Rafidain Journal of Science

https://rsci.uomosul.edu.iq

Vol. 34, No. 4, pp. 59-67, 2025 (December)

Estimating the Infestation and Population Density of Piercing-Sucking Insects Associated with Apple Trees from Different Orchards in Erbil Province of Kurdistan Region-Iraq

Nawzad B .Kadir

Department of Plant Protection/ College of Agricultural Engineering Sciences/ University of Salahaddin- Erbil/ Iraq

p-ISSN: 1608-9391
e -ISSN: 2664-2786

Article information

Received: 11/5/2025
Revised: 3/7/2025
Accepted: 13/7/2025

DOI: 10.33899/rjs.2025.190522

corresponding author:
Nawzad B. Kadir
nawzad.kadir@su.edu.krd

ABSTRACT

This study was conducted in 2024 to estimate the population density of piercing-sucking insects associated with apple trees from five different orchard locations (Almawan, Garota, Balisan, Hiran and Nazanin) within Erbil province, Iraq. Four species of piercing-sucking insects from four families of the order Hemiptera were collected. The population density of piercing-sucking insects varied significantly depending on the species, location and environmental factors. In total, across all studied locations, the woolly apple (Eriosoma lanigerum) was found to be the highest (45%) followed by the shield bug (Apodiphus amygdali) (25%), and pear lace bug (Stephanitis pyri) (25%), while the seed bug (Spilostethus pandurus) was the lowest 21%. Depending on the orchard location, in Garota village the insect infestations were higher (42.5%) followed by Almawan (36.25%), Hiran (35%), Balisan (16.25%) and Nazanin (15%), respectively. The most infested part of trees by woolly apple aphid was the branch followed by the leaf and trunk respectively. Also, the highest infestation by woolly apple aphid was at 2 meters.

Keywords: Insect pests, apple trees, population density, hemiptera.

INTRODUCTION

Apple trees (*Malus domestica*), a member of Rosaceae family, are among the most widely cultivated and recognizable fruit-bearing trees in the world, providing significant economic value and nutritional benefits (Qian *et al*., 2010). Apple trees thrive in temperate climates, where they require a period of winter chill to set fruit properly (Qian *et al*., 2010; Kruczek *et al*., 2017; Mbovora *et al*., 2021). They prefer well-draining soil with good fertility and full sunlight for optimal growth and fruit production (Kopytko *et al*., 2017; Licina *et al*., 2021).

However, their productivity and quality are often threatened by various arthropod pests (Kamusiime *et al*., 2023), particularly piercing-sucking insects, which feed on plant sap and cause direct and indirect damage, thus, yield loss (Khan *et al*., 2020). Among the most important piercing-sucking pests' worldwide, green apple aphid (*Aphis pomi.*), rosy apple aphid (*Dysaphis plantaginea*), San Jose scale (*Quadraspidiotus perniciosus*), Blossom thrips (*Frankliniella occidentalis*), and the woolly apple aphids (*Eriosoma lanigerum*), which found where apples are grown (Khan *et al*., 2020), dark brown or small black spots are formed due to the eating of both adult and nymph stages of the piercing-sucking mouthpart insects on the upper side of the plant leaves. On the other hand, the insects induce shiny black spots on the lower side of the leaves due to their excretions (Vergnani and Caruso, 2008). The true bugs fauna which belongs to the order Hemiptera, varies in areas with fruits growing, and most of remains to be scientifically studied especially in terms of their biology and their relationships with other species (Schaefer and Panizzi, 2000).

Understanding the population dynamics of these insect pests across different apple orchards is essential for effective pest management and sustainable apple production. Various factors, such as orchard location, environmental conditions, and management practices, influence pest populations, necessitating region-specific studies to develop targeted control strategies (Kinkorova and Kocourek, 2000).

In the world, research has been done on the physiological aspects (Özyurt *et al*., 2014) and species diversity of some types of hemipteran insects that infest fruit trees (Hradil *et al*., 2013). In Kurdistan region, a few researchers have been worked on the sucking insects on fruits trees especially on apple trees (Muhammed and Al-Iraqi, 2010; Al-Iraqi and Muhammed, 2010). Therefore, this study aims to estimate the population density of piercing- sucking insects in apple orchards with different environmental and agronomic conditions. By analyzing population fluctuations and identifying key factors affecting pest abundance, the findings will provide valuable insights for developing integrated pest management (IPM) strategies to mitigate pest damage and ensure the long-term sustainability of apple cultivation.

MATERIALS AND METHODES

Insect collecting

A survey was conducted during the year 2024, to investigate the piercing and sucking insects on fruit tree fields (orchards) around Shaqlawa District belonging to Erbil Governorate (Table 1).

In this study, 20 apple trees were randomly selected from each orchard; insects were collected from all four directions of the trees, as well as from different parts (trunk, leaf and branch). All collected insects were transferred to the laboratory of plant protection-agricultural engineering sciences college, then the sampled insects were grouped according to insect order and families, after then, they (insects) were sent to the museum for identification to the genera and species level by comparing the collected samples with those preserved in the museum.

In each orchard, the infestation percentage was worked out based on the following formula:

$$\text{Infestation percentage } \% = \frac{\text{Number of infested samples}}{\text{Total number of samples}} \times 100$$

The data of insects recorded in different orchards, tree directions, and tree parts were transferred to an excel sheet prior to analyzing statistically, and comparing with each other.

Table 1: Survey sites for sucking insects in the studied orchards.

Location/Site	Distance from Erbil	N line (Longitude)	E Line (Latitude)	Meter above sea level (MASL)
Almawan	15 km north	36.2419˚ N	44.1310˚ E	726
Garota	40 km north	36.1844˚ N	44.2780˚ E	974
Hiran	45 km north	36.1644˚ N	44.2917 ˚ E,	1036
Nazanin	55 km. north	36.2410˚ N	44.5323˚ E	783
Balisan	60 km. north	36.2358˚ N	44.3250˚ E	1014

RESULTS AND DISCUSSION

Survey of piercing and sucking insect pests on orchard trees in Erbil province

(Table 2) shows the common name, scientific name, family and order of collected insect pests from different Apple orchards with Erbil province during year 2023.

According to the provided (Table 2), there were four insect pests belonging to four different insect families within the order Hemiptera, found in apple tree orchards at five locations: Almawan, Garota, Hiran, Nazanin, and Balisan. The insects surveyed were woolly apple aphid (*Eriosoma lanigerum* Hausmann) within the family Aphididae, lace bug (*Stephanitis pyri*) within the family Tingidae, seed bug (*Spilostethus pandurus* Scopoli, 1763) within the family Lygaeidae, and Shield bug (*Apodiphus amygdali* Germar, 1817) within the family Pentatomidae.

Further, the (Table 3) shows the infestation percentages of four different piercing and sucking insect pests on apple trees on five locations in Erbil Province during growth season (2023). According to the (Table 3), the highest infestation percentage on apple trees occupied by wooly apple aphid which was 45, while the lowest percentage of insect infestation on apple trees occupied by seed bug which was 21%, however, the apple tree infestation by both pear lace bug and shield bug was located in middle by recording 25% for each of them over five studied locations mentioned above.

Turning to effect of location on the infestation ratio; looking at wooly apple aphid infestation, the highest infestation ratio was recorded in Almawan village orchards which 85% of surveyed trees were infested followed by Garota village orchards which was 60% infestaion and the lowest infestation ratio by wooly apple aphid was recorded in apple orchards located at Nazanin which was 20% aphid infestation followed by both Balisan and Hiran where the aphid infestation on surveyed apple trees was 30% for each one. Moreover, pear lace bug infestation, the highest infestation ratio was recorded in Garota village orchards where 55% of surveyed trees were infested followed by Hiran village orchards which had a 40% infestation and the lowest infestation ratio by Pear lace bug was 10% in orchards located at Nazanin, Balisan and Almawan.

As for seed bugs, the highest infestation percentage was recorded in Hiran village orchards, where 50% of surveyed trees were infested by this insect pest and the lowest infestation ratio by seed bug was recorded in apple orchards located at Almawan which was 10% infestation on the surveyed trees, while each of Balisan and Nazanin and Garota location orchards were in the middle position occupying 15% infestation of surveyed apple trees by seed bugs.

The last surveyed insect pest on apple orchards in the current investigation is the shield bug. The lowest infestation percentage was recorded in Balisan village orchards which 10% of surveyed trees were infested by this insect pest followed by Nazanin orchards which had 15% shield bug infestation. The highest infestation ratio by shield bug was recorded in apple orchards located at Almawan and Garota which had 40% infestation on the surveyed trees for each of the mentioned sites, however, Hiran location orchards were in the middle position by occupying 20% infestation of surveyed apple trees by shield bug. This means that the infestation of apple trees by shield bug in Almawan and Garota is double of the same insect pest infestation in Hiran.

According to Šťastná and Psota (2013) in south Moravia, eleven insect orders were reported to be exist on apple trees among them the Hemiptera was 17.4%, they also stated that predatory true bugs of the Hemiptera prevailed in apple tree tops, namely nymphs and imagos of the Anthocoridae (*Anthocoris* spp., *Orius* spp.), nymphs of the predatory bug *Himacerus apterus* of the Nabidae and

zoophytophagous bug *Pentatoma rufipes* of the Pentatomidae, and the most interesting species was *Stephanitis pyri.* On the other hand, according to tree type and variety, Kacar and Dursun (2022) discovered that the species diversity and quantity of hemiptera insect species varied. They also noted there are 12 families with a total of 48 species. At the two locations, species of three fruit varieties were identified: 16 Miridae, 14 Pentatomidae, 5 Lygaeidae, 3 Ropalidae, 2 Coreidae, 2 Pyrrhocoridae, and 1 Anthocoridae, Cydnidae, Nabidae, Rhyparochromidae, Scutelleridae, and Stenocephalidae. In addition, they stated that *Apodiphus amygdali* was one of the most frequently abundant individuals on the apple trees which belong to the family Pentatomidae. Montazersaheb *et al*. (2024) researched *S. pyri* on Walnut. They concluded that there was no notable correlation between the variations in the pear lace bug population and shifts in temperature or relative humidity. *S. pyri* has been successfully established on Rosaceae, especially Juglandaceae plants in Mediterranean regions (Aysal and Kıvan, 2008). The damage caused by *S. pyri* is typically not economically significant; however, in cases of severe infestations, it can lead to notable damage or even the death of host plants (Froeschner, 1995). The adult and nymph stages of *S. pyri* feed on the undersides of leaves by extracting the sap from plants. Pear lace bugs use their stylets to penetrate the lower epidermis of leaves, consuming the majority of the parenchyma cells beneath the upper epidermis, which results in leaf chlorosis (Buntin *et al*., 1996).

Şahİn *et al*. (2009) investigated the population density of *S. pyri* across 13 apple varieties in western Turkey, finding no significant differences in population densities among the varieties, and noted that pest activity in apple trees ceased by mid-October. Conversely, in Kermanshah, the cessation of the pear lace bug's activity on walnut trees was postponed by approximately one month, with observations made in late November (Montazersaheb *et al*., 2024). According to some research, many species of Tingidae may be oligophagous and even, some of them are polyphagous (Schaefer and Panizzi, 2000). The pear lace bug, *S. pyri* is one of highly polyphagous species and is widespread throughout Europe and Palearctic Region. Its hosts are primarily trees and shrubs of many unrelated genera: *Amygdalus*, *Castanea*, *Chaenomeles*, *Cornus*, *Cotoneaster*, *Crataegus*, *Cydonia*, *Juglans*, *Malus*, *Ligustrum*, *Populus*, *Prunus*, *Pyrus*, *Quercus*, *Ribes*, *Rosa*, *Sorbus*, *Robinia*, *Tilia*, *Ulmus* and *Vaccinium* (Onder and Lodos, 1983).

The majority of insect species within the Heteroptera (Insecta: Hemiptera), particularly those in the family Pentatomidae, are plant feeders. Known commonly as stink bugs or shield bugs, Pentatomids are often viewed as agricultural pests due to their capacity to form large populations that feed on crops, resulting in damage to production. Numerous heteropteran species pose a risk to cotton, corn, and sorghum, soybeans, as well as various native and ornamental trees, shrubs, vines, weeds, and cultivated crops globally (Schuh and Slater, 1995; Schaefer and Panizzi, 2000).

Table 2: Scientific name, family and order of collected insects in surveyed orchards

Common name	Scientific name	Family	Order	Host
Woolly apple aphid	*Eriosoma lanigerum* Hausmann	Aphididae	Hemiptera	Apple
Lace bug	Stephanitis pyri	Tingidae	Hemiptera	Apple
Seed bug	*Spilostethus pandurus* Scopoli, 1763	Lygaeidae	Hemiptera	Apple
Shield bug	*Apodiphus amygdali* Germar, 1817	Pentatomidae	Hemiptara	Apple

Table 3: Piercing sucking insects infesting apple trees in localities of Erbil province

Location	Insect infestation %				
	Woolly apple	Pear lace bug	Seed bug	Shield bug	Average
Almawan	85	10	10	40	36.25
Garota	60	55	15	40	42.5
Hiran	30	40	50	20	35
Nazanin	20	10	15	15	15
Balisan	30	10	15	10	16.25
Average	45	25	21	25	29

Description of damage caused by woolly apple aphid colony on apple trees

Woolly apple aphids are tiny, soft-bodied insects with a pale yellow to greenish-yellow coloration. The characteristic woolly appearance of the colony is due to the white, cottony fluid that they have on their bodies. Individuals with wings and those without, as well as adults and nymphs, made up the colonies; they differed somewhat in size and form. Large populations of the sap-sucking woolly apple aphid are found on apple trees. Infesting apple tree trunks and foliage, woolly apple aphids have established colonies on apple tree fruits in certain plants. The afflicted area was completely covered by a mass of cottony, white, waxy materials from the aphid colony. The similar substance covered the aphids' bodies as well. Additionally, honeydew was found on the aphid-secreting tree portions that were afflicted and the size of the colony varied from tree to tree and from one area to another Fig. (1). In the research on the susceptibility of apple varieties to infestation by woolly apple aphid, (Ateyyat and Al-Antary, 2009), it has been found that there are variations of aphid infestation on the apple trees due to variation in the apple varieties. It has been reported that apple orchards planted in sandier soils or with mulches may be partially protected from woolly apple aphid root feeding (Orpet *et al*., 2019), this means that the type of soil affects the infestation and amount of damage caused by wooly apple aphid on apple trees.

Fig. 1: Colony of wooly apple aphid on the apple tree.

Effect of directions, height and parts of the apple tree on the aphid infestation

The pie chart Fig. (2) explains the woolly apple aphid infestations on four directions of apple tree from five locations in orchards near Erbil during 2023.

According the figure, the maximum ratio of infestation was recorded in the south direction of the apple tree which was 44% aphid infestation, followed by East direction of the surveyed apple trees (27%), and west direction were found to be 16% aphid infestation while the north direction showed the lowest infestation percentage of wooly apple aphid 13%.

Turning to effect of apple tree parts on the woolly apple aphid infestation which is shown in Fig. (3), according to the figure, the highest infestation percentage of woolly apple aphid was recorded on branches in all five surveyed village orchards which were 49%. In contrast, the lowest infestation percentage based on the tree parts was recorded on the trunk of the surveyed apple trees in all five surveyed locations by occupying 9% infestation, however, the infestation percent of this type of aphid reached to 42% on the leaves. Meanwhile, the Fig. (4) shows the infestation percentages by woolly apple aphid in different tree heights from five location orchards. The figure explains that the maximum infestation ratio by woolly apple aphid was recorded in the two-meter height of apple trees which was 47% aphid infestation, in contrary, the minimum percent of aphid infestation was found apple tree at the level of one meter tree height which was 15% infestation, however, the middle

position of aphid infestation on apple trees was at the 1.5-meter height by recording 38% woolly apple aphid infestation.

Asante *et al*. (1993), observed that at low infestations the aphid is confined to the trunk and large branches, but disperses to establish colonies on twigs or new lateral growths during peak populations. Other factors that play roles in fluctuation of population of woolly apple aphids one apple includes predators like spiders (De Roince *et al*., 2013) and insect predators, earwigs, could be good candidates as biocontrol agents of woolly apple aphid (Lordan *et al*., 2015; Orpet *et al*., 2019). Another research conducted by (Hoyt and Madsen, 1960) found that air movement over a smooth surface in the laboratory caused most of the aphids to orient themselves with or against the flow of air. In the field, the surface of the ground was not smooth, and wind direction was variable; as a result, the orientation of the aphids did not appear to be affected by air movements.

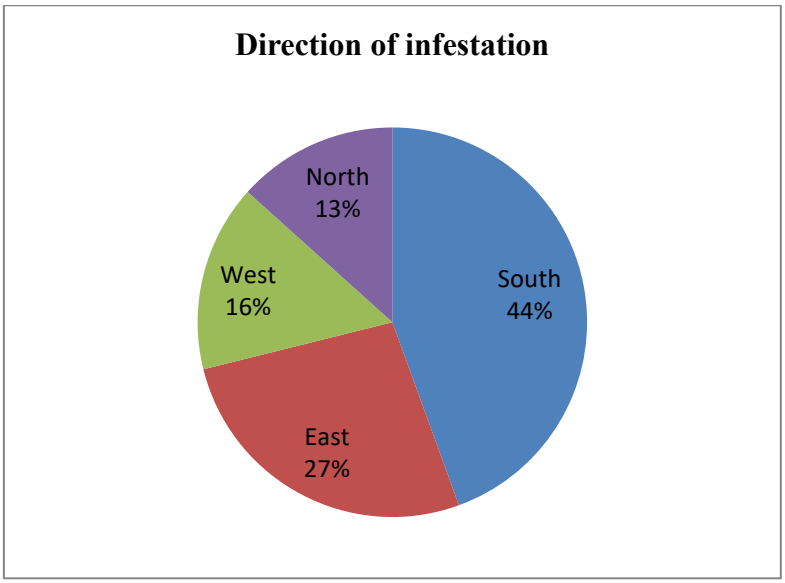

Fig. 2: Effect of apple tree directions on the infestation of woolly apple aphid.

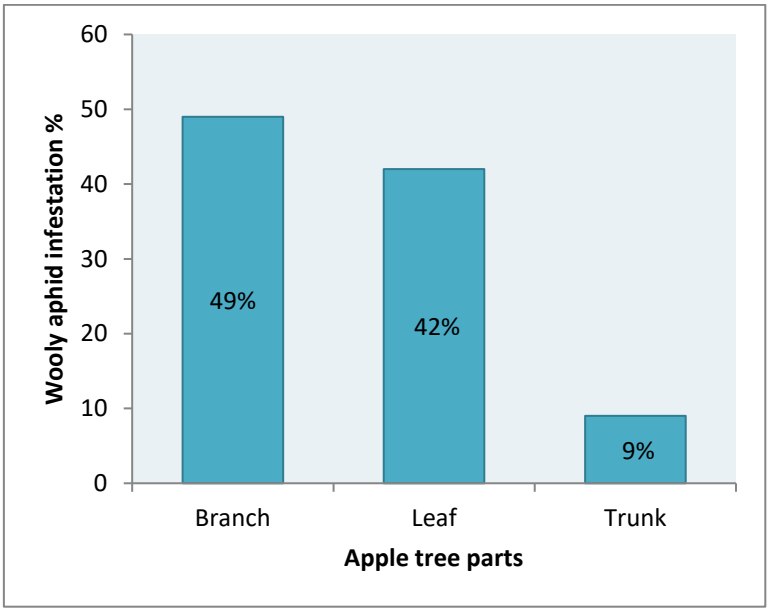

Fig. 3: Effect of woolly apple aphid on different apple tree parts.

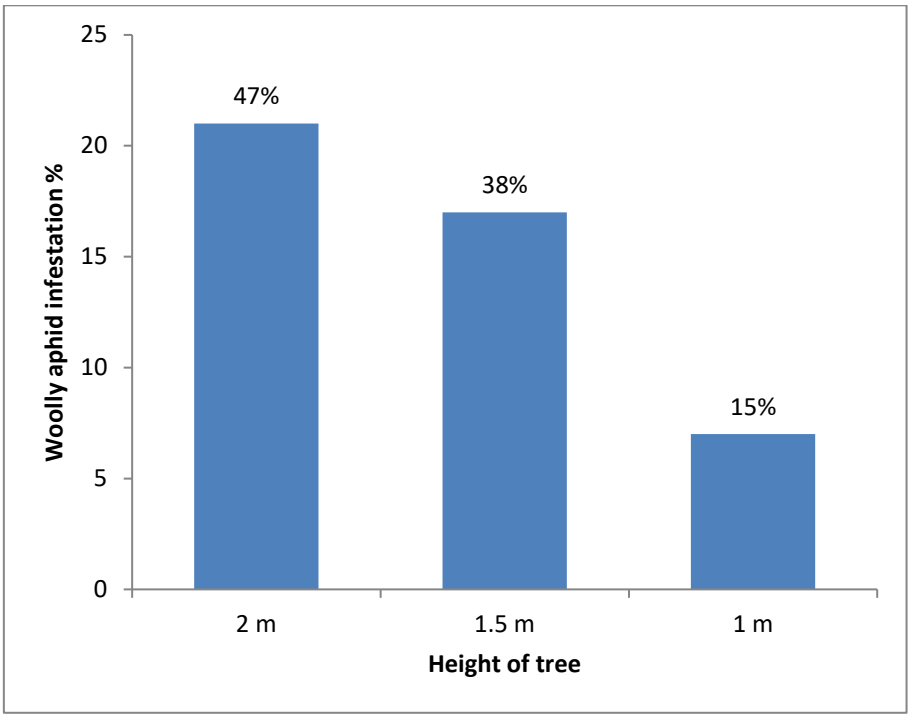

Fig. 4: Effect of apple tree height on the woolly apple aphid infestation.

CONCLUSIONS

The apple tree is the most important fruit trees in the Kurdistan region of Iraq especially in Erbil province. They encounter many insect pests that affect their products quality and quantity, the most destructive insect pests of apple tree in front line are piercing-sucking mouthpart insects which suck the sap of tree parts including leaves trunks, branches and roots. In the current study, four insect pests were recorded on the apple tree orchards from five locations within Erbil province. The most abundant one was woolly apple aphid which established colonies on the branches, leaves and trunks in descending order, the infestation of these insects also investigated on different directions of the apple tree and revealed that the south direction showed the highest infestation rate and according to tree height, the study showed that insect infestation increased positively with increasing of tree height until two meters. Based on the present study, it is advisable to investigate more deeply on the apple tree insects aiming to find effective and ecofriendly control method for the harmful insects and produce apples with quality.

ACKNOWLEDGMENT

The current research is funded by the Salahaddin University-Erbil.

REFERENCES

Al-Iraqi, R.A.; Muhammed, S.H. (2010). The residual toxicity of actara and decirin insecticides to adults of stink bug *Apodiphus amygdali* (germar) (hemiptera: Pentatomidae). *Mesopotamia. J. Agric.,* **38**. DOI:10.33899/magrj.2010.33580

Asante, S.K.; Danthanarayana, W.; Cairns, S.C. (1993). Spatial and temporal distribution patterns of *Eriosoma lanigerum* (Homoptera: Aphididae) on apple. *Envir. Entom.,* **22**, 1060-1065. DOI:10.1093/ee/22.5.1060

Ateyyat, M.A.; Al-Antary, T.M. (2009). Susceptibility of nine apple cultivars to woolly apple aphid, *Eriosoma lanigerum* (Homoptera: Aphididae) in Jordan. *Intern. J. Pest Manag.,* **55,** 79-84. DOI:10.1080/09670870802546164

Aysal, T.; Kıvan, M. (2008). Development and population growth of *Stephanitis pyri* (F.) (Heteroptera: Tingidae) at five temperatures. *J. Pest Sci.*, **81**, 135-141. DOI:10.1007/s10340-008-0198-9

Buntin, G.; Braman, S.; Gilbertz, D.; Phillips, D. (1996). Chlorosis, photosynthesis, and transpiration of azalea leave after azalea lace bug (Heteroptera: Tingidae) feeding injury. *J. Econ. Entom.,* **89,** 990-995. DOI:10.1093/jee/89.4.990

De Roince, C.B.; Lavigne, C.; Mandrin, J.-F.; Rollard, C.; Symondson, W.O.C. (2013). Early-season predation on aphids by winter-active spiders in apple orchards revealed by diagnostic PCR. *Bull. Entomo. Res.,* **103**, 148-154. DOI:10.1017/S0007485312000636

Froeschner, R. (1995). Review of the new world lace bug genera *Acanthocheila* stal and *Carvalhotingis* new genus (Hereroptera: Tingidae). *Proc. Entomo. Soc. Washington,* **97**, 331-339.

Hoyt, S.C.; Madsen, H.F. (1960). Dispersal behavior of the first instar nymphs of the woolly apple aphid., *Hilg.*, **30**, 267-299. DOI:10.3733/hilg.v30n10p267

Hradil, K.; Psota, V.; Šťastná, P. (2013). Species diversity of true bugs on apples in terms of plant protection. *Plant Prot. Sci.,* **49**. DOI:10.17221/30/2012-PPS

Kacar, G.; Dursun, A. (2022). Comparative diversity of Heteroptera (Hemiptera) in fruit orchards. *Turkish J. Zoo.,* **46**, 289-297. DOI:10.3906/zoo-2103-24

Kamusiime, E.; Ssali Nantongo, J.; Wacal, C. (2023). Insect pests in apple (*Malus domestca* Borkh) gardens. *GSC Adv. Res. Rev*., **15**(01), 030-053. DOI:10.30574/gscarr.2023.15.1.0109

Khan, A.A.; Kundoo, A.; Nissar, M.; Mushtaq, M. (2020). Sucking pests of temperate fruits. *Suck. Pes. Crops*, 369-409. DOI:10.1007/978-981-15-6149-8_12

Kinkorova, J.; Kocourek, F. (2000). The effect of integrated pest management practices in an apple orchard on Heteroptera community structure and population dynamics. *J. App. Entom.,* **124**, 381-385. DOI:10.1046/j.1439-0418.2000.00488.x

Kopytko, P.; Karpenko, V.; Yakovenko, R.; Mostoviak, I. (2017). Soil fertility and productivity of apple orchard under a long-term use of different fertilizer systems. *Agron. Res.,* **15**.

Kruczek, M.; Gumul, D.; Ivaniå, E.; Gambuå, H. (2017). Industrial apple pomace by-products as a potential source of pro-health compounds in functional food. *J. Microb., Biotech. Food Sci.,* **7**, 22-26. DOI:10.15414/jmbfs.2017.7.1.22-26

Licina, V.; Krogstad, T.; Simić, A.; Akšić, M.F.; Meland, M. (2021). Nutrition and fertilizer application to apple trees-a review. *NIBIO Rapp*.

Lordan, J.; Alegre, S.; Gatius, F.; Sarasúa, M.J.; Alins, G. (2015). Woolly apple aphid *Eriosoma lanigerum* Hausmann ecology and its relationship with climatic variables and natural enemies in Mediterranean areas. *Bull. Entom. Res.,* **105,** 60-69. DOI:10.1017/S0007485314000753

Mbovora, S.M.; Musvosvi, C.; Gasura, E. (2021). Morphological diversity among accessions of apple tree (*Malus domestica* Borkh). *Adv. Agric.,* **2021**, 7705856. DOI:10.1155/2021/7705856

Montazersaheb, H.; Zamani, A.A.; Pourian, H.-R. (2024). Bioecology of the pear lace bug, *Stephanitis pyri* (F.) (Hemiptera: Tingidae) on walnut trees in *Kermanshah Province*, Iran. *J. Entom. Soc. Iran*, **44**. DOI:10.61186/jesi.44.2.8

Muhammed, S.H.; Al-Iraqi, R.A. (2010). The biology of the stink bug *Apodiphus amygdali* (Germar) (Hemiptera: Pentatomidae). *Mesopotamia J. Agric.,* **38**, 1-53. DOI:10.33899/magrj.2010.33585

Onder, F.; Lodos, N. (1983). Preliminary list of Tingidae with notes on distribution and importance of species in Turkey. *CABI*, **449**(51), 25. DOI:10.5555/19830503130

Orpet, R.J.; Jones, V.P.; Reganold, J.P.; Crowder, D.W. (2019). Effects of restricting movement between root and canopy populations of woolly apple aphid. *PLoS One,* **14**, e0216424. DOI:10.1371/journal.pone.0216424

Özyurt, N.; Candan, S.; Suludere, Z. (2014). The morphology and histology of the male reproductive system in *Apodiphus amygdali* Germar 1817 Heteroptera Pentatomidae. *Life: Excit. Bio.,* **2**. DOI:10.9784/LEB2(1)Ozyurt.01

Qian, G.-Z.; Liu, L.-F.; Tang, G.-G. (2010). 1933 Proposal to conserve the name *Malus domestica* against *M. pumila*, *M. communis*, *M. frutescens*, and *Pyrus dioica* (Rosaceae). *Tax.,* **59**, 650-652. DOI:10.1002/tax.592038

Şahin, A.; Özpınar, A.; Polat, B.; Sakaldaş, M. (2009). Population density of pear lace bug (*Stephanitis pyri* (F.), Heteroptera: Tingidae) at different apple cultivars in Çanakkale province. *Res. J. Agric. Sci*., **2**, 119-122.

Schaefer, C.W.; Panizzi, A.R. (Eds.). (2000). "Heteroptera of Economic Importance". London, CRC press.

Schuh, R.T.; Slater, J.A. (1995). "True Bugs of the World (Hemiptera: Heteroptera): Classification and Natural History", Cornell University press. DOI:10.1093/aesa/89.4.609

Šťastná, P.; Psota, V. (2013). Arthropod diversity (Arthropoda) on abandoned apple trees. *Acta Univer. Agric. Silvic. Mend. Brun.,* **61**, 1405-1422. DOI:10.11118/actaun201361051405

Vergnani, S.; Caruso, S. (2008). Investigations on the efficacy of different products for the control of *Stephanitis pyri* in an organic pear orchard during the two-year period 2004-2005. CABI Databases. IFOAM Organic World Congress, Modena, Italy, June 16-20, 2008.

تقدير الاصابة والكثافة السكانية للحشرات الثاقبة الماصة المرتبطة باشجار التفاح من بساتين مختلفة في محافظة اربيل

نوزاد باوكر قادر

قسم وقاية النبات/ كلية علوم الهندسة الزراعية/ جامعة صلاح الدين– اربيل/ العراق

الملخص

أجريت هذه الدراسة خلال عام 2024 لتقدير الكثافة السكانية للحشرات الثاقبة والماصة المرتبطة بأشجار التفاح من خمسة مواقع مختلفة (الماوان، گروته، باليسان، هيران ونازنين) ضمن محافظة اربيل–العراق. تم تشخيص وجمع اربعة انواع من الحشرات الثاقبة الماصة والتابعة لأربعة عوائل مختلفة تابعة لرتبة الحشرات نصفية الاجنحة. الكثافة السكانية للحشرات الثاقبة والماصة تباينت بشكل كبير اعتمادًا على النوع والموقع والعوامل البيئية. وفي المجمل، في جميع المواقع المدروسة، أظهرت حشرة المن القطني للتفاح أعلى نسبة اصابة حيث بلغت (45%) تلتها (25%) لكل من حشرة البقة المدرعة وحشرة بقة الكمثرى المطرزة بينما كانت نسبة الاصابة بحشرة بقه البذور (21%) وهي الأقل.

اعتمادًا على مواقع البساتين المدروسة، كانت نسبة الإصابة بالحشرات الثاقبة الماصة في قرية گاروتا هي ألاعلى (42.5%) تلتها الماوان (36.25%)، هيران (35%)، باليسان (16.25%) بينما سجلت اقل نسبة اصابة في بساتين نازانين حث كانت (15%). أكثر أجزاء الأشجار إصابةً بمنّ التفاح القطني هي الأغصان، تلتها الأوراق والجذع على التوالي. كما سُجِّلت أعلى إصابة بمنّ التفاح القطني على ارتفاع مترين.

الكلمات الدالة: الآفات الحشرية، أشجار التفاح، الكثافة السكانية، رتبة نصفية الأجنحة.