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ECOLOGICAL STUDIES ON THRIPS, *GYNAIKOTHRIPS FICORUM* (MARCHAL) (THYSANOPTERA: PHLOETHRIPIDAE) INFESTING FICUS TREES, *FICUS BENJAMINA*

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ABSTRACT: Population dynamics of *Gynaikothrips ficorum* (Marchal, 1908) (Thysanoptera, Phlaeothripidae) and monthly fluctuations of thrips populations infesting *Ficus benjamina* trees were monitored in El- Zohria Garden, Cairo Governorate and in Smart village, 6 October city, Giza Governorate, Egypt. The relation between the population activity of the tested insect and weather factors were studied during the 2018 year months (January to December) on the ornamental trees *Ficus benjamina*. The obtained results indicated that the total stages of the Thrips *G. ficorum* have two activity generations along the year of study . The number of eggs were significantly increased in July with 64 eggs and were slightly in October with 19 eggs. Presence of eggs was rare in August and September. The nymph stages were present from March and April with 39, and were slightly in December. Presence of nymphs was rare in August. Adults were active in May and June, reaching 39 individuals. The highest numbers of total thrips adults were observed in March and April. The number of adults were gradually increased reaching a maximum of 117 individuals. Statistical analysis of the data shows that the simple correlation and simple regression between the maximum, minimum temperature and relative humidity with the monthly mean of the total population, adults, nymphs and egg stages, of *G. ficorum* ranged between significant and highly significant at El-Zohria Garden, Cairo Governorate. The same trend was observed in Smart village, 6 October city. Generally the infestation of *G. ficorum* thrips in El- Zohria Garden, was more than that in Smart village.

Key words: *Gynaikothrips ficorum*, *Ficus benjamina*, population fluctuation, weather factors

INTRODUCTION

Ornamental plants have a great value for the human as either a producer or as he is a consumer. It is known, that such plants are pleasing to the eye Later they became as one of the important components for increase income for the groers themselves and for national income by exporting such plants to different foreign countries, (Emam, 2009).

Ornamental plants are suffering from attack and damage caused by different insect pests infesting them causing a lot of injury which lids to reducing qualitative and quantitative values of them. Thrips insects are among of them. (Abul Naser 1975, Sauer, 1997, Kumar *et al.*, 2006 and Somalia, 2006). In recent year due to the active marketing of ornamental plants, large number of non-native insects have penetrated in different continents and countries. After introduction into a new area, they may become acclimatized, surviving outdoors. In some cases these are very harmful species. Thrips insects not only cause significant damage to ornamental plants, reduce their aesthetic and market values but also may threaten the native flora. Thus, their invasion becomes a global environmental problem regarded as one of the main factors that lead to a decline in regional biodiversity (FAO

2003, Chornesky *et al.,* 2005). Thrips insects originate from Southeast Asia, but have been described from Africa; they are associated with Moraceae plants and especially infest the ornamental ficus and fruiting figs causing considerable damage (Mound, 2009, Dang *et al*., 2014). Leaf-gall thrips in the genus *Gynaikothrips* originating in southeast Asia infest ficus. Thrips insects feed on other hosts, particularly other species of the genus *Ficus*, namely *F. axillaris*, *F. aurea*, *F. Benjamina*, *F. elastica*, *F. retusa*, as well as *Codiaeu variegatum, Melicocca bijuga*, *Nicotiana tabacum*, *Viburnum suspensum* and *Citrus sp*. Thrips insects has also been found on *Eucalysptus* sp. in Cuba, *Gliricidia* in Puerto Rico, *Calicarpum sp*. in Colombia (Denmark, 1967). Watson (1923) listed the genus in his key to thrips of North America. Two species, recognized as distinct by Priesner (1939) based only on differences in the length of the pronotal setae, are established in Florida: *Gynaikothrips ficorum* (Marchal) and *Gynaikothrips suzeli* (Zimmerman). The researchers suggested that *Gynaikothrips ficorum* is probably a form of *Gynaikothrips uzeli* that has been spread by the horticultural trade. They are commonly called Cuban laurel thrips and weeping fig thrips, respectively. Thrips are one of the most common pests of ficus trees, roses and carnation, which are severely responsible for decreasing plant growth, crop quality, yield, vase life.

Thrips suck the sap from the leaves, causing them to turn yellow and patchy often with black streaks and slight crinkling. While most *Gynaikothrips* spp. are of Asian origin, species in this genus have been described from Africa. *Gynaikothrips ficorum*is pantropical, appearing wherever *Ficus microcarpa* L. is planted (Denmark, 1967). Thrips species may attack a wide range of plant species belonging to several botanical families (Belharrath *et al*., 1994, Kirk 2001, Cloyd 2009). The galls induced by thrips insects reduce the photosynthetic activity of the plants and depreciate their ornamental value due to discolored and curled leaves. Furthermore, adult thrips can be very annoying, landing and involuntarily biting people, causing skin irritation (Piu *et al.,* 1992). Thrips are important pests of greenhouse vegetable and ornamental crops around the world (Lewis, 1997, Moritz, 2002).

The aims of this study were to study the monthly fluctuation of *Gynaikothrips ficorum,* and its relation with weather factors, temperature and humidity.

MATERIALS AND METHODS

The present study aims to study the thrips, *Gynaikothrips ficorum* prevailing on ornamental trees *Ficus benjamina*. As well as, to throw light at the population fluctuation of the most dominate thrips species infesting such plants and the effect of weather factors on its activity. The study was carried out throughout the period extending from January to December 2018. Two locations were chosen to carry out the present study, the first was El- Zohria garden, Cairo governorate, while the second location was Smart village, 6 October city, Giza Governorate.

Ecological studies:

Thrips. *Gynaikothrips ficorum* was the most dominant thrips on the tested *Ficus benjamina*. To study the population fluctuation of thrips, *G. ficorum* on ornamental trees *F. benjamina* , twenty five leaves were collected from each tree which were selected randomly. This experiment was carried out at El- Zohria Garden, Cairo Governorate and in Smart village, 6 October city indicated throughout one year extended from the beginning of 2018 to the end of 2018.

Five leaves were taken from each cardinal directions, while 5 leaves were

taken from the core of the tree. Observations were recorded at intervals of 15 days. Immediately after collection of leaves, the samples were picked up in cloth bags and taken to the laboratory for examination under stereoscopic dissecting microscope. Identification of insects was carried out to *G. ficorum* at Plant Protection Research Institute Doki, Giza, Egypt. The numbers of insect stages were recorded. In addition, direct count method was done in this experiment according to Patel (2015).

Effect of weather factors:

In order to evaluate the influence of weather factors on the fluctuations observed in the numbers of thrips, *Gynecothrips ficorum* , on *Ficus benjamina.* Records of certain weather factors were obtained from the central laboratory for Agricultural meteorology, Agricultural Research Center, Ministry of Agriculture. Weather factors were : daily maximum temperature (D. Max.T.), daily minimum temperature (D. Min. T.) and daily mean relative humidity (D.M. R.H.). The daily records of each weather factor were grouped into biweekly averages, according to the sampling dates. These averages were assumed to represent the field records of weather factors at the sampling dates.

Statistical analysis :

Statistical analysis was carried out to obtain the relation between the changes in thrips *G. ficorum* numbers on *Ficus benjamina* trees and the changes recorded in weather factors in the experimental location. The simple correlation (r) and regression coefficient value (b) were adopted to clarify the change in insect population due to change in each of weather factors and the mean values compared with the least significant differences as well as, SAS program (SAS Institute 1988).

RESULTS AND DISCUSSION

Population fluctuations of the different stages of *G. ficorum* on *F. benjamina* trees during 2018 year :

It is well-known that precise knowledge of appropriate date of *Gynaikothrips ficorum* activity of the one hand and the number and duration of annual field generations from the other considers the fundamental basic information for Integrated Pest Management programs. This work was dedicated to monitor the changes in the population density of the *G. ficorum*, which occurs on the *F. benjamina* trees, by integrating the fluctuations in the seasonal abundance curve expressed as number of half monthly counts on *F. benjamina* trees at El- Zohria Garden, Cairo Governorate and Smart village, 6 October city Giza Governorate.

1. The population at El- Zohria Garden:

Data recorded in Table (1) and graphically illustrated in Fig. (1) show the population fluctuations of the nymph and adult stages of thrips , *G. ficorum* at El-Zohria Garden. Bi weekly counts of the different stages (eggs, nymphs and adults) along January to December 2018 year were done. As shown in Table (1) and Fig. (1) the population fluctuations of the two stages significantly different all over the year, the fluctuations in the population density of nymphs throughout all 2018 year samples. The integration of the seasonal abundance curve revealed the presence of two peaks, which represent two overlapping generations.

Total stages:

The thrips individuals appeared by early of January and increased gradually to make the first generation with the highest number by 6th week of March by 117.3 thrips / leaf. The weather factors, maximum, minimum temperature °C and

relative humidity% were 27, 16.3 °C and 82%., respectively. The highest mean number (77.2 individuals) was recorded when maximum temperature was 19.2°C and minimum temperature was 12.4 °C , while the relative humidity was 74%.

The population density was high and appeared the most economically important, after that, the infestation with all stages decreased and disappeared during July and mid August (Table 1 and Fig.1).

Table (1): Biweekly average numbers of eggs, nymphs and adults thrips of *Gynaikothrips ficorum* (Marchal) infesting *Ficus benjamina* trees in El- Zohria Garden, during 2018 year.

Sampling dates	Average no. of stages				Weather factors (means)		
	Adults / leaf	Nymphs/ leaf	Eggs/ leaf	Total stages / leaf	Max. Temp	Min. Temp	RH%
01/01/2018	13	12.8	12.6	38.4	18.3	11.1	72
15/01/2018	16.4	16.6	16.3	49.3	20.1	12	79
01/02/2018	20	19	13.6	52.6	18.2	11.5	77
15/02/2018	21.1	17.6	20.3	59	24.5	13.5	83
01/03/2018	19.3	28.3	36.6	84.2	22.4	14	78
15/03/2018	34	39	44.3	117.3	27	16.3	82
01/04/2018	30.6	36	34.6	101.2	28.8	16.2	72
15/04/2018	35	27.2	22.8	85	28.2	16.8	76
01/05/2018	39.3	38	25.6	102.9	29.9	19	70
15/05/2018	27.8	20	37.3	85.1	31.8	21.5	74
01/06/2018	16.2	14.3	50.5	81	36	23.4	70
15/06/2018	11.9	16.6	62.3	90.8	34.9	23.2	77
01/07/2018	8.7	17.2	64.3	90.2	36	25.3	74
15/07/2018	7.3	8	33.6	48.9	35.3	24.5	82
01/08/2018	0	0	12.1	12.1	35.7	25.7	80
15/08/2018	0	0	0	0	35.6	25.8	83
01/09/2018	10.8	10.8	0	21.6	34.8	24.9	82
15/09/2018	10.6	10.9	14.3	35.8	34.3	25.1	78
01/10/2018	10.9	12	20.6	43.5	33.3	23.5	83
15/10/2018	12.5	11.1	24.8	48.4	30.5	22.2	78
01/11/2018	14.4	15.8	27.5	57.7	29.5	20.1	68
15/11/2018	16.3	18	21.2	55.5	26.1	17.4	80
01/12/2018	22.7	23.3	22.3	68.3	24.5	16.2	79
15/12/2018	27.7	24.1	23.9	75.7	21	14.1	74
30/12/2018	28	24.9	24.3	77.2	19.2	12.4	74
Total	454.5	461.5	665.7	1581.7	-	-	-
Mean	18.2	18.4	26.6	63.2	-	-	-

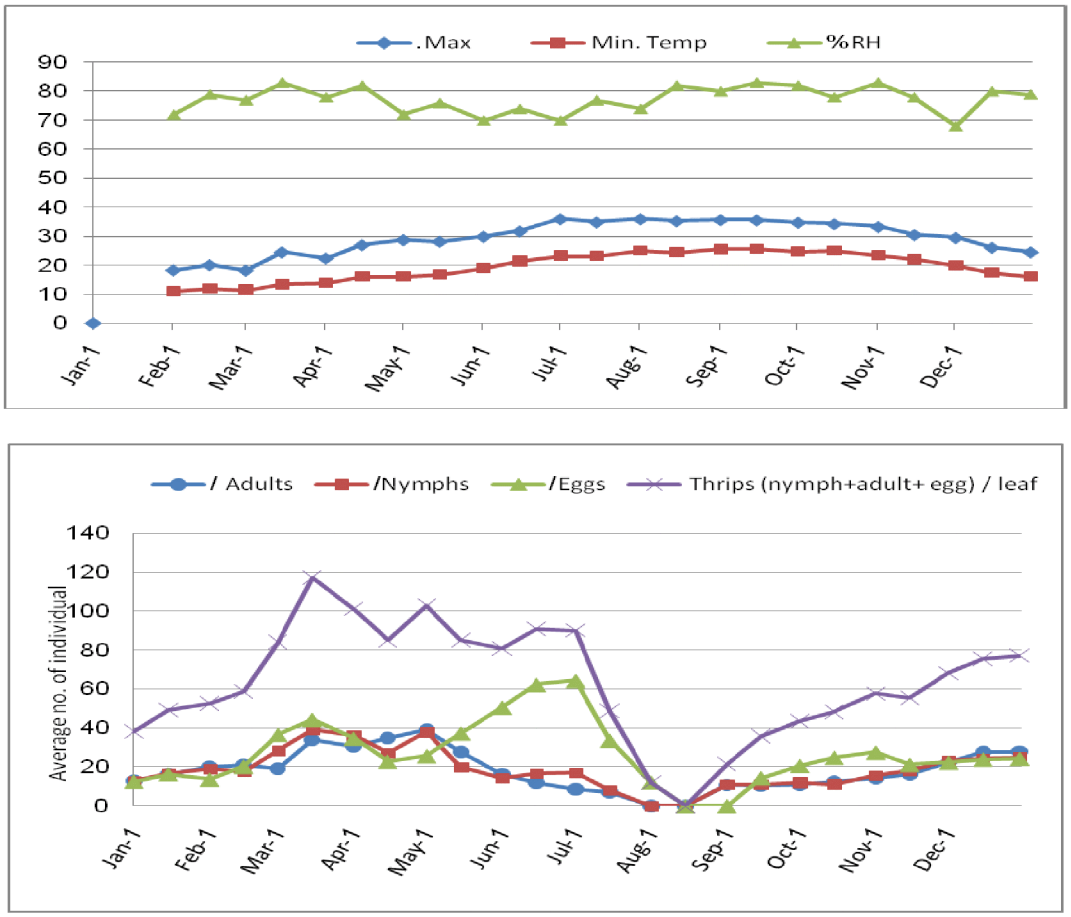

Fig. (1): Biweekly average numbers of *G. ficorum* eggs, nymphs and adult thrips on *Ficus benjamina* and weather factors at El- Zohria Garden during 2018 year.

The infestation with total stages reincreased and fluctuated to make the second generation on the end of December with the average mean number of 17.8 individuals when the maximum temperature was 20.9°C and minimum temperature was 13.1°C while, the relative humidity was 80%. This generation period demonstrated the moderate number as compared with the first generation.

Statistical analysis of the results in Table (2) show that the simple correlation between the maximum, minimum temperature and relative humidity on the monthly mean of the total population of *G. ficorum* were highly significant and significant and inverse relationship correlation (r = -0.175, -0.321 and -0.452*), respectively. In addition, results in Table (2), show that the simple regression of the maximum, minimum temperature and relative humidity on the monthly mean of total population of *G. ficorum* were highly significant and significant (b = 2.155, - 2.354 and - 0.320), respectively.

Adult stages:

The adults start to appear as early as January and increased gradually to make one activity infestation period with the highest number at the beginning of May with average mean number as 39.3 individuals when maximum temperature was 29.9°C and minimum temperature was 19 °C also the relative humidity was 70%; the population density was high and appeared the most economically

important, after that then the infestation with individuals decreased to first and mid August Table (1). The infestation with adults increased at the beginning of early September and increased gradually reaching the second infestation period at the end of December with average mean number 28 individuals when maximum temperature was 19.2 °C and minimum temperature was 12.4°C and 74% relative humidity. This infestation period demonstrated the moderate number as compared with the first infestation period of adults.

Egg stages:

The eggs start to appear as early as January and increased gradually to make one activity infestation period with highest number on beginning of early-July with average mean number 64.3 individuals when maximum temperature was 36°C and minimum temperature was 25.3°C also the relative humidity was74%; the population density was high and appeared the most economically important, after that then the infestation with eggs decreased to mid-August and beginning of Septamber Table (1). The infestation with eggs increased at mid-September and increased gradually to make the second infestation period in mid-October with average mean number 24.8 individuals when maximum temperature was 30.5°C and minimum temperature was 22.2°C also the relative humidity was 78% and decreased again till the end of the year. This infestation period demonstrated the moderate number as compared with the first infestation period eggs.

Statistical analysis of data in Table (2) shows that the simple correlation between the maximum, minimum temperature and relative humidity were significant or highly significant on the monthly mean of the total population of *G. ficorum* (r = 0.243, 0.135 and -0.346), respectively and inverse relationship correlation. The same tends was observed in Table (2), in case the simple regression (b = 4.565, -4.740 and -1.141), respectively.

Table (2): Correlation between biweekly average numbers of *G. ficorum* population on *F. benjamina* in relation to weather factors at El- Zohria Garden during 2018 year

weather factors (Variable)		Simple correlation		Partial regression values	
		r	P	b	P
Adults	Max. Temp	-0.460*	0.021	2.693	0.017
	Min. Temp.	-0.577**	0.003	-4.248	0.003
	R.H. %	-0.382	0.060	-0.515	0.157
Nymphs	Max. Temp	-0.422*	0.035	2.922	0.009
	Min. Temp.	-0.549**	0.005	-4.437	0.002
	R.H. %	-0.358	0.079	-0.439	0.215
Eggs	Max. Temp	0.243	0.242	4.565	0.031
	Min. Temp.	0.135	0.512	-4.740	0.062
	R.H. %	-0.346	0.090	-1.141	0.103
Total	Max. Temp	-0.175	0.003	2.155	0.003
	Min. Temp.	-0.321	0.001	-2.354	0.001
	R.H. %	-0.452*	0.052	-0.320	0.052

"r" : Correlation coefficien "b": Partial regression coefficient value "P": Probability level

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

2- The population of Smart village, 6 October city:

Data presented in Table (3) and graphically illustrated in Fig. (2) show the population fluctuations of the adults, nymphs and eggs of thrips, *G. ficorum* at Smart village, 6 October city during January to December 2018 year.

As shown in Table (3) and Fig. (2) the population fluctuations of the two stages, significantly different all over the year, the fluctuations in the population density nymphs throughout all 2018 year. The integration of the seasonal abundance curve revealed the presence of two peaks, which represent two overlapping generations. The following are a brief description of these generations:

Table (3): Biweekly counts of different stages of the eggs, nymphs and adults thrips of *G. ficorum* infesting *F. benjamina* trees at Smart village during 2018 year.

Sampling dates	Average no. of stages				Weather factors (Means)		
	Adults / leaf	Nymphs /leaf	Eggs /leaf	Total stages /leaf	Max. Temp	Min. Temp	RH%
01/01/2018	12.8	13.6	8	34.4	18.3	11.1	72
15/01/2018	12.9	13	10	35.9	20.1	12	79
01/02/2018	17.8	15.6	9	42.4	18.2	11.5	77
15/02/2018	14.1	15.3	11.5	40.9	24.5	13.5	83
01/03/2018	20	19	13.6	49.5	22.4	14	78
15/03/2018	21.1	17.6	20.3	59	27	16.3	82
01/04/2018	19.3	28.3	36.6	84.2	28.8	16.2	72
15/04/2018	34.3	39	44.3	117.6	28.2	16.8	76
01/05/2018	30.6	36	34.6	101.2	29.9	19	70
15/05/2018	35.1	27.2	22.8	85.1	31.8	21.5	74
01/06/2018	39.1	38.3	25.6	103	36	23.4	70
15/06/2018	27.8	22	37.3	87.1	34.9	23.2	77
01/07/2018	16.2	14.3	48.5	79	36	25.3	74
15/07/2018	3.3	6.3	33.3	42.9	35.3	24.5	82
01/08/2018	0	0	16.9	16.9	35.7	25.7	80
15/08/2018	0	0	0	0	35.6	25.8	83
01/09/2018	0.6	1.5	0.6	2.7	34.8	24.9	82
15/09/2018	1.3	1.5	3.3	6.1	34.3	25.1	78
01/10/2018	1.6	0.3	1.3	3.2	33.3	23.5	83
15/10/2018	2.6	1	12	15.6	30.5	22.2	78
01/11/2018	6.3	11	19	36.3	29.5	20.1	68
15/11/2018	7.8	9.5	10.3	27.6	26.1	17.4	80
01/12/2018	11.8	15	13.3	40.1	24.5	16.2	79
15/12/2018	23.3	15.3	16.3	54.9	21	14.1	74
30/12/2018	19.1	18.5	16.9	54.5	19.2	12.4	74
Total	378.8	379.1	465.3	1220.1	-	-	-
Mean	15.1	15.1	18.6	48.8	-	-	-

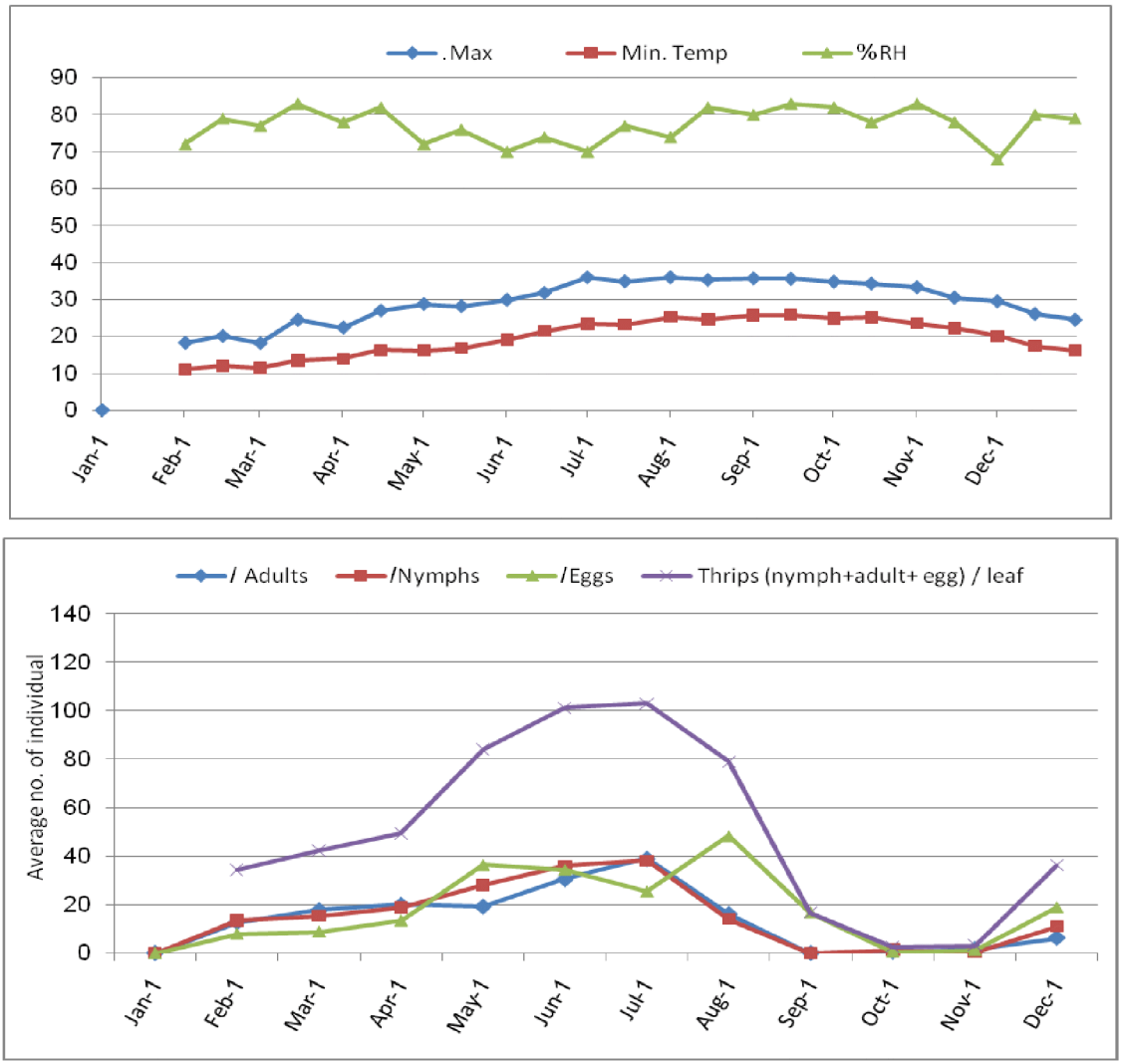

Fig. (2): Biweekly average numbers of *G. ficorum* eggs, nymphs and adults on *Ficus benjamina* and weather factors at Smart Village, 6 October city, during 2018 year.

-Total stages:

Results in Table (3) and Fig. (2) indicated that the total stages of *G. ficorum* start to appear as early as January and increased gradually to make first generation with the highest number of mid-April with average mean number 117.6 individuals when maximum temperature was 28.2 °C and minimum temperature was 16.8 °C also the relative humidity was 76%; after that the infestation with total stages decreased to mid-August. The infestation with total stages increased The first of September and increased gradually to make the second generation on mid-December with average mean number 54.9 individuals when maximum temperature was 21°C and minimum temperature was 14.1 °C also the relative humidity was 74% and decreased again till the end of the year. This generation period demonstrated the moderate numbers as compared with the first generation of total stages.

Statistical analysis of data in Table (4) show that the simple correlation between the maximum and the monthly mean of

the total population of *G. ficorum* was non-significant (r = -0.014) , while was significant between minimum temperature (r = -0.181), whereas, was highly significant between relative humidity (r = -0.594**), respectively. And inverse relationship correlation . In addition, the simple regression of the maximum, minimum temperature and relative humidity on the monthly mean of total population of *G. ficorum* were highly significant and significant (b = 13.569, -16.512 and -3.626), respectively.

Adults stages:

As shown in Table (3) and Fig. (2) the adults start to appear as early of January and increased gradually to make the first activity infestation period with highest numbers on mid-June with average mean number 39.1 individuals when maximum temperature was 36°C and minimum temperature was 23.4°C also the relative humidity was 70%; the population density was high and appeared the most economically important, after that, the infestation with adults decreased at The first and mid-August.The infestation with adults increased again on early-September and increased gradually to make the second infestation period on mid-December with average mean number 23.3 individuals when maximum temperature was 21°C and minimum temperature was 14.1°C , also, the relative humidity was 74% and decreased again till the end of the year. This infestation period demonstrated the moderate numbers as compared with the first infestation period of the adults.

Results in Table (4) indicated that the simple correlation between the maximum, minimum temperature and relative humidity on the monthly mean of the total population of *G. ficorum* were significant and high significant (r = -0.171, -0.311 and -0.552**), respectively and inverse relationship correlation. In addition, results in Table (4), show that the simple regression of the maximum, minimum temperature and relative humidity on the monthly mean of the total population of *G. ficorum* were highly significant and significant (b = 3.806, -4.997 and -1.156), respectively.

Table (4): Correlation between the average numbers of *Gynaikothrips ficorum* population on *F. benjamina* in relation to some weather factors during 2018 year.

weather factors (Variable)		Simple correlation		Partial regression values	
		r	P	b	P
Adults	Max. Temp	-0.171	0.413	3.806	0.004
	Min. Temp.	-0.311	0.131	-4.997	0.002
	R.H. %	-0.552**	0.004	-1.156	0.008
Nymphs	Max. Temp	-0.104	0.435	4.735	0.001
	Min. Temp.	-0.335	0.102	-6.121	0.001
	R.H. %	-0.608**	0.001	-1.229	0.001
Eggs	Max. Temp	0.246	0.236	5.013	0.002
	Min. Temp.	0.103	0.626	-5.403	0.004
	R.H. %	-0.457	0.022	-1.229	0.016
Total	Max. Temp	-0.014	0.003	13.569	0.003
	Min. Temp.	-0.181	0.001	-16.512	0.001
	R.H. %	-0.594**	0.052	-3.626	0.001

"r" : Correlation coefficien "b": Partial regression coefficient value "P": Probability level

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

The nymphs start to appear as early of January and increased gradually to make the first activity infestation period with highest numbers on mid-April with average mean number 39 individuals when maximum temperature was 28.2 °C and minimum temperature was 16.8 °C ,also, the relative humidity was 76.0%, after that the infestation with nymphs were decreased at first and mid-August Table (3). The infestation was increased again from the beginning of Septamber and increased gradually to make the second infestation period on end-December with average mean number 18.5 individuals when maximum temperature was 19.2°C and minimum temperature was 12.4°C ,also, the relative humidity was 74% and decreased again till the end of the year. This infestation period demonstrated the moderate numbers as compared with the first infestation period nymphs.

Data in Table (4) show that the simple correlation between the maximum, minimum temperature and relative humidity and the monthly mean of nymphs of *G. ficorum* were highly significant or significant (r = -0.104, -0.335 and -0.608**) and inverse relationship correlation. The same trend was obtained in case the simple regression (b = 4.735,- 6.121 and -1.229), respectively.

Eggs stage:

Reults in Table (3) and Fig. (2) show that eggs start to appear at early January and increased gradually to make the first activity infestation period with highest numbers on first-July with average mean number 48.5 individuals, when maximum temperature was 36°C and minimum temperature was 25.3°C ,also, the relative humidity was 74%; the population density was high and appeared the most economically important, after that the infestation with eggs were decreased at mid-August. Results in Table (3) indicated that the infestation increased again at the beginning of Septamber and increased gradually to make the second infestation period on first-November with average mean numbers 19 individuals when maximum temperature was 29.5°C and minimum temperature was 20.1°C , also, the relative humidity was 68% and decreased again till the end of the year. This infestation period demonstrated the moderate number as compared with the first infestation period eggs.

Statistical analysis in Table (4) indicated that the simple correlation between the maximum temperature and the monthly mean of eggs of *G. ficorum* was positive relationship, while minimum temperature and relative humidity inverse relationship correlation on the monthly mean of eggs of *G. ficorum* ,and the simple correlation between the maximum, minimum temperature and relative humidity were significant on the monthly mean of total population of *G. ficorum* (r = 0.246, 0.103and -0.457), respectively. The same tend was observed in Table (4), in case the simple regression (b = 5.013, -5.403 and -1.229), respectively.

Generally, data from this study indicate greater diversity at all stages of *G. ficorum* on *F. benjamina*. The number of total stages was particularly diverse and highly significant in spring. For the adult stages, abundance was highest in start of the summer, while for the nymph stages, it was highest in March and April. The number of egg stages was particularly diverse and highly significant in July, and this likely due to the age of leafs and the influence of climatic conditions. The high population of *G. ficorum* in August may be due to the shorter life cycle of thrips and greater opportunity of an overlapping generation (Mascarenhas and Silva, 2016). Arthurs *et al.* (2011) suggested that the temperature

variation has an impact on the life cycle of the *Gynaikothrips* under greenhouse conditions. Shogren and Pain (2015) mentioned that another factor that may influence the population of thrips is the sampling period.

Results of this study indicate to great diversity at all stages of *G. ficorum* on the gall leaf of *Ficus retusa.* The number of eggs was particularly diverse and highly significant in August. For the larval stages, abundance was highest in autumn and spring, while for the pupal stage, it was the highest in November, likely due to the age of galls and the influence of climatic conditions. However, the population of this species was highest in August, followed by November and October (Ziouani, *et al*., 2019).

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دراسات بيئية على حشرة التربس *Gynaikothrips ficorum* (Marchal) Thysanoptera: Phloethripidae التى تصيب أشجار الفيكس بنجامينا

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تم رصد التغيرات فى تعداد حشرة التربس *Gynaikothrips ficorum* (Marchal,1908) Thysanoptera، Phlaeothripidae) والتقلبات الموسمية للافراد على أشجار الفيكس بنجامينا ومدى تأثير التغيرات في الظروف المناخية من حرارة ورطوبة علي الطور الكامل والحوريات والبيض في حديقة الزهرية بمحافظة القاهرة وفي القرية الذكية بمدينة 6 أكتوبر بمحافظة الجيزة وذلك من شهر يناير إلى شهر ديسمبر 2018.

أشارت النتائج المتحصل عليها إلى أن حشرة التربس *G. ficorum* لها جيلين بقمتين من النشاط خلال عام الدراسة. زاد عدد البيض بشكل ملحوظ في شهر يوليو بعدد 64 بيضة ثم قل العدد في أكتوبر فأصبح 19 بيضة وكان التواجد نادرًا في شهري أغسطس وسبتمبر. كانت مراحل الحوريات متواجدة من مارس وأبريل بعدد 39 حورية ، وكان التعداد اقل في ديسمبر، وكان التعداد نادرًا في أغسطس. أشارت النتائج الى ان عدد الحشرات البالغة النشطة والمتواجدة في شهرى مايو ويونيو 2018 وصل إلى 39 فردًا . سجل أعلى تعداد لاجمالى عدد اطوار حشرة التربس في شهرى مارس وأبريل بحيث زاد تعداد الاجمالى للذروة تدريجيًا ليصل إلى 117 فردًا كحد أقصى. كما أثبت التحليل الإحصائي أن هناك ارتباط معنوى بين التعداد الكلي والاطوارالكاملة الحوريات والبيض وبين الظروف المناخية من حرارة عظمى وصغرى ورطوبة.

وعموما كان تعداد حشرات التربس *G. ficorum* في حديقة الزهرية أعلى بفروق معنوية عن تعداد حشرات التربس فى القرية الذكية خلال شهور عام 2018.

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