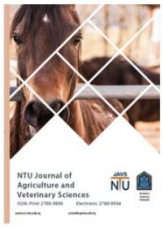
NTU Journal of Agricultural and Veterinary Sciences (2023) 3 (3) : 133-137
DOI: https://doi.org/10.56286/ntujavs.v2i2

IRAQI Academic Scientific Journals

JAVS NTU

P-ISSN: 2788-9890 E-ISSN: 2788-9904
NTU Journal of Agricultural and Veterinary Sciences
Available online at: https://journals.ntu.edu.iq/index.php/NTU-JAVS/index



Studying the Effect Of Olive Cultivars and Tree Orientation in the Seasonal Activity of Olive Leaf Fly *Dasineura oleae* F. Loew during 2022

1st Alaa Y. Dhannoon Alobidy [1], 2nd Emad Q. Mohammed Alebady.
1,2 Department of Plant Protection, College of Agriculture and Forestry, University of Mosul, Mosul, Iraq

Article Informations

Received: 24-06- 2023,
Accepted: 04-07-2023,
Published online: 18-10-2023

Corresponding author:
Name: Alaa Y. Dhannoon Alobidy
Affiliation : College of Agriculture and Forestry, University of Mosul, Mosul.
Email: alaa.alsafawy89@ntu.edu.iq

Key Words:
Olive leaf flay, *Daisenura oleae*, Olive cultivars , Seasonal Activity

A B S T R A C T

The results of a study of the effect of olive cultivars in Kowal, Nepali, Khastawi, and Syria, and tree orientation, on the seasonal activity of the olive leaf fly, *Dasineura oleae*, showed that the infection appeared at the end of February 2022 in the form of swellings on young and tender leaves. The highest average infection was on 28/2 and reached 8.78 swellings / 10 leaves, while the lowest average infection was 1.62 swellings / 10 leaves. The Bakwal verity was the most sensitive cultivar to infestation with the olive leaf fly with an average infection rate of 8.08 swellings / 10 leaves, followed by the Nepali verity with 4.98 swellings / 10 leaves, and Al Khastawi with 3.98 swellings / 10 leaves. As for the Syrian variety, it was the most resistant variety with an average of 2.58 swellings / 10 leaves, and the results showed that the eastern side was the preferred side for the insect, with an average infestation of 8.15 swellings / 10 leaves, followed by the southern side, 5.00 swellings / 10 leaves, the northern side 3.88, and finally the western side, 2.58 swellings / 10 leaves. The results of the correlation values were positive and significant between temperature and insect infestation, positive and significant correlation between temperature and insect infestation for Bakool, Nepali and Syrian verities, but negative and significant with the Khastawi verity, and negative and significant between the relative humidity and the same verities and positive and significant with the Khastawi verity.

Introduction

The olive tree is exposed to many types of insects which cause great economic damage and at the same time affect the quality of the crop and thus lead to its deterioration in terms of quantity and quality. The most important of which is the olive fruit fly *Bactrocera oleae*(Gmelin ,1790) . Olive moth *Prays oleae* Bernard , Jasmine butterfly *Margaronia unionalis* Hubner , olive psyllium *Euphlura olivine* Costa , olive neron *Phloeotribuss carabeoidse* (Bren). The olive leaf fly, viz. *Dasineura oleae* F. Loew, is one of the olive insects that has appeared in recent years in olive groves in some parts of the world. It has recorded many infections in the Mediterranean regions, where it has been recorded as one of the most dangerous insect pests on olive trees in coastal areas in Greece [12]. The olive leaf fly is one of the most dangerous pests that infect olive trees. Infestations were recorded for the first time in 2011 in many orchards in the rural area around and central Macedonia, where the olive leaf fly caused severe deformities and tumors evident on the leaves and tender branches [11]. In a previous study, [7] showed that this insect is a major pest in Italy, as well as it could be in other countries. The olive leaf fly also has spread in Palestine, Jordan, Turkey, Syria and Cyprus [6] [8] [9] .The olive leaf fly is one of the dangerous insects that infect olive trees in Iraq, which prompted farmers to use many control methods in an attempt to control this insect and reduce its damage, especially the use of chemical pesticides, which is well known for its side effects on the environment and public health. In addition to the possibility of the emergence of tolerant or resistant strains of this type of insecticides used in control operations. It is known that the olive leaf fly stops its development in nature in the second larval age, and this period is relatively long, extending from the beginning of July until the end of January, after which it returns to activity with the onset of high temperatures. In general, the duration of the third larval age is on average 23.9 ± 2.5 days, while the duration of the pupal stage is about ten days, and the adult insect of the olive fly or insomnia lives for a short period of one to two weeks [5]. Given the lack of prior studies on the olive leaf fly in Iraq, the current study aimed at determining the times of appearance and disappearance of this insect and its population activity, as well as determining the sensitivity of olive varieties to infection with this type of fly and the preferred destination of the flies from the tree with the construction of regression equations for the relationship between numbers Insect and abiotic factors to determine the percentage of the effect of these factors on the activity of the olive leaf fly, in order to employ them in the future in building integrated management programs for this insect.

Materials & Methods :

The current study was carried out in the olive grove of the Nineveh Horticultural Station during the year 2022 to study the sensitivity of olive trees on the infestation of the olive leaf fly on Bakwal, Khastawi, Syrian and Nepali varieties, through taking weekly paper samples in a random manner. Starting from 2/28/2022 until 11/22/2022, with four trees for each variety and ten leaves for each side of the tree (east, west, north and south), so that the sample size is 40 leaves for each direction and 160 leaves for each variety. Plant leafy samples were placed in polyethylene bags and brought from the field to the laboratory for the purpose of calculating the numbers of insects as adults and larvae and calculating the percentage of plant leaf damage [2]. Also, regression equations were built for the relationship between the number of insects and abiotic factors (temperature, relative humidity and wind speed) that were obtained from the meteorological station of the Department of Physics Sciences, College of Science/ University of Mosul. Results were analyzed using randomized complete block design software and the differences between means were tested using Duncan test and L.S.D. For some experiments at a probability level of 5% [4].

Results & Discussion :

Table (1) shows the effect of olive varieties and dates for taking readings on the rates of olive leaf fly infestation, as the infestations began to appear at the end of February with the appearance of swellings on the fresh and newly grown olive leaves, where it was observed that a varying number of swellings were present on the leaves and flower stalks, since the onset of the infection. On 2/28 until its disappearance on 11/22 in 2022. The highest average number of swellings was 8.78 swellings / 10 leaves on 28/2 at an average temperature of 20.14 o C and a relative humidity of 33.88%, while the lowest average number of swellings was 1.62 swellings / 10 leaves on 7/18 at an average temperature of 44.14 o C and humidity relative 9.28%, each swelling included only one larva, and thus it can be concluded that the number of the swellings were equal to the number of caterpillars on one leaf or within the group of leaves on one branch. These swellings formed places of feeding and wintering for an insect until its emergence, and these results are consistent with what was proven by [10] that the infestation of the olive leaf fly in the regions of the Syrian coast was characterized by the appearance of swellings on the leaves and flower stalks, and their number differed according to the severity of the infection, concentrated dearly in the middle veins, and the insects appeared with the start of rising temperatures at the end of February.

Table (2) shows the effect of the overlap between olive cultivars and tree orientation that the cultivar Bakwal was more sensitive to infection with the olive leaf fly, as the average number of bulges was 8.08 bulges / 10 leaves, while the Syrian variety, which is considered local, was the most resistant to infection, and the average bulges was 2.58 bulges / 10 leaves. As for the Nepalese variety, it reached 4.98 and Al-Khastawi 3.98 swelling / 10 leaves. The results of the statistical analysis showed a clear significant difference in the average infection rates between the four studied cultivars, while the results showed that the eastern side of the tree showed the highest average number of swellings and reached 8.15 swellings / 10 leaves, while the western side was less infected with olive leaf fly and reached 2.58 swellings / 10 leaves, while the northern side had 3.88 infection and the southern side 5.00 swellings 10 leaves. These results may explain that the average number of infestations depends on the olive variety that the insect prefers because it contains materials and chemical compounds that are attractive to the insect. Environmental factors play an important role in the direction of the insect such as wind, heat and humidity. These results are consistent with what was proved by [3] that the general average number of the two types of aphids, Dysaphis pyri and Dysaphis reaumuri, was in the eastern side more significant than the rest of the directions as it reached 21.17, 6.13, 5.41 and 12.7 insects / leaf for the eastern, western, northern and southern directions, respectively. These results are consistent with what [1] found regarding the number of embroidered bugs preferring the eastern side of the tree with an average of 28 insects/leaf, followed by the southern side with an average of 18.5 insects/leaf and the west and north sides with an average of 15.5 and 13.3 insects/leaf, respectively.

The results of Table (3) showed the correlation values of the relationship between environmental factors and the average infection if the correlation values were positive and significant between temperatures and the average number of bulges on olive varieties in Koala, Nepali and Syrian, and they amounted to 0.093 +, 0.159 + and 0.042, respectively, while the correlation value was negative and significant between temperatures and the average number of swellings on the Khastawi cultivar, and it was -0.066. As for the results of the table, it showed that the correlation values for the relationship between relative humidity and the average number of insect swells on olive cultivars were negative for the Bakool, Nepali and Syrian cultivars and amounted to -0.130, -0.209 and -0.074, respectively, while it was positively correlated for the Khastawi cultivar and was 0.033. These results are consistent with what [1] proved, that the correlation values of the relationship between the average number of embroidered bugs and the average temperature and relative humidity on pear cultivars were positive and significant between the average temperature and the number of insects, with a value of +0.74, +0.77, and +0.79 for cultivars. Saffronia, Osmani and Leconte, respectively, negatively and significantly between relative humidity and number of insects -0.65, -0.67 and -0.69 for the same cultivars. The above results indicate the importance of temperature and relative humidity factors in determining the seasonal activity of the olive leaf fly, and that the variation in the correlation values on the olive cultivars used in the study shows the effect of the cultivar in determining the activity of this insect, in addition to the factors of temperature and humidity.

References

[1]Al-Obadi , A. K. Ibrahim . (2006). Resistance mechanism of some pear varieties to the infection by pear lace bug . Ph.D. University of Mosul . College of Agri. And Forestry . 202p.

[2]Al-Mallah , N. M. , Abdul Jabar , K. A. and Haitham , M. M. (2011). Comparative seasonal activity study of *Dysaphis pyri* (Boy.) and *Dysaphis reaumri* (Mord.) on some pome fruits . Mesopotamia J. of Agric. Vol.(39)2149-155.

[3]Al-Mallah , N. M. , Haitham , M. M. and Abdul Jabar , K. A. (2018). Ecological study and susceptibility of some pear varieties to attack by *Dysaphis reaumri* and *Dysaphis pyri* . Mesopotamia J. of Agric. Vol.(46)4:365-372.

[4]Antar, Salem Hamadi (2010). Statistical analysis in scientific research and SAS program. University of Mosul Faculty of Agriculture and Forestry. Book House for Printing and Publishing, 192 pages.

[5]Baidaq , Z. M. , A. M. Ramadhane, and Randa A. T. (2015). Biological Synchronization of The Endo-parasitoid *Platygaster demades* Walker (Hymenoptera : Platygasteridae) With Its host The Olive Leaf Midge *Dasineura oleae* F. Loew (Diptera : Cecidomyiidae). SSRG International Journal of Agriculture & Environmental Science (SSRG-IJAES) – volume 2 Issue 3 November to December 1-8 .

[6]Batta . Y. (2020). A study of natural enemies of olive leaf gall midge (Dasineura oleae Angelini, Diptera, Cecidomyiidae) as an emerging pest on olive trees in Palestine . An - Najah Univ. J. Res. (N. Sc.) Vol. 34(1)11-30.

[7]Katsoyannos, P. (1992). Olive pests and their control in the Near East. FAO Plant Production and Protection. FAO publication number 135.

[8]Mustafa, T.M. (1990). Evaluation of some insecticides for the control of olive midge and influence on its parasites. Iraqi Journal of Agricultural Sciences, 21: 142-147.

[9]Patil, R.K., A. Shekharappa, I.K. Kalappanavar and K. Giriraj. (1998). (Diptera : Cecidomyiidae) maggots eeding on rust spores of groundnut. Bibliographic Citation. Insect Environment, 6: 54-55.

[10]Ramadan, A.M., R. Abu Tara and Z.M. Baidaq. (2015). The biology of the olive leaf midge *Dasineura*

oleae F. Löew in the olive trees along the Syrian coast. Arab Journal of Plant Protection, 33(3): 265-271.

[11]Simoglou, K.B., A. Karataraki, N.E. Roditakis and E. Roditakis. (2012). *Euzophera bigella* (Zeller) (Lepidoptera: Pyralidae) and *Dasineura oleae* (F. Low) (Diptera: Cecidomyiidae): Emerging olive crop pests in the editerranean. Journal of Pest Science, 85: 169-177.

[12]Karataraki E.A.; Simoglou K.B.; Roditakis N. (2010). Extensive infestations by the olive leaf midge Dasyneura oleae (Diptera: Cecidomyiidae) (In Greek). ΕΝΤΟΜΟΛΟΓΙΚΗ ΕΤΑΙΡΕΙΑ ΕΛΛΑΔΟΣ .14◦ ΠΑΝΕΛΛΗΝΙΟ ΕΝΤΟΜΟΛΓΙΚΟ ΣΥΝΕΔΡΙΟ. Συνεδρία: Συμπεριφορά – Φαινολογια. Pages 152-153.

Table 1. Effects of olive verities, average temperature and relative humidity on the seasonal activity of the olive leaf fly *Dasineura oleae* during the 2022 season.

date of sampling	average temperatures	Average relative humidity %	Average number of larvae in bulges / 10 leaves for verities			
			Bakwal	Nepali	Khastawi	Syrian
2 / 28	20.14	33.88	18.50	7.50	6.15	3.00
3 / 14	14.7	43.8	10.50	6.00	3.50	2.50
3 / 28	18.81	50.63	10.50	7.50	3.50	1.50
4 / 11	29.4	20.8	9.50	6.00	3.50	0.00
4 / 25	28.7	23.3	7.50	6.00	4.50	3.50
5 / 9	26.4	31.2	8.00	5.00	7.00	2.50
5 / 23	33.63	10.9	11.50	6.50	5.00	6.00
6 / 6	43	7.14	8.50	7.00	6.50	4.50
6 / 20	41.28	10	10.50	8.50	4.50	3.50
7 / 4	40.28	9.2	6.50	5.00	3.50	1.50
7 / 18	44.14	9.28	4.00	2.00	0.50	0.00
8 / 1	44.5	6.4	5.00	1.50	1.00	0.50
8 / 15	41.85	13.42	3.00	6.00	3.00	1.50
8 / 29	43.5	8.7	12.00	0.00	6.50	5.50
9 / 12	39.25	10.63	10.50	4.50	3.00	1.50
9 / 26	37.05	12.09	6.00	5.00	5.00	4.00
10/ 10	34.93	12.87	10.50	4.50	3.50	1.50
10/ 24	27.89	28.36	6.00	6.00	6.00	5.00
11 / 7	27.43	17.36	3.00	5.00	3.50	3.50
11/ 22	21.44	45.04	0.00	0.00	0.00	0.00
Total	658.32	405	161.5	99.5	79.65	51.5
Average	32.92	20.25	8.08	4.98	3.98	2.58

L.S.D. 3.59

Table 2. Effects of cultivar and tree orientation on average infection with *Dasineura oleae* olive leaf fly

direction the tree olive verities	North	South	East	West	General Average For verities
Bakwal	5.90 cd*	8.40 b	13.60 a	4.40 de	8.08 a
Nepali	4.70 de	4.60 de	8.00 b	2.60 fg	4.98 b
Khastawi	2.93 ef	4.40 de	6.40 c	2.20 fg	3.98 c
Syrian	2.00 fg	2.60 fg	4.60 de	1.10 g	2.58 d
General average	3.88 c	5.00 b	8.15 a	2.58 d	

* means with different letters in the same sectors showed a significant difference at p= 5%.

Table 3. Correlation values for the relationship between environmental factors and the average infection rate with *Dasineura oleae* olive leaf fly

Olive verities Environmental factors	Bakwal	Nepali	Khastawi	Syrian
Heat	0.093	0.159	− 0.066	0.042
Relative humidity	− 0.130	− 0.209	0.033	− 0.074