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SPATIAL DISTRIBUTION OF DUBAS BUG, *OMMATISSUS LYBICUS* (HOMOPTERA: TROPIDUCHIDAE) IN DATE PALM FROND ROWS

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ABSTRACT

Dubas bug, *Ommatissus lybicus* Debergevin, is an important pest of date palms in Iraq, the Arab peninsula and many countries planting date palms. This sucking insect causes great damage to the trees and reduces the quantity and quality of the dates. Field surveys were conducted during 2014 to explore the spatial distribution of Dubas Bug *Ommatissus lybicus* Debergevin (eggs of 1st generation and nymphs of 2nd generation) stages and honeydew in palm trees (Barhee variety) of Iraq middle region date palm orchards. The results indicated the high level population density of eggs stage in the fifth frond row (26934 eggs / frond) having the distribution of 31%, 55% and 14% in the fourth, fifth, and sixth frond rows, respectively. The high level of nymphal population was recorded in the fourth row (7035 nymph / frond) having the distribution of 5.5%, 23.3%, 48.0%, 12.3%, 8.2%, 2.7% in the 2nd, 3rd, 4th, 5th, 6th and 7th row, respectively. The high quantity of honeydew was recorded in the seventh row with 546.4 gm / frond. The results of the study will be contributed positively on all future research projects especially those of controlling programs.

Keywords: Dubas Bug, *Ommatissus lybicus*, Date palms trees, spatial distribution, eggs, nymphs and honeydew.

INTRODUCTION

Dubas bug, *Ommatissus lybicus* Debergevin is distributed in North Africa (Morocco, Algeria, Tunisia, Libya and Egypt), Sudan, Iran and Spain. In addition, it is also widespread and an important pest of date palm, *Phoenix dactylifera* in Iraq, Kuwait, Bahrain, Qatar, Saudia Arabia, The United Arab Emirates and Sultanate of Oman (Hussain, 1963; Waller and Bridge, 1978; El-Haidari, 1982; Bitaw and Ben-saad, 1990; Elwan and Al-Tamiemi, 1999; Al-Jboory, 2000; Al-Jboory *et al*, 2001; Ahangaran, 2001). This pest is active on leaflets, rachis, fruiting bunches and spines during the different stages of date palm tree (Hussain, 1963; Bitwa and Ben-saad, 1990; Aljamali *et al*, 2008) and causes many direct and indirect damages to the infested date palm and nearby trees. The direct damages of this pest emerge when the nymphs and adults feed via sucking sap from leaflets and rachis in spring and autumn (Kinawy and Al Siyabi, 2012). However, the indirect

damage can be exemplified by the deterioration of date palm fruits and other fruits of trees that planted underneath through honey dew that attracts the dust, dry leaflets and rot fungi. The indirect damage is caused by the females during the deposition of their eggs inside the tissue of biaxial frond surface reducing the photosynthesis activities of the plant (Mokhtar and Al-Mjeini, 1999; Al Jamali and Karim, 2010). Gassouma, (2004) demonstrated that in the case of heavy infestation, dubas bug can reduce the crop yield by 50%. Moreover, fruits of infested palm trees are also reported to be smaller and ripen more slowly. The females lay their eggs homogeneously depending upon the kind of tree fronds rows (Hussain, 1974). The highest eggs ratio are laid on the second frond row in the 1st generation (spring generation) while in the 2nd generation (autumn generation) eggs are laid on the 4th frond row; however, females do not lay eggs on 7-10 rows (Hussain,1974). The main objective of this study is to investigate Dubas Bug honeydew quantity and distribution depending on infestation stages in date palm tree.

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MATERIALS AND METHODS

The study was conducted in date palm orchards in Almadain region (30km South Baghdad) in Iraq. The main variety of date palm that planted in this orchard was Barhee which was highly infested by dubas bug with no application of any control techniques during the study time (2014). Twelve middle-aged date palm trees were chosen to establish this study. Three replicates of each fronds row direction (North, South, West, and East) were selected (Figure 2). In total there were 37 (one in first row + 36 from 2 to 10 rows) fronds in date palm tree with 10 rows in each tree. Total of 7437 leaflets /

frond were used in the study with an average of 201 leaflets / frond. The leaflet length, width and the frond length was counted. The fronds were cut from the base of the each row and direction was used to count the mean number of eggs laid (first spring generation) on each leaflet. Then, the eggs were counted in the laboratory under the sterio microscope. The honeydew quantity was calculated depending on the variation between the weight of leaflet before and after washing the water. The first and second nymphal instars (second autumn generation) were calculated directly in fronds to each row (Figure 2).



Figure 1. a) Honeydew, b) Laid eggs and C) Nymphs of dubas bug.



Figure 2. Distribution of fronds rows on date palm tree.

RESULTS AND DISCUSSION

Honey dew quantity: The results indicated that the presence of honeydew started particularly with emergence of the second generation on the 2nd to 10th frond row (Table 1). However, no honeydew was found in the first frond row. The highest quantity of honeydew was found in

leaflets of 7th frond row with 0.663, 133.3, 3.3, 533.1 and 13.3 grams on one leaflet, leaflets in one frond, rachis, and leaflets in row and rachis in row, respectively; while, on the second row with 0.022, 4.4, 0.1, 17.7 and 0.4 grams, respectively. Similarly, the highest percentage of (leaflets and rachis) was also recorded on the 7th

frond rows (23.4%) followed by 10th (18.9%) and 9th frond rows (17.6) (Table 2). From these results the grand total of honeydew quantities was 2333.5, 233344.4 and 373351.0 grams on one date palm tree, 100 tree per hectare, and 160 trees per hectare, respectively (Table 3).

Table 1. Honeydew quantity and insect stages of Dubas Bug, *Ommatissus lybicus* on leaflets of Barhee variety in 2nd autumn generation at 2014 season.

Row	Type of honey dew	on one leaflet	Honeydew quantity/ gm				Number of insect at 75-80% eggs hatch						
			on one frond		on frond row		Eggs			Nymphs			
			leaflets	Rachis	leaflets	Rachis	leaflet	frond	row	leaflet	frond	row	
1	---	0.000	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0
2	New	0.022	4.422	0.100	17.688	0.400	0	0	0	4	804	3216	
3	New	0.098	19.698	0.301	78.792	1.204	0	0	0	17	3417	3216	
4	New	0.144	28.944	0.782	115.776	3.128	75	15075	60300	35	7035	28140	
5	New	0.222	44.622	1.205	178.488	4.820	134	26934	107736	9	1809	7236	
6	New + old	0.390	78.390	2.410	313.560	9.640	33	6633	26532	6	1206	4824	
7	New + old	0.663	133.263	3.331	533.052	13.324	0	0	0	2	402	1608	
8	Old and dust and fungi	0.257	51.657	1.302	206.628	5.208	0	0	0	0	0	0	
9	Dust and old honey & Fungi	0.497	99.897	2.640	399.588	10.560	0	0	0	0	0	0	
10	Dry honey	0.547	109.947	0.450	439.788	1.800	0	0	0	0	0	0	
LSD		0.102	7.362	0.630	16.532	1.101	23.13	79.46	100.12	10.13	25.74	60.31	

Eggs laid in fronds: Table 1 also revealed that the eggs in the first generation were only laid on the 4th, 5th, 6th rows with 75, 134 and 33 egg / leaflet, respectively and 15075, 26934 and 6633 egg / frond; moreover, 60300, 107736 and 26532 eggs /row, respectively. The total percentages of laid eggs were 30.99%, 55.37% and 13.37% on 4th, 5th and 6th frond rows, respectively (Table 2). From these results, the total laid eggs were 194568, 195468800 and

31130880 on one date palm tree, 100 tree, and 160 trees per hectare respectively (Table 3).

Nymphs on leaflet: Table 1 demonstrates that the total nymphs (Figure 1) (especially 1st and 2nd instars from 2nd generation) were found in the 2nd, 3rd, 4th, 5th, 6th and 7th row only with 4, 17, 35, 9, 6 and 2 nymph per leaflet respectively. Moreover, the number of nymphs was 804, 3417, 7035, 1809, 1206 and 402 per frond and 3216, 13668, 28140, 7236, 4824 and 1608 nymph per row respectively.

The total nymphs percentages in rows were 5.48%, 23.29%, 47.94%, 12.33%, 8.22% and 2.74% in the 2nd, 3rd, 4th, 5th, 6th and 7th rows, respectively (Table 2). From these results, the total nymphs were 58692, 5869200 and 9390720 nymph in one date palm tree, 100 tree, and 160 trees per hectare, respectively (Table 3). The study results disagreed with the results that found by Hussain (1974) who mentioned that the highest eggs population density for the 2nd generation (autumn generation) was in

the 4th fronds row (equal 6 row in this study). However, the results agreed with him at the new frond rows between 7-10 (equal 1-3 rows in this study) from the 2nd generation that have no laid

eggs that might be subjected to the environmental conditions (temperature, humidity and wind velocity) and the service that expressed to the orchard. Also our results disagreed with those

found by Jasim and Al-Zubaidy (2010) which reported that the highest laid eggs density from the 2nd generation was in 1st and 2nd fronds rows (equal 9th and 10th fronds rows in present study).

Table 2. Spatial distribution percentage of Dubas Bug *Ommatissus lybicus* on Date palm fronds rows of Barhee variety in 2nd Autumn generation 2014.

Row	Leaflet length (cm)	Leaflet width in center (cm)	Frond length (cm)	Total eggs in row		Total nymphs in row		Honeydew quantity in row (gm)	
				Mean	%	Mean	%	Mean	%
1	48	2.00	320	0	0	0	0	0	0
2	49	2.50	350	0	0	3216	5.48	18.088	0.8
3	50	3.00	400	0	0	13668	23.29	79.996	3.4
4	50	3.00	425	60300	30.99	28140	47.95	118.904	5.1
5	51	3.50	440	107736	55.37	7236	12.33	183.308	7.9
6	51	3.75	455	26532	13.37	4824	8.22	323.200	13.8
7	51	3.75	460	0	0	1608	2.74	546.375	23.4
8	51	3.75	460	0	0	0	0	211.836	9.1
9	51	3.75	460	0	0	0	0	410.168	17.6
10	51	3.75	460	0	0	0	0	441.588	18.9
LSD	2.314	0.762	20.15						

Table 3. Honeydew quantity, eggs and of Dubas Bug *Ommatissus lybicus* on Date palm trees (Barhee variety) in 2nd Autumn generation 2014 at 75-80% eggs hatch.

Treatment	Total eggs	Total nymphs	Honeydew quantity (gm)		
			on leaflet	on Rachis	Grand total
On one date palm tree	194568	58692	2283.36	50.084	2333.463
On one Ha. Area (planted 100 tree)	194568800	5869200	228336	5008.4	233344.4
On one Ha. Area (planted 160 tree)	31130880	9390720	365337.6	8013.44	373351.04

The results from present investigation showed that the dubas bug females laid eggs on 4th, 5th and 6th fronds rows only, also the nymphs were found in 2nd, 3rd, 4th, 5th, 6th and 7th rows only. The highest quantity of honeydew was found in 7th row only as well. These highest population

densities caused high quantity of honeydew increasing the damages in date palm trees reducing the photosynthesis activities leading to reducing the quality and quantity of crop yield. The results of this study will be contributed positively on all future research projects

especially those of controlling programs via identifying the exact location that can be targeted when applying management technique.

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