidae, Coreidae, Reduviidae were the most common families in the Heteroptera order as olive pests.

MATERIAL AND METHOD

In this study, species which are pests on olive in Türkiye were investigated.

It was compiled from the studies (Güçlü et al., 1995, Abacıgil et al., 2010, Kaçar & Dursun, 2015, 2022; Yazıcı, 2022, Genç & Saran, 2023), which were carried out on Olive, which is one of the important crops especially for the Mediterranean region, and how they cause damage to the plant.

RESULTS

Türkiye has an important potential land aspects of olive production in the world. It has many olive pests changing in number not only year by year but also region by region. Turkish olive fauna is also very rich in its natural enemy complex.

Lygaeoidea is a superfamily belonging to the Hemiptera order having mostly phytophagous pests. There are 20 species of olive pests in the Lygaeoidea superfamily:

- Aphanus rolandri* (Linnaeus, 1758),
- Geocoris lineola* (Rambur, 1839),
- Graptostethus servus* (Fabricius, 1787),
- Geocoris megacephalus* (Rossi, 1790),
- Heterogaster urticae* (Fabricius, 1775),
- Horvathiolus superbus* (Pollich, 1781),
- Lamprodema maura* (Fabricius, 1803),
- Lygaeus creticus* (Lucas, 1854),
- Microplax albofasciata* (A. Costa, 1847),
- Nysius cymoides* (Spinola, 1837),
- Oxycarenus pallens* (Herrich-Schaeffer, 1850),
- Peritrechus meridionalis* Puton, 1877,
- Plinthisus longicollis* Fieber, 1861,
- Proderus belloveyei* Puton, 1874,
- Raglius alboacuminatus* (Goeze, 1778),
- Paromius gracilis* (Rambur, 1839),
- Remaudiereana annulipes* (Baerensprung, 1859),
- Xanthochilus quadratus* (Fabricius, 1798),
- Scolopostethus pictus* (Schilling, 1829),
- Spilostethus pandurus* (Scopoli, 1763)

Nysius cymoides (Spinola, 1837) is one of the most harmful species. *Nysius cymoides* (Spinola, 1837) (Hemiptera: Lygaeidae) is known and widely distributed around the world (Hori, 2000; Sweet, 2000; Scaccini & Furlan, 2019). The common name is called the false chinch bug and was described previously as *A. cymoides* (Bocchi et al., 2016; Haouas et al., 2019).

In Türkiye, it has been determined that on canola in Hatay (Demirel, 2009), olive orchards in Edremit (Abacigil et al., 2010), and cultivated fruit trees in Mardin and Siirt (Matocq & Özgen, 2010), pistachio (Bolu, 2012), vineyard (Özgen, 2012) and on tomato, cucumber, watermelon, eggplant, pepper, corn, purslane, alfalfa and weeds as well (Özgen et al., 2020).

Nysius cymoides is thermophilic insect (Péricart, 1999; Aukema, 2013; Scaccini & Furlan, 2019). It is an epidemic species in Türkiye and commonly distributed in Europe, Central Asia and North Africa, the Middle East, and Arabian deserts (Péricart, 1999; Aukema, 2013; Scaccini & Furlan, 2019; Haouas et al., 2019). It is reported to prefer cruciferous plants as legumes and many other plant families (Haouas et al., 2019; Yazıcı, 2022).

It is stated as univoltine or multivoltine at lower latitudes (Bocchi et al., 2016).

The outbreaks occur in hot summer by increasing their population causing damages to seeds, vegetables and fruits. Several epidemic populations were reported for the false chinch bug on quinoa and canola (Bocchi et al., 2016). Like all sucking mouth insects, the damages of *N. cymoides* are caused by vascular tissues (phloem and xylem) and new growth parts of the plants by nymphs and adults (Özgen et al., 2020). The damaged plant turns to yellowish-brown in color and develops wilthing and necrosis. However, recent distributions and new host plants of this pest were determined, and the enhanced cultivated host plant list, the biology of the false chinch bug, the different biological stages, generation times, managements, biological control agents and molecular studies were not well studied.

According to Lodos 1986, most of the species are phytophagous, feeding mainly on plant seeds and are usually found on the soil surface, under rocks or on low plants. It spends winters in plant residues. Adults and nymphs of the pest feed on leaves. Spots appear on the affected areas of the leaves, which are

first light-colored, then darken.

As a result, in the light of the studies conducted for Türkiye, the most common pests of the Lygaeoidea superfamily are *Nysius cymoides* (Spinola, 1837), *Lamprodema maura* (Fabricius, 1803) and *Plinthisus longicollis* Fieber, 1861.

A total of 20 genera and 20 species were found in olives.

Priority should be given to producer training in order to preserve the existing natural balance in the increasing olive areas and to prevent possible unnecessary spraying. In addition to adhesive and food traps, drugs with active ingredients fenthion, deltamethrin and dimethoate are now used in the fight against pests.

REFERENCES

- Abacıgil, T.Ö., Varlı, V.S. & Tezcan, S., 2010, Edremit (Balıkesir) Körfezi çevresindeki zeytin bahçelerinde kışlak tuzaklarla saptanan Heteroptera türleri, *Türk. Entomol. Derg.*, 34 (1): 105-115.
- Aukema, B., Rieger, Ch. & Rabitsch, W., 2013, *Catalogue of the Heteroptera of the Palaearctic Region 6: Supplement*. The Netherlands Entomological Society, Amsterdam, 653 pp
- Bocchi, S., Cinquanta, D., Negri, M., Dioli, P. & Limonta, L., 2016, *Nysius cymoides* (Spinola) on *Chenopodium quinoa* Willd. cultivated in Italy, *Journal of Entomological and Acarological Research*, 48: 332-334.
- Canözler, Ö., 1991, *Standart zeytin çeşitleri kataloğu*, T.C. Tarım ve Köyişleri Bakanlığı Yayınları, Yayın Dairesi Başkanlığı, Yayın No: 32, Seri:16.
- Çerçi, B. & Koçak, O., 2016, Contribution to the knowledge of Heteroptera (Hemiptera) fauna of Türkiye, *Journal of Insect Biodiversity*, 4 (15): 1-18. doi: 10.12976/jib/2016.4.15.
- Demirel, N., 2009, Determination of Heteroptera species on canola plants in Hatay province of Türkiye, *African Journal of Agricultural Research*, 4: 1226-1233.
- Dolling, W.R., 1991, *Hemiptera*, Oxford Natural History Museum Publications, Oxford University Press, Oxford, UK: Wiley-Blackwell 274 pp.
- Dursun, A. & Fent, M., 2017, Type Localities of Heteroptera (Insecta: Hemiptera) from Türkiye. *Zootaxa*, 4227 (4): 451-494. doi:10.11646/zootaxa.4227.4.1
- Food and Agriculture Organization of the United Nations (FAO) 2017, Olive Statistics. <http://faostat3.fao.org/download/Q/QC/E>. (Accessed : 26.11.2017).
- Food and Agriculture Organization of the United Nations (FAO) 2018, <http://www.fao.org/faostat/en/#search/olive%20production> (Accessed: 12.05.2018)
- Haouas, D., Gnidez, H.G., Hafsi, C., Nhaili, H. & Matocq, A., 2019, *Nysius cymoides* (Heteroptera, Lygaeidae), an emerging insect pest in Tunisia. *Bulletin OEPP/EPPO Bulletin*, 49 (2): 355-358.
- Henry, T.J., 2009, *Biodiversity of the Heteroptera*. In: Foottit RG, Adler PH (editors). *Insect biodiversity: Science and Society*. Oxford: Wiley-Blackwell pp. 223-263.
- Hori, K., 2000, Possible causes of disease symptoms resulting from the feeding of phytophagous Heteroptera, pp. 11-35.
- Kaçar, G. & Dursun, A. 2015, Survey and abundance of suborder Heteroptera: pest and beneficial species in olive groves of Turkey. *The Egyptian Journal of Biological Pest Control* 25 (2): 499-502.
- Kaçar, G. & Dursun, A., 2022, Comparative diversity of Heteroptera (Hemiptera) in fruit orchards. *Turkish Journal of Zoology*, 46(3): 289-297.
- Karabulut, C., 2013, 2013 Yılı zeytin ve zeytinyağı raporu. Aydın Ticaret Borsası, Aydın, 17 p.
- Kılınç, G., 2019, Farklı pestisitlerin ve karışımlarının önemli zeytin zararlılarına olan etkilerinin belirlenmesi Doktora Tezi Bursa Uludağ Üniversitesi (Türkiye).
- Lodos, N., 1986, *Türkiye Entomolojisi (Genel, Uygulamalı ve Faunistik)*, Cilt II. (Gözden Geçirilmiş II. Basım), Bornova-İzmir: Ege Üniversitesi Ziraat Fakültesi Basımevi, 398-515.
- Matocq, A. & Özgen, İ., 2010, A preliminary list of Heteroptera collected in Mardin and Siirt provinces from South-Eastern Anatolia of Türkiye (Hemiptera). *Munis Entomology & Zoology*, 5: 1011-1019.
- Önder, F., Karsavuran, Y., Tezcan, S., & Fent,

- M., 2006, *Heteroptera (Insecta) catalogue of Türkiye*. Meta Basım, Bornova, İzmir: Ege Üniversitesi Ziraat Fakültesi, Türkiye 164 pp.
- Özgen, İ., 2012, The species of suborder Heteroptera (Hemiptera) on vineyards agroecosystems which found in Diyarbakır, Elazığ and Mardin provinces, Türkiye. *Mun. Ent. Zool.*, 7: 255-258.
- Özgen, İ., Kaymak, K., B., Miroğlu, S., Koç, İ. & Dioli, P., 2020. A New Potential Pest of East and Southeastern Anatolia in Türkiye: *Nysius cymoides* (Spinola, 1837) (Heteroptera, Lygaeidae). *Munis Entomology & Zoology*, 15 (1): 265-268.
- Pericart, J., 1999, *Hemipteres Lygaeidae Euro-Mediterraneens, Generalites systematique:1. Premiere partie.- Faune de France 84 A*, Paris, France.
- Scaccini, D. & Furlan, L., 2019, Outbreak of *Nysius cymoides* on second crop soybean Glycine max and proposal for Integrated Pest Management. *Bulletin of Insectology*, 72 (1): 29-34.
- Schuh, R.T. & Slater, J.A., 1995, *True bugs of the world (Hemiptera: Heteroptera): classification and natural history*. Cornell, USA: Cornell University Press. Science 336 pp.
- Sweet, M.H., 2000, *Seed and chinch bugs (Lygaeoidea)*. In: Schaefer CW, Panizzi AR (eds) *Heteroptera of economic importance*. CRC Press, Boca Raton, 143-264
- TÜİK 2017, <https://biruni.tuik.gov.tr/bitkiselapp/bitkisel.zul> (Erişim Tarihi: 27.10.2017).
- Weber, H., 1930, *Biologie der Hemipteren. Biologische Studienbücher, XI.*, Berlin, Germany: Julius Springer (in German).
- Yazıcı, G., 2022, Türkiye'de Kültür Bitkilerinde İstilacı Tür *Nysius cymoides* (Spinola, 1837) (Hemiptera: Heteroptera: Lygaeidae)'ın Yeni Konukçuları ve Yayılma Alanları. *KSÜ Tarım ve Doğa Dergisi*, 25 (2): 267-273.