

INFESTATION DENSITY OF LEAFHOPPERS; *EMPOASCA DECIPIENS* AND *OROSIUS ALBICINCTUS* AND GREEN BUG; *NEZARA VIRIDULA* ON SESAME IN FAYOUM

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ABSTRACT

Field population of *Empoasca decipiens* Paoli, *Orosius albicinctus* Dist. and *Nezara viridula* were evaluated during 2010 and 2011 seasons on sesame; *Sesamum indicum* L. under Fayoum conditions. Sampled with sweeping net, *Empoasca decipiens* was relatively higher (132-173/25 double strokes/week) than *O.albicinctus* (13.6-19.7/25 double strokes/week). The maximum densities of the former species were 304 and 349 /25 double strokes in 2010 and 2011 seasons, while were 36.5 and 40.5 /25 double strokes for the 2nd one. On the other hand, infestation with *N. viridula* began with relatively low numbers (2.0-3.3 individual/25 double strokes) and increased gradually to reach its maximum of 56.5 and 72.0 individual/25 double strokes in the 1st and 2nd week of August during 2010 and 2011 seasons, respectively. The estimated population densities of the studied three insects indicated that they became serious pests for sesame in Fayoum.

Key words: Population, *Empoasca decipiens*, *Orosius albicinctus*, *Nezara viridula*, sesame.

INTRODUCTION

Sesame; *Sesamum indicum* L. is an important oil crop cultivated for oil, paste, cake and flour produced from seeds and is considered a typical crop of small farmers in developing countries. Sesame oil, an important agricultural attribute, reaches 53.583% in seeds which also contain 26.25% protein. Sesame cultivations are susceptible to several pest infestations which cause considerable economic damage. Leafhoppers and green bugs in particular are piercing and sucking pests which feed on the cell sap from leaves, flowers and buds leading to curling and redness of leaf margins; yellowing, stunting, and abnormal growth of the plants. Among the various insect pests of sesame, the bug *Nezara viridula* (L.) and the leafhoppers *Empoasca decipiens* Paoli and *Orosius albicinctus* Dist. are the most common, **Bhadauria et al., (2000)** reported that, *N. viridula*, *Empoasca* spp. and *O. albicinctus* are regular pests that appear in large numbers infesting pods and leaves of sesame. The latter species transmits a viral disease from infected sesame plants to healthy ones (**Akhtar et al., 2009 and Omid et al., 2010**).

Therefore, the present study was carried out to shed some the light on the populations of these pests on sesame crop under Fayoum conditions.

MATERIALS AND METHODS

A farmer field of one feddan in Senores district, Fayoum Governorate during 2010 and 2011 seasons was chosen. The experimental area was ¼ fedden, divided into 4 equal plots, each consists of 48 rows (8 m long and 0.5 m wide). Sesame seeds (Giza 32 variety) were planted on June, 1st in both

seasons. The plants received the normal agricultural practices but no insecticides were applied. Sampling started two weeks after plantation and continued weekly to the end of the season using a standard sweeping net (37 cm. diameter and 60 cm. deep). Each sample was 25 double sweeping strokes randomly taken from each plot. The collected insects were placed in polyethylene bags and kept in the freezer for 15 minutes to kill the insects which were later counted and identified according to Sabra (2002) to record data on the chosen studied species, *E. decipiens*, *O. albicinctus* and *N. viridula*. Statistical analysis with simple correlation (b) between maximum temperature and R.H.% was done to show their effect on populations of these insects.

RESULTS AND DISCUSSION

A. Population fluctuation of *E. decipiens*.

As shown in table (1&2) infestation of *E. decipiens* began in the seedlings stage; two weeks after plantation, in relatively few numbers (38.3 individuals/25 double strokes) and gradually increased through the season reaching the highest (304.5 individuals /25 double strokes) in July 20 during the 1st season and 349.3/individuals /25 double strokes during 2nd season. Thereafter population gradually decreased to reach its lowest (34.0-41.3 individuals /25 double strokes) at the end of both seasons respectively, at a maximum temperature of 32.9-39.1°C and an average relative humidity of 55.0-60.6%. The highest densities during the 3rd week of July was at max. temps. 35.2-40.9°C and 51.9-57.2% R.H for the two seasons, respectively. Statistical analysis in table (3), revealed that no correlation was evident between maximum temperature or mean percent of relative humidity and populations of *E. decipiens* in the 1st season because weather conditions were around the optimum levels, while in 2nd season the population was significantly positively correlated to maximum temperature but was not affected by RH%. In this respect, Sewify *et al*, (1996) reported also that, the maximum population density of *E. decipiens* occurred on cotton during August and September, and in Assiut, Ali (1996) reported that, this insect was the most abundant on sesame field representing 57.89% of total pests population found.

B. Seasonal fluctuation of *O. albicinctus*:

As shown in table (1&2) the infestation of sesame plants with this species began at a low intensity as 3-4 individuals/25 double strokes, 4 weeks after plantation at 34.6 – 39.4°C and 44.4-55.5% R.H. The infestation gradually increased throughout the season showing two peaks in each season.

The respective highest densities were 36.5 - 40.5 individual/25 double strokes in the 1st week of September and the 4th week of August at max. temp. 34.1-39.7°C and average R.H. 47.4 - 59.3%. The population density was higher in 2011 than in 2010 season with mean catch of 19.7 and 13.6 individual/25 double strokes/week, respectively, due to the effect of maximum temperature which were 39.7 and 34.5°C, respectively. This leafhopper showed two peaks, the first were moderately; 16.25 and 25.25 Individuals/25 double strokes at the 4th and 3rd week of July in 2010 and 2011 season, respectively. The second peak was the highest being 36.5

and 40.5 individual/ 25 double strokes at the end of August and the beginning of September of 2010 and 2011 season, respectively. Statistical analysis in table (3), revealed that no correlation were evident between maximum temperature or mean percent of relative humidity and population of *O. albicinctus* in the 1st season. In the second season the population was not affected with maximum temperature but a significant positive correlation with RH% was evident. In this respect, Serinivasula and Narayanasamy, 1995 in India found that, the sesame sown in April showed high population of *O. albicinctus*. In Assiut, **Ali (1996)** found that, this species represented 5.47% of the total catch as the second abundant pest of sesame.

Table 1. Weekly counts (25 double strokes x 4 reps.) of *E. decipiens*, *O. albicinctus* and *N. viridula* on sesame in Fayoum during 2010 season.

Inspection date	Average /25 double strokes			Weather factors	
	<i>E. decipiens</i>	<i>O. albicinctus</i>	<i>N. viridula</i>	Max. temp.	RH%
June 15	38.3	0.0	2.0	33.0	54.7
22	62.3	0.0	6.0	37.8	61.0
29	97.5	4.0	11.5	34.6	55.5
July 6	145.3	10.3	18.5	32.7	58.3
13	212.8	11.0	28.3	33.4	59.4
20	304.5	12.5	36.3	35.2	57.2
27	280.0	16.3	41.8	35.7	57.8
Aug. 3	201.3	13.5	56.5	35.3	60.6
10	163.0	11.0	50.3	35.7	57.1
17	109.8	9.8	37.0	35.4	60.8
24	90.5	14.5	25.8	35.8	59.7
31	75.3	29.3	18.5	35.6	55.9
Sept. 7	51.5	26.5	12.0	34.1	59.3
14	34.0	21.8	6.5	32.9	60.6
Total	1866.1	185.3	350.8	487.2	817.9
Mean	133.3	12.9	25.1	34.8	58.4

In general, the results showed that, the numbers of *E. decipiens* were clearly higher (1866.1-2421.6) than those of *O. albicinctus* (185.5-276.5). Its obvious that the total mean numbers of *E. decipiens* represented 8-9 times as *O. albicinctus* may be due to wide spread of first species all the year round and on large scale of hosts than the second. In this respect, **Sabra (2002)** reported that, *E. decipiens* attack 36 host plants all the year round, while *O. albicinctus* attack 12 host plants only on the warm months.

Table 2. Weekly counts (25 double strokes x 4 reps.) of *E. decipiens*, *O. albicinctus* and *N. viridula* on sesame in Fayoum during 2011 season.

Inspection date	Average /25 double strokes			Weather factors	
	<i>E. decipiens</i>	<i>O. albicinctus</i>	<i>N. viridula</i>	Max. temp.	RH%
June 15	42.0	0.0	3.3	39.3	41.3
22	74.3	0.0	8.0	38.3	46.3
29	102.5	3.0	13.8	39.4	44.4
July 6	140.5	6.8	20.5	38.7	47.1
13	197.5	15.3	31.3	40.6	52.0
20	349.3	25.3	40.0	40.9	51.9
27	338.0	22.0	48.3	42.0	47.4
Aug. 3	322.8	19.0	57.5	41.1	55.1
10	253.3	26.5	72.0	40.5	53.4
17	211.0	35.8	51.3	37.5	56.0
24	170.3	36.3	23.0	40.7	49.3
31	102.0	40.5	16.3	39.7	47.4
Sept. 7	76.8	28.0	9.5	38.8	51.0
14	41.3	17.3	5.8	38.1	55.0
Total	2421.6	275.5	400.3	555.6	697.6
Mean	173.0	19.7	28.6	39.7	49.8

C. Seasonal fluctuation of *N. viridula*:

Data presented in table (1&2) revealed that, the infestation with this pest started early, two weeks after plantation, in relatively low numbers 2.0 - 3.25 individuals/25 double strokes at a max. temp. of 33.0 - 39.3°C and average R.H. 41.3 - 54.7% R.H. whereas the adults migrate from the neighboring fields. The population increased gradually to reach its maximum; 56.5 and 72.0 individuals/25 double strokes in the 1st and 2nd weeks of August at 35.3-40.5°C and 53.4 - 60.6% R.H. % during 2010 and 2011 seasons, respectively, then decreased toward the end of the season. The population showed only one peak at the beginning of August in both seasons. Data table (3) of statistical analysis revealed that no correlation were evident between maximum temperature or mean percent of relative humidity and population of *N. viridula* in the 1st season. In the second season the population was not affected with maximum temperature but a significant positive correlation with RH% was evident. In this respect, **Al-Shannaf (2010)** reported that, the seasonal mean numbers of *N. viridula* was 7.93 individuals /100 cotton plant. The relatively high population of *N. viridula* in sesame field may be due to the lowest numbers of its scelionids parasite which sesame leaves act as a repellent of this natural enemy (**Turner 1983**). In general, the three aforementioned insect populations were relatively higher at the end of the season because sesame plants are harvested before complete dryness to avoid the loss of seed crop.

Table 3. Statistical analysis for the effect of the weekly maximum temperatures and R.H.% on *E. decipiens*, *O. albicinctus* and *N. viridula* populations on sesame in 2010 and 2011 seasons.

Season	Insect	Max. temp.	RH%
2010	<i>E. decipiens</i>	0.142	-0.039
	<i>O. albicinctus</i>	-0.130	0.125
	<i>N. viridula</i>	0.315	0.181
2011	<i>E. decipiens</i>	0.721**	0.426
	<i>O. albicinctus</i>	0.188	0.543*
	<i>N. viridula</i>	0.499	0.574*

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كثافة الإصابة بنشاط الأوراق *Orosius albicinctus* و *Empoasca decipiens* والبقعة الخضراء *Nezara viridula* على محصول السمسم بمحافظة الفيوم.

إبراهيم مخيمر صبرة

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أجريت تجربة حقلية على محصول السمسم خلال موسمي ٢٠١٠ و ٢٠١١ تحت الظروف المناخية لمحافظة الفيوم لدراسة تعداد نوعين من نشاطات الأوراق وهما *Empoasca decipiens* و *Orosius albicinctus* بالإضافة إلى البقعة الخضراء *Nezara viridula* والتي كانت تعتبر من الآفات الثانوية في مصر.

أوضحت النتائج أن تعداد نشاط الأوراق الغير ناقل للأمراض *E. decipiens* كان أعلى نسبياً (١٣٢-١٧٣ حشرة/٢٥ ضربة مزدوجة/أسبوع) مقارنة بنشاط الأوراق الناقل *O.albicinctus* (١٣٠٦-١٩٠٧ حشرة/٢٥ ضربة مزدوجة/أسبوع) وكانت أعلى كثافة عددية للنوع الأول ٣٠٤ و ٢٥/٣٤٩ ضربة مزدوجة بينما كانت ٣٦.٥ و ٢٥/٤٠.٥ ضربة مزدوجة للنوع الثاني خلال موسمي ٢٠١٠ و ٢٠١١ على الترتيب. وعلى الجانب الآخر نجد أن الإصابة بالبقعة الخضراء بدأت مبكراً بأعداد منخفضة نسبياً (٢.٠، ٣.٣ حشرة/٢٥ ضربة مزدوجة) خلال يونية وزاد التعداد تدريجياً حتى وصل إلى أعلى كثافة عددية (٥٦.٥، ٧٢.٠ حشرة/٢٥ ضربة مزدوجة) خلال أغسطس ونتيجة للتعداد العالي لهذه الحشرات فأنها أصبحت آفات حقيقية تحت ظروف مصر ولذا يجب التدخل للحد من تزايد أعدادها على محصول السمسم لتقليل الفقد منه ورفع إنتاجيته.