

EFFECT OF CERTAIN ECOLOGICAL FACTORS ON POPULATION DENSITY OF *Thrips tabaci* LIND. ATTACKING ONION CROP

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ABSTRACT

Changes in the seasonal population of *Thrips tabaci* lind. attacking onion crop and the effect of environmental factors were studied throughout (2006/2007&2007/2008) onion growing seasons .it appeared in few numbers by the 2nd week of February . Dynamics of the nymphal stage showed increase steadily after half of February until end of March , and highest decrease in population density of thrips was recorded at temperature 24.52 and relative humidity 69 in thrips populations. The values of correlation coefficient infer that infestation and degree days are highly correlated . The simple regression value (b) indicate that for every 1.0 temperature increase in degree days there are 3.5 individual increased and so on.

In onion growing season after rain falls population of *T. tabaci* decreased.

INTRODUCTION

Onion (*Allium cepa*) is the most important plant infesting *Thrips tabaci* lind. by (Afifi and Hayder(1990); Elkhayat *et al.*(1997) and Moawad 2003). The onion and cotton thrips is considered as one of the important insect pest attacking onion crops in Egypt.

The infestation by thrips appears early on onion and the outer leaves have silvery spots. It has been recorded to cause much damage and considerable loss in almost all onion growing fields larvae, nymphs and adults of this species feeding on leaves and in heavy infestation, they may cause stunted growth of plants by Hudak and Penzes (2004).

The present work was conducted to study population density of *T. tabaci* on onion and it's relation with the ecological factors all over the season.

MATERIALS AND METHODS

The objective of the present work was initiated to investigate the ecology of *Thrips tabaci* Lind. infesting onion plants, also to evaluate the efficiency of environmental factors on the populations of *T. tabaci* such as temperature, humidity degree ,rains and the relation of onion planting dates to infestation levels .

The ecological studies were carried out under natural field conditions prevailing in Gharbia Governorate during the two successive seasons of onion in (2006/2007 and 2007/2008). The seasonal abundance and population fluctuations of *T. tabaci* in onion plants were determined.

The population of *T. tabaci* in onion plantations was carried out to evaluate the population density of this pest . The samples were collected and the studying period started from January 2007 to May 2008, samples were 10 onion plants from every plot area picked and put in paper bags to examine in the laboratory with sterio-microscope to count the immature stages and put in Table (1) which include nymph stage and date of occurrence of each inspection .

Onion plants cultivated about in last week of November and second week of December in the two successive seasons. The first inspection started on first week of January, about 12 inspection were taken weekly around the onion-growing season for each year.

counts were made of the total number of *T. tabaci* on 560 onion plants at seven day intervals.

The plants were examined weekly to determine the population density of *T. tabaci* in the different treatments (planting dates).

Plant examination started two weeks after transplanting and continued until harvesting. Weekly samples of ten plants were collected at random from each plot and taken to the laboratory for inspection. The infestation were determined and when ever the population level (8-10 nymph/plant) was reached to the insecticidal spraying . This continued at 15 day interval till harvest to evaluate the effect of planting dates to onion infestation and on the onion yield of every treatment , yield of every plot at the end of season were weighed.Efficiency of environmental factors was tested.

RESULTS AND DISCUSSION

Population density of *Thrips tabaci* on onion plants:

First season (2006/2007):

Data in Table(1) and figure (1) indicatd that in the first season the number of *T.tabaci* nymph started with 5.1 nymphs/sample on 6th of January and recorded the first peak 21.3 nymphs/sample on 21 January . The population of *T.tabaci* decreased in the followed inspection to reach 9.85 nymphs/sample on 3rd of February , then increased above to reach the second peak 150.4 nymphs/sample on 15 April and the last inspection decreased to reach 98.5 nymphs/sample on 28 April .

Second season(2007/2008):

Data in Table (1) fig.(1) indicated that in 2008 season the number of *T.tabaci* nymph started with 4.9 nymphs/sample on 6 January then increased to 5.8 nymphs/sample on 13 January . The number of nymphs ups and downs to reach first peak 69.9 nymphs/sample on 3 March and then increased above to reach the second peak 138.7 nymphs/sample on 15 April . the last inspection decreased to reach 94.5 nymphs/sample on 28 April .

Table (1): Population density of *Thrips tabaci* nymphs on onion plants at Gharbia Governorate during 2006/2007 and 2007/2008 season.

Date of inspections	mean of <i>Thrips tabaci</i> nymph 2006/2007	Date of inspections	mean of <i>Thrips tabaci</i> nymph 2007/2008
06-Jan	5.1	05-Jan	4.9
13-Jan	6.2	12-Jan	5.8
21-Jan	21.3	19-Jan	20.4
27-Jan	22.5	26-Jan	20
03-Feb	9.85	02-Feb	8.5
10-Feb	22.6	09-Feb	21.5
17-Feb	25.2	16-Feb	23.9
26-Feb	32.2	23-Feb	27.1
03-Mar	72.4	01-Mar	69.9
11-Mar	118.3	08-Mar	97.4
07-Apr	125.7	15-Mar	121.6
15-Apr	150.4	05-Apr	138.7
21-Apr	117.7	19-Apr	100.6
28-Apr	98.5	26-Apr	94.5
Total	827.95	Total	754.8

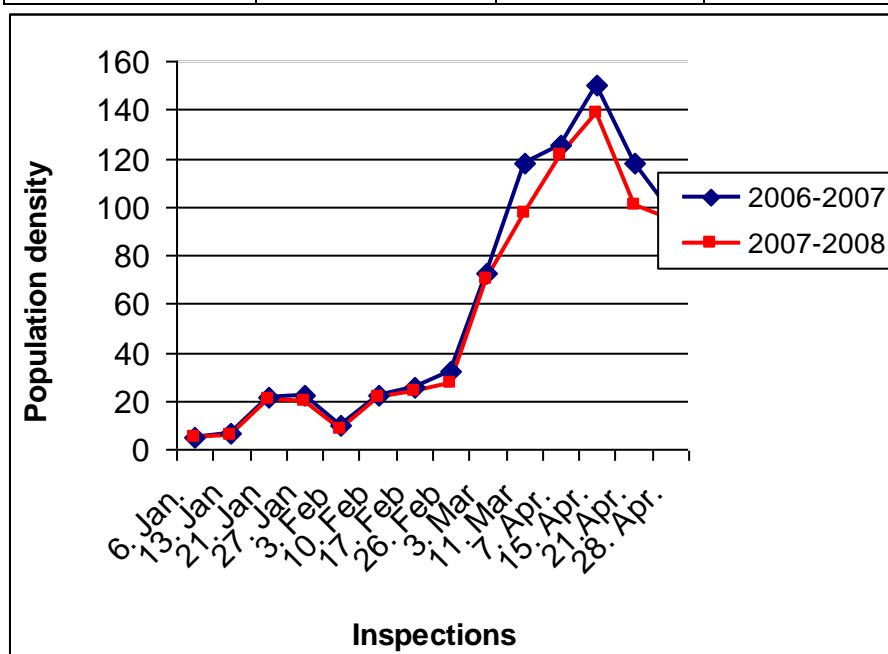


Fig. (1): Population density of *Thrips tabaci* nymphs on onion plants during the two successive seasons at Gharbia Governorate.

Table (2): Effect of temperature and relative humidity on the population density of onion thrips plantation at Gharbia Governorate in 2007 season

Date of inspections	Weekly mean of day temperature	Weekly mean of day R.H	Mean No. of <i>Thrips tabaci</i> lind at 7 day intervals per sample
6-Jan.	5.96	70.75	5.1
13-Jan.	7.75	78.38	6.2
21-Jan.	14.25	58.04	21.3
27-Jan.	23.38	45.29	22.50
4-Feb.	13.65	68.38	9.85
10-Feb.	15.67	64.75	22.600
17-Feb.	17.75	55.38	25.20
26-Feb.	14.92	60.42	32.20
3-March	24.54	47.33	72.40
10-March	26.13	52.67	118.3
17-March	27.88	49.96	125.7
24-March	24.00	46.9	150.4
2-April	24.71	48.67	117.7
9-April	29.38	55.5	98.5

From the data recorded in Table (3) the highest decrease in population density of thrips was recorded at temperature 4.52 and relative humidity 69.52 during season (2008) in onion plantations.

The relation between population density in onion and the mean weekly of temperature.

Table (3): Effect of Temperature and relative humidity on the population density on thrips onion plantations at Gharbia Governorate during season 2008.

Date of inspections	Weekly mean of day temperature	Weekly mean of day R.H	Mean No. of <i>Thrips tabaci</i> lind at 7 day intervals
4-Jan.	4.52	69.52	4.9
11-Jan.	6.83	75.46	5.8
18-Jan.	13.15	56.25	20.4
25-Jan.	21.72	43.42	20
2-Feb.	12.52	66.52	8.5
9-Feb.	14.81	63.50	21.5
16-Feb.	18.21	53.64	23.9
23-Feb.	16.27	60.35	27.1
29-Feb.	23.18	46.50	69.9
7-March	23.25	51.26	97.4
14-March	23.31	47.84	121.6
21-March	22.16	45.67	138.7
28-March	23.84	47.53	100.6
4-April	28.21	53.85	94.5

To verify the relationship between the infestation and the corresponding degree day of temperature in Tables (2007 & 2008) the correlation coefficient were worked out, taking as variables the two year means of weekly temperature. The following table gives the calculated correlation and regression values.

Table (4): Relationship between the population density of *T. tabaci* nymphs and temperature on onion plants during 2007 and 2008 season.

Season	r	b
2006/2007	+0.8716 *	3.469
2007/2008	+0.8728 *	3.558

* highly significant at 0.1 level of probability

These values infer that infestation and temperature degree days are highly correlated, and therefore, the degree days temperature could be taken as an indication of infestation in the field. The simple regression value (b) indicate that for every 1.0 temperature increase in degree days there are 3.5 individual increased and so on.

3-Rains

First season (2006/2007)

In onion growing season after rain falls population of *Thrips tabaci* decreased as showing from population Table (5)

Second year (2007/2008)

In the growing season after rain falls, population of *Thrips tabaci* decreased as follow population Table (5).

Table (5): Effect of rain fall on the population density of thrips in onion plantation at Gharbia Governorate during the seasons 2007 and 2008.

Date of rain fall	No. of <i>T. tabaci</i> nymph	Date of rain fall	No. of <i>T. tabaci</i> nymph
1 st date of rain falls 5-January 2007	5.1	1 st date 9 Jan. 2008	14.9
2 nd date 3 Feb. 2007	8.9	2 nd date 25 25-Jan 2008	20
3 rd date 5 Feb. 2007	8.9	3 rd date 29 Jan 2008	19.8
4 th date 9 Feb. 2007	15.6	4 th date 18 Feb. 2008	17.1

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تأثير العوامل الجوية على تعداد حشرة التربس على محصول البصل
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درس تأثير الحرارة والرطوبة والمطر على تعداد حشرة التربس على محصول البصل خلال موسمي 2007/2006, 2008/2007 وتبين من الدراسة أن بداية ظهور التعداد على محصول البصل كان في أول فبراير وبدأ التعداد في الزيادة تدريجياً خلال شهرى فبراير ومارس وأن أعلى تعداد للحشرة كان عند متوسط درجة حرارة 24.52 ورطوبة نسبية 69% وكانت قيمة الارتباط عالية عند مستوى 1% حيث أن قيمة (ب) الارتباط أوضحت أنه كلما زادت درجة الحرارة درجة واحدة مئوية زاد تعداد الحشرة 3.5 فرد وهكذا كما أوضحت الدراسة انخفاض تعداد الحشرة بعد سقوط الأمطار.

قام بتحكيم البحث

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