

Seasonal fluctuation of the white peach scale insect, *Pseudolacaspis pentagona* (Targioni) and its associated parasitoid, *Aphytis* sp. At Mett-Ghamer, Dakahliya Governorate, Egypt

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ABSTRACT

Ecological Studies were carried out on the white peach scale insect, *Pseudolacaspis pentagona* (Targioni) at Meet-Ghamer, Dakahliya Governorate throughout two successive years started from February 1977 till January 1999. The study of the first year showed that the total population of *P. pentagona* had five peaks recorded on mid February, early of April, July, November 1997 and January 1998. In the second year of investigation, peaks were recorded on mid of March, May, July, early November and mid December 1998. The study clearly showed that the nymphal stage had four high infestation periods through the 1st and 2nd year of investigation. The same results were recorded for *P. pentagona* adult females, while results concerning the ovipositing females had a curve of three peaks. The study of seasonal abundance of *Aphytis* sp. as a mortality biotic factor showed that the total population of *Aphytis* sp. parasite had five peaks; the first started from early February till early April, the second main peak started from early November 1997 till mid January 1998. In the second year of investigation, the parasitoid total population had a curve of six peaks. On the other hand, the larval stage of *Aphytis* sp. recorded five annual peaks on early March, mid April, early of June, August 1997 and early January 1998. However, the pupal stage showed low density in compared with the larval stage. The percentage of parasitism of *Aphytis* sp. immature stage had a curve of five peaks in the two years; the highest one on mid January 1998, 1999 in the first and second year of investigation, respectively.

Keywords: Seasonal fluctuation, white peach scale insect, *Pseudolacaspis pentagona* (Targioni), *Aphytis* sp.

INTRODUCTION

The white peach scale insect, *P. pentagona* belonging to Order: Homoptera-Family: Diaspididae (Ezzat and Nada, 1986), which attacks branches and twigs of peach trees. It sucks a great amount of sap causing dry of branches and defoliation of leaves.

Habibian and Assadi (1989) recommended that white peach scale insect had three generations annually, the first begins in early May, the second around mid July and the third in early September. Erklie *et al.* (1995) recommended that population fluctuation from November 1991 to November 1993 were observed at 4 locations representing 2 different types of ecological conditions. Kreiter *et al.* (1997) found that in field studies in Emilie-Romagne, Italy in 1995, *P. pentagona* had 3 generations per year; the 1st one occurred in April to July, the 2nd from July to September and the 3rd one from September, overwintering as gravid females. Also, Nalepa and Meyer (1990) showed that the white peach scale insect exhibited three peaks of crawler

emergence, and a partial fourth generation was observed in both years. Three species of Hymenopteran parasites consistently collected from traps were the primary parasites, *Encarsia berlesi* (Howard) and *Aphytis proclia* (Walker) and the hyperparasite, *Marietta comesi* (Howard). Populations of all three parasitoid showed seasonal peaks of activity that differed in the two years of study.

The present study aimed to contribute some of the necessary information to achieve successful integrated pest management for white peach scale insect, *P. pentagona*.

MATERIALS AND METHODS

1. Seasonal fluctuation of *P. pentagona* and its parasitoid, *Aphytis* sp. at Mett-Ghamr, Dakahliya Governorate:

a. Sampling and assessment:

Sampling was taken once every fortnight within the two successive studied years from first February 1997 till mid January 1999. Sample of 30 peach branches (6 cm each) were replicated 3 times and picked at random from the 10 untreated and highly infested peach trees at Meet Ghamer, Dakahliya Governorate. The samples packed in paper bags, transferred to the laboratory for examination. The samples were examined every fortnightly by counting *P. pentagona* different stages by means of a binocular microscope. Also, the monthly variation (V.) value was calculated by dividing the total number recorded in a month over that found in a preceding one.

The number of generations of this scale was estimated from the changes in the half-monthly nymphal stage percentages throughout the two successive years.

The seasonal fluctuation of the main associated Hymenopterous parasitoid, *Aphytis* sp. as a biotic mortality factor for the white peach scale insect, *P. pentagona* was also studied where the parasitized scale insect were counted fortnightly and classified into larvae and pupae. Also, the rote of parasitism was recorded throughout the two successive years of investigation.

2) Statistical analysis:

several trials of simple correlation were carried out to chose the most effective factors to determine the simultaneous effect of four selected a biotic factors in addition to one biotic factors on the variability within the population, several trials using the partial regression method termed the "C-multipliers" were applied by the help of a computer, M.S Programm.

RESULTS AND DISCUSSION

Seasonal fluctuation of the white peach scale insect, *P. pentagona* total population on peach trees:

Data presented in Tables (1&2) and illustrated in Figs (1&2) showed that, *P. pentagona* total population had a dynamic curve with five peaks recorded on mid February and early of April, July, November 1997 and January 1998 with 726, 588, 331, 853 and 647 individuals/30 peach branches, respectively. However, the high population of this pest was recorded in autumn, winter and the moderate in late spring and summer seasons. On the other hand, four annual depressive periods occurred on early March, mid of May, August 1997 and January 1998 where the low population numbers being 193, 195, 52 and 109 individuals/30 peach branches, respectively.

In the 2nd year of study, revealed that the *P. pentagona* population density had five peaks of infestation recorded on mid of March, May, July, early November 1997

and mid December 1998 with total population of 366, 490, 732, 564, and 747 individuals/30 branches, respectively.

Table (1): Seasonal abundance of *P. pentagona* stages and total population on peach trees, the half monthly variation (v) and the percentage of nymphal stage in relation to climatic factors from early Feb. 1997 till mid Jan. 1998 at Dakhliya Governorate

Season	Sampling date	No. of individuals /30 branches				Monthly variation (v)	% nymphal stages	Climatic factors			
		Nymphs	Ad. Females	Ad. + eggs	Total pop.			Temp.		RH	Light
								Min	Max		
Winter	1/2/1997	123	261	15	399	-	30.8	8.3	24	62	10.4
	15/2	358	303	65	726	1.83	49.3	10.6	21.4	67	13.3
	1/3	43	74	67	193	0.27	22.3	9.3	20.5	65	12.2
	15/3	52	148	71	271	1.4	19.2	11.4	26.2	67	12.2
Spring	1/4	500	20	68	588	2.17	85.1	11.6	27	64	12.4
	15/4	250	16	53	319	0.54	78.4	12.2	29.2	53	12.9
	1/5	115	70	21	206	0.65	55.8	13.3	33	55	13.1
	15/5	64	120	11	195	0.95	32.8	18.5	33.1	58	13.5
	1/6	35	146	15	195	1	17.9	20.0	34.8	55	13.6
	15/6	75	91	38	204	1.05	36.8	20.1	34	60	13.7
Summer	1/7/1997	234	54	43	331	1.62	70.7	22.3	33.1	63	13.6
	15/7	68	38	89	195	0.59	34.9	20.7	33.4	67	13.4
	1/8	14	10	47	71	0.36	19.7	20.3	38	64	13.2
	15/8	20	13	19	52	0.73	37.5	20.0	35.7	64	13.8
	1/9/	112	22	36	170	3.27	65.9	19.5	33.4	63	12.6
	15/9	150	24	136	310	1.82	48.4	20.4	31.5	58	12.1
Autumn	1/10	313	50	99	462	1.49	67.7	19.2	31.2	55	11.8
	15/10	617	88	51	756	1.64	81.6	17.1	30.6	58	11.4
	1/11	748	91	14	853	1.13	87.7	13.8	27.8	62	11.1
	15/11	377	150	6	533	0.62	70.7	11.2	25.2	60	10.8
	1/12	177	190	-	367	0.69	48.2	8.5	19.6	63	10.7
	15/12	29	311	-	420	1.10	25.9	9.5	21.2	65	10.6
Winter	1/1/1998	21	686	-	647	1.75	6.3	9.0	22.3	68	11.0
	15/1	6	103	-	109	0.15	13.4	7.3	20.5	64	10.9
Total	-	4501	3079	964	8572	-					
Mean	-	187.54	128.29	40.17	357.17						

Table (2): Seasonal abundance of *P. pentagona* stages and total population on peach trees, the half monthly variation (v) and the percentage of nymphal stage in relation to climatic factors during season (1998-1999) at Dakhliya Governorate.

Season	Sampling date	No. of individuals /30 branches				Monthly variation (v)	% nymphal stages	Climatic factors			
		Nymphs	Ad. Females	Ad. + eggs	Total pop.			Temp.		RH	Light
								Min	Max		
Winter	1/2/1998	37	269	2	308	-	12.01	11.1	22	61	11.3
	15/2	63	136	7	206	0.67	30.6	9.3	22.9	64	11.5
	1/3	170	12	42	224	1.09	75.9	10.8	22.8	63	11.1
	15/3	286	15	65	366	1.63	78.1	12.2	25.4	66	12.2
Spring	¼	202	49	45	296	0.81	68.2	13.8	27	64	12.5
	15/4	112	45	33	190	0.57	58.9	14.3	29	58	12.9
	1/5	313	164	6	483	2.84	64.8	18.2	25.3	61	13.1
	15/5	154	322	14	490	1.01	31.4	19.8	34.9	59	13.5
	1/6	97	182	56	335	0.68	28.9	20.1	35.8	65	13.6
	15/6	210	95	45	350	1.04	60	21.8	36.5	67	13.7
Summer	1/7/1998	548	143	22	713	2.04	76.9	22.1	33.5	64	13.6
	15/7	296	424	12	732	1.03	34.5	23.2	33.6	61	13.4
	1/8	156	220	17	393	0.64	39.7	22.9	34.9	56	13.2
	15/8	137	40	21	198	0.55	69.2	23.2	33.3	63	12.8
	1/9/	167	69	59	295	1.66	56.6	22.7	35.2	61	12.5
	15/9	195	79	128	402	1.63	48.5	22.3	34.8	59	12.1
Autumn	1/10	344	82	76	502	1.25	68.5	20.4	30	62	11.8
	15/10	410	98	43	551	1.10	74.4	14.3	28.6	60	11.4
	1/11	340	218	6	564	1.02	60.3	15.4	27	58	11.3
	15/11	159	86	48	293	0.52	54.3	13.7	25.9	60	10.9
	1/12	146	314	21	481	1.64	30.3	10.9	23.4	63	10.7
	15/12	138	602	7	747	1.55	18.5	10.2	22.1	65	10.6
Winter	1/1/1999	107	359	3	469	0.63	22.8	9.8	21.1	60	10.6
	15/1	50	119	1	170	0.36	29.4	8.4	19.7	62	10.9
Total	-	4837	4142	779	9758						
Mean	-	201.54	172.58	32.46	406.58						

However, the higher population recorded in early summer and autumn seasons, where the moderate numbers occurred in winter and spring seasons.

The activity of *P. pentagona* in the second years of investigation was 1.15 time of the first one. Where the total annual means were 406.58 and 357.17 individuals/30 branches, respectively.

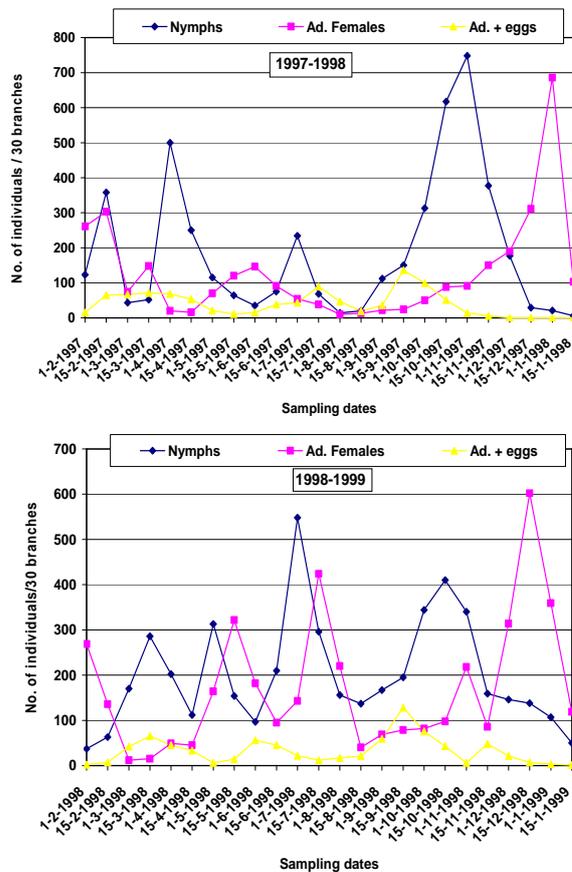


Fig. (1): Seasonal abundance of *P. pentagona* different stages on peach trees at (1997-1998) and (1998-1999) seasons at Dakahlia Governorate

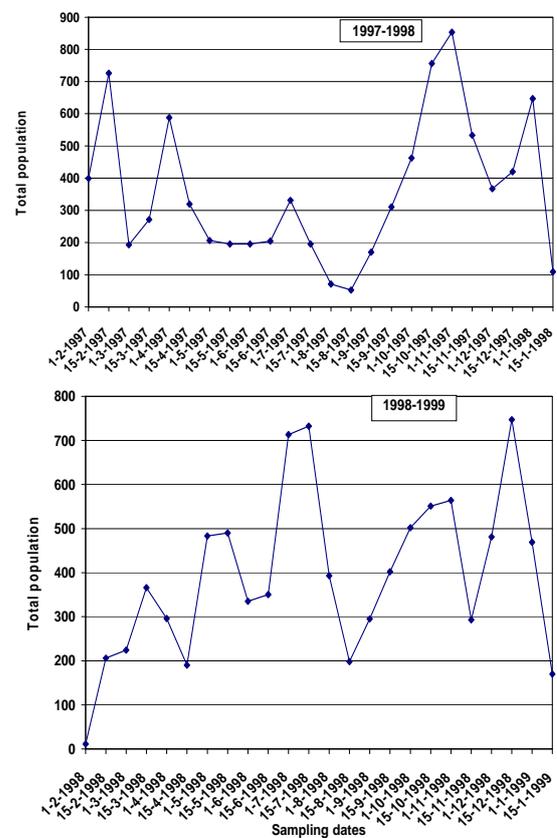


Fig. 2: Seasonal abundance of *P. pentagona* total population on peach trees during (1997-1998) and (1998-1999) seasons at Dakahlia Governorate.

The obtained results are agree with those obtained with Ding (2003) who showed that the mulberry white scale, *Pseudauleacapsis pentagona* had 4 generations a year in Gutian area. The adult females hibernate on the branches and start egg-laying when the mean daily temperature reaches 17°C. The peak periods of the young scales are in mid-April, early to mid-July, early-mid September and mid-late October.

Seasonal abundance of different stages of *P. pentagona* on peach trees.

Data in the previous tables showed that the nymphal stages had four high infestation periods throughout the first and second years of investigation. On the other hand, low infestation periods with nymphs were happened during March, from mid May to mid June, from mid July till mid September 1997 and mid December 1997 till mid January 1998, however, the average nymphs numbers ranged between 6-150 nymphs/30 branches but in the 2nd year of the study, the nymphal infestation had four annual peaks were registered on mid March, early May, July and mid October 1998. The average number was 286, 313, 548 and 410 nymphs/30 branches, respectively.

On the left side, two low numbers of *P. pentagona* females infestation recorded on early March and mid April with 74 and 16 females/30 branches, followed by a long depressive period started from early July till early October with a lowest number in early August 1997 (10 females /30 branches). The 2nd year of investigation, data showed that, adult females recorded 5 peaks of infestation on early February (269),

mid May (322) mid July (424), early November (218) and mid December 1998, with the highest peak of infestation (602 females/30 branches).

However, the high population of gravid females recorded in late winter and summer seasons and the moderate population were in spring and early autumn seasons. On the other hand, the ovipositing female had four periods of low infestation on early February (15), mid of May (11), August (19) and November (6) ovipositing females/30 branches.

The obtained results agreed with those obtained with Zhou (1999) he found that the mulberry white scale, *Pseudaulacaspis pentagona* is an important pest of peach in Yichang area, China. *P. pentagona* has 3 generations in a year and the hibernated adults lay eggs in mid-April. Second instar insects are light-yellow/yellow in color and the third instars are pink-red/red.

The monthly variations (V):

Data in Table (1) proved that the most favorable periods for *P. pentagona* total population activity occurred during the two years of investigation from early February 1997 till mid January 1999 were recorded on mid February, early of April, July, September 1997 and early January 1998, where the monthly variation (V) values being 1.83, 2.17, 1.62, 3.27 and 1.75, respectively. These results may be due to the favorable climatic factors during these periods where the minimum temperature ranged between (10.6- 22.3°C), maximum temperature (21.4-33.4°C), RH (63-68%) and the light period (11.0-13.6 hours). On the other hand, the unfavorable period for *P. pentagona* for total population develop were recorded on early March, mid April, early August, mid November 1997 and mid January 1998 where the minimum monthly variation (V) values were 0.27, 0.54, 0.36, 0.62 and 0.15, respectively. Such depression numbers were occurred under the efficacy of the abiotic factors. The biotic factor, *Aphytis* sp. results are in agreement with those obtained by Jiang (1985) Guyot and Quilici (1987).

Number of generations of *P. pentagona* on peach tress:

From the previous data clearly showed that, *P. pentagona* had five annual generations.

The obtained results are harmony with those obtained with Pan *et al.* (2003) found that *Pseudaulacaspis pentagona* is a plum pest, in northern Zhejiang, China, and had 3 generations every year. The nymph and female adult damaged 2-year-old plum branches resulting in yield decrease and even plant death. The peak period of the first generation nymph occurred in mid- and late-May (when the fruit nears maturation period).

Analysis of data clearly showed that the first 4 generations occurred in the same periods of the monthly variations (v) high records also, the fifth generation of early November happened with (v) value of 1.2. The 1st generation of mid February may be due to the good efficiency of climatic factors especially, RH and day light period which were 67% and 13.3 hrs, respectively, and record of the Max. temp. (21.4°C). Also, the low rate of parasitism (35.4%) at the same time was considered a main reason of this generation. The 3rd and 4th generation of early July and early September were as the same, were happened as a result of the good effect of a biotic factors, which ranged between (22.3-19.50°C) (33.1-33.4°C), (63%) and (13.6-12.6 hours) in cases of min, max. temp., RH and light period, respectively.

Regarding to biotic factors efficacy, the parasitism rate of the main associated *P. pentagona* parasitoid, *Aphytis* sp. recorded 26.6 and 54.7 % at the same periods, respectively as showing in Table (3) and Fig. (3).

Table (3): Half monthly counts of *Aphytis* sp. the associated parasitoid of *P. pentagona* ,pre-adult stages, total number and the rate of parasitism on 30 peach branches at Dakahlia Governorate from Feb. 1997 till mid of Jan. 1999.

Season	Sampling date	Season 1997-1998				Sampling date	Season 1998-1999			
		Larvae	Pupa	Total pop.	Rate of parasitism		Larvae	Pupa	Total pop.	Rate of parasitism
Winter	1/2/1997	255	73	328	45.1	1/2/1998	45	75	120	28.0
	15/2	393	5	398	35.4	15/2	26	22	98	32.2
	1/3	536	30	566	74.6	1/3	39	32	71	24.1
	15/3	423	6	429	61.3	15/3	61	20	81	18.1
Spring	¼	228	5	233	28.4	¼	324	33	357	54.7
	15/4	272	2	274	46.2	15/4	49	7	56	22.8
	1/5	221	7	228	52.5	1/5	113	14	127	20.8
	15/5	196	3	199	50.5	15/5	771	77	848	63.4
	1/6	278	9	287	59.4	1/6	464	52	516	60.6
	15/6	238	14	252	55.3	15/6	216	5	221	38.7
Summer	1/7/1997	93	27	120	26.6	1/7/1998	114	15	129	15.3
	15/7	187	29	216	52.6	15/7	288	25	313	30
	1/8	249	54	303	81.0	1/8	147	8	155	28.3
	15/8	187	66	253	83.0	15/8	56	3	59	23.0
	1/9/	164	41	205	54.7	1/9/	288	-	288	49.4
	15/9	177	65	242	43.8	15/9	65	-	65	13.9
Autumn	1/10	162	75	237	33.9	1/10	191	-	191	27.6
	15/10	140	80	220	22.5	15/10	183	3	186	25.2
	1/11	108	43	151	15	1/11	93	9	102	15.3
	15/11	260	32	292	35.4	15/11	294	24	318	52.1
	1/12	289	13	302	45.1	1/12	354	-	354	42.4
	15/12	402	7	409	49.3	15/12	600	42	642	46.2
Winter	1/1/1998	717	20	737	53.3	1/1/1999	572	9	581	55.3
	15/1	333	36	369	77.2	15/1	575	27	602	78.0
Total		6508	742	7250			5928	502	6430	

These results are in agreed with those obtained by Brailoiu (1998) in Romania, detected that *Pseudaulacaspis pentagona* for the first time in 1988 on mulberry plantations in the Baneasa area of Bucharest. The pest had two complete generations overlapping and one overwintering generation in the stage of fertilized females. On the left side, the biotic factor was in lowest record, where, the rate of parasitism being 15% at the same period of 5th generation.

Whereas, the incidence percentage of nymphs were 78.1, 64.8, 76.9, 69.2 and 74.4, respectively.

This data agree with those obtained by Nalepa and Meyer (1990) recorded that *P. pentagona* had four generations.

Seasonal fluctuation of *Aphytis* sp. as a mortality biotic factor influencing *P. pentagona* Population density on peach trees:

Laboratory examination of collected peach branches infested by white peach scale inset, *P. pentagona* showed the presence of one Hymenopterous parasitoid ; *Aphytis* sp belonging to order Hymenoptera, family : Aphelinidae. It is highly host specific ectoparasite of white peach scale insect.

Analysis of data in Table (3) and Fig.(3) proved that *Aphytis* sp. total population had a dynamic curve with 5 peaks; two main peaks; the 1st started from early February till early April, where its top recorded on early March with 566 individuals/30 branches. However, the 2nd main peak started from early November 1997 till mid January 1998, its top happened on early January 1998 with 737 individuals/30 branches.

The obtained results were not agree with those obtained with Shinano (1976) who found two generations of the parasite *Aphytis* sp. were produced annually at Nara where the average temperature was 12.7°C, and 3 at Norinsho where it was 14.6°C.

In between, three low peaks of *Aphytis* sp. parasitoid total population were recorded during mid April, early June, August (1997) with 274, 287 and 303 individuals of *Aphytis* sp. total population /30 branches.

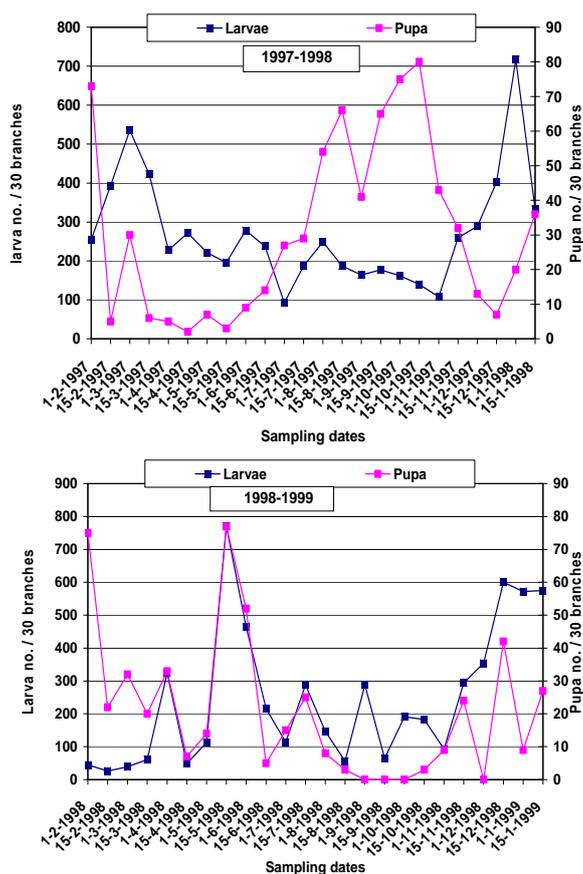


Fig. (3): Half monthly counts of *Aphytis* sp. the associated parasitoid of *P. pentagona*, pre-adult stages on 30 peach branches at Dakahlia Governorate from early Feb. 1997 till mid of Jan. 1999.

But in the 2nd studied year showed that, parasitoid total population had a curve of six peaks of *Aphytis* sp. The 1st one is from mid March till early April with a top of 357 parasitized scales/30 branches in early April. The 2nd highest peak from mid April till early July with 848 individuals/30 branches in mid May. The 3rd and 4th peaks were moderate and recorded on mid July to early September with 313 and 288 parasitized scales/30 branches. The 5th and lowest peak was occurred in early October 1998 with 191 parasitized scales/30 branches. The 6th peak was recorded in mid Jan. 1999 with 602 parasitized scales/30 branches.

On the other hand, the lower *Aphytis* sp. population were recorded on early July and early November in the 1st year with 120 and 151 parasitized scales/30 branches, respectively. However, data of the 2nd year of investigation indicated that, the lower occurrence of the parasitoid happened on early March (71), mid April (56) mid August (59), mid September (65) and early November 1998 (102 parasitized scale insects/30 peach branches).

These results of the two years of investigation proved that the proper time of *P. pentagona* integrated pest control are in early July and early November, where the insect population began to increase and its parasitoid, *Aphytis* sp. are in low population.

Seasonal abundance of *P. pentagona* parasitoid, *Aphytis* sp. different stages on peach trees:

The highest occurrence of *Aphytis* sp. larvae Table (3) and Fig. (3) recorded five annual peaks on early March (536), mid April (272) early of June (278), August 1997 (249) and early January 1998 (717 larvae/30 branches).

On the left side, the low density of *Aphytis* sp. larvae were recorded on early July and early November 1997 with 93 and 108 larvae/30 branches.

However, the pupal stage showed low density in compared with the larval stage, where its high numbers registered on early February (73), early March (30), mid August (66) mid October 1997 (80) and mid January 1998 with (36) pupae/30 branches.

Concerning the obtained data in the 2nd year of investigation in the same Table (3) could be seen that, *Aphytis* sp. larval stage had a curve of five peaks occurred on early April (324), mid May (771), mid July (288), early September (288) and mid December 1998 (600 larval stages/30 branches), while the lowest population of larval stage were recorded on mid February (26), mid of April (49), August (56), September (65) and early November with (93 larvae/30 branches).

The parasitic role of *Aphytis* sp. as biotic mortality factor influencing *P. pentagona* Population density:

Data represented in Table (3) clearly showed that the percentage of parasitism of *Aphytis* sp. had a curve of five generations appeared on early February (45.1%), early March (74.6%), early June (59.4%) mid August 1997 (83.0%) (the highest one) and mid January 1998 with (77.2%).

On the other hand, three depressive parasitism rate were recorded during early April (28.4%), early July (26.6%) and early November 1997 with 15.0% parasitism, while in the 2nd year of study, the *Aphytis* sp. immature stage recorded its sufficient percentage on early April, mid May, early September, mid November 1998 and mid January 1999 with 54.7, 63.4, 49.4, 52.1 and 78.0%, respectively. This data agree with that obtained with Gardona and Viggioni (1988).

These results means that, *P. pentagona* associated parasitoid had five generations per season in the first and second years of investigation, respectively.

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ARABIC SUMMARY

التغيرات الموسمية لحشرة الخوخ القشرية البيضاء بسيدولاكسبس بنتاجونا (ترجونى) والطفيل المصاحب لها أفيئس سبيشز في ميت عمر في محافظة الدقهلية - مصر

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2- قسم الحشرات - كلية العلوم - جامعة بنها

أجريت هذه الدراسة في حديقة خوخ بقرية سنماى - مركز ميت عمر محافظة الدقهلية لمدة عامين متتاليين بدأ من سنة 1997 وحتى منتصف يناير 1999.

ولقد اشتملت الدراسة أولاً على التغيرات الموسمية للأعداد الكلية لهذه الحشرة وتبين انه يوجد خمسة فترات من الإصابة الوبائية سجلت خلال منتصف فبراير، وأول إبريل، يوليو، نوفمبر 1997، وأول يناير 1998 من العام الأول وخلال منتصف مارس، مايو، يوليو، أول نوفمبر ومنتصف ديسمبر 1998 من العام الثانى.

أما التغيرات الموسمية للأطوار المختلفة لهذه الآفة كانت كالتالى :

- ارتفع تعداد الحوريات خلال أربع فترات في سنتى الدراسة سجلت فى وسط فبراير، أول إبريل، يوليو، نوفمبر 1997 فى السنة الأولى و سجلت فى وسط مارس، أول مايو، ويوليو، ومنتصف أكتوبر 1998 فى السنة الثانية.
- نفس النتائج سجلت بالنسبة للأنثى الكاملة أما بالنسبة للإناث واضعة البيض سجلت أعلى ارتفاع خلال ثلاث فترات فى السنة الأولى وهى منتصف مارس، يوليو، و سبتمبر
- أثبتت الدراسة الإيكولوجية لهذه الآفة ان لها خمسة أجيال فى السنة.

أما التغيرات الموسمية لطفيل الأفيئس المصاحب لحشرة الخوخ القشرية البيضاء كعامل حيوى محدد لكثافتها العديدة، سجلت الدراسة خمس فترات ارتفاع لهذا الطفيل خلال السنة الأولى (أول فبراير الى أول إبريل) وكانت قمتها فى أول مارس، و الارتفاع الثانى (أول نوفمبر 1997 الى منتصف أول يناير 1998) وكان بينهما ثلاث فترات متوسطة فى نسبة النطفل خلال منتصف إبريل، أول يونية وأول أغسطس 1997 أما السنة الثانية فسجلت ست فترات ارتفاع كانت قمتهم فى أول إبريل ومنتصف مايو.

أما التغيرات الموسمية للأطوار المختلفة لطفيل الأفيئس ودوره كعامل حيوى مؤثر على كثافة حشرة الخوخ القشرية البيضاء سجلت الدراسة خمس فترات نشاط لطور اليرقة خلال العامين أما العذارى فقد سجلت ست فترات نشاط خلال موسم الدراسة كان أعلاها خلال أول فبراير ومنتصف مايو.