

## PARASITISM OF NEZARA VIRIDULA L. EGGS UNDER FIELD CONDITIONS AT KAFR EL-SHEIKH GOVERNORATE

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### Abstract

The egg parasitoids of *Nezara viridula* L. are of the most important factors which keep the insect well under control . Therefore, the rate of parasitism of *N. viridula* eggs was determined under field conditions of Kafr El-sheikh governorate from early April to the end of October during three successive years , 1999, 2000 and 2001.

The obtained results showed that the parasitism started with low rate during April. The high rate of parasitism and the parasitoid emergence were recorded during June, July and August for the three years and this was synchronized with the increase of temperature. The parasitoids failed to emerge from the parasitized eggs at the low rate of parasitism . In general, the rate of parasitism was higher in the first and second year than in the third one, while the emergence rate of parasitoids was higher in the second year than in the first and third year. *Trissolcus megallocephalus* (Ashm.) was the only parasitoid emerged from eggs of *N. viridula* .

However, the gained results indicate the important role of parasitoids as a bio-control agents in the integrated control programs of *N. viridula*.

### INTRODUCTION

The green stink bug , *Nezara viridula* L. is a very injurious insect pest attacking various kinds of plants in different parts of the world (Kirittani, 1975 and Colazza *et al.* 1986). In Egypt, recently, its population density tended to be high causing considerable damage to several field and horticultural crops (Abd EL - baky, 1989).

The scellionid egg parasitoid , *Trissolcus megallocephalus* (Ashm.) is the most important natural enemy of the green stink bug eggs, which keep the insect well

under control (Orr *et al.*, 1986, Awadalla & Shanab, 1993 and Awadalla, 1996). However, egg parasitism of the green stink bug is the most significant mortality factor in most affected regions of the world. Also, the percentage of parasitism of *N. viridula* eggs in the field was variable among years and crops (Shepard *et al.* 1994).

So, this work was carried out to determine the rate of parasitism of *Nezara viridula L.* eggs under field conditions of Kafr El-Sheikh during 1999, 2000 and 2001 years.

### MATERIALS AND METHODS

Egg-masses of *N. viridula* were collected weekly from different field crops which were grown at the Experimental Farm of Sakha Agric. Res. Station, Kafr El-Sheikh from early April to the end of October during three successive years: 1999, 2000 and 2001. The collected egg-masses were placed in petri dishes provided with pieces of moistened cotton wool and kept in room conditions of  $27 \pm 1^{\circ}\text{C}$  and  $70 \pm 3\%$  RH. till hatching. The number of eggs/mass, parasitized eggs, and emerged parasitoids were counted and recorded. The emerged parasitoids were identified in the Department of Biological Control Research at Plant Protection Research Institute, Dokki, Egypt.

### RESULTS AND DISCUSSION

All the emerged parasitoids from the collected eggs of *Nezara viridula L.* were identified as the scelionid, *Trissolcus megallocephalus* (Ashmead) (Hymenoptera: Scelionidae).

Data presented in Table 1. show that in the first year (1999), the mean number of eggs/mass of *N. viridula* ranged from 68 eggs during April to 94.25 eggs in July. It is important to clear that the eggs of *N. viridula* did not observed in the field till March. The parasitism of *N. viridula* eggs started in low rate during April (2.57%), then it increased recording 13.82% during May and the parasitoids failed to emerge from the parasitized eggs at the same time. The parasitism recorded the maximum rate of 70.56% during June and it declined during July (38.73%), then it began to increase again during August recording 54.29%. The emergence of parasitoids started during June (33.06%) and recorded the highest rate of 49.84% during August. Both parasitism and the emergence of parasitoids declined sharply during September recording 10.46% and 6.86%, respectively and continued to decrease reaching 2.57% and 0.0% during October.

Table 1. Parasitism of *Nezara viridula* L. eggs under field conditions during 1999 year at Kafr El-Sheikh

Month	Mean no. of eggs/mass	Mean no. of parasitized eggs/mass	% parasitism	Mean no. of emerged parasitoids	%emerged parasitoids	Weather factors					
						Temp. C°			RH%		
						Min.	Max	Mean	Min.	Max.	Mean
April	68.00	1.75	2.57	0.00	0.00	9.30	5.50	17.40	46.00	73.50	59.75
May	85.00	11.75	13.82	0.00	0.00	15.00	28.50	21.75	42.00	68.00	55.00
June	90.00	63.50	70.56	29.75	33.06	18.00	31.00	24.50	42.00	73.00	57.50
July	94.25	36.50	38.73	23.80	25.25	20.00	30.50	25.25	55.00	80.00	67.50
Aug.	78.75	42.75	54.29	39.25	49.84	22.40	31.00	26.70	54.40	80.00	67.20
Sept.	76.50	8.00	10.46	5.25	6.86	19.00	32.00	25.50	44.00	81.00	62.50
Oct.	77.75	2.00	2.57	0.00	0.00	15.00	29.60	22.30	49.00	76.00	62.50
General mean ±SD	81.46 ± 8.91	23.75 ± 23.99	27.57 ± 27.14	14.01 ± 16.56	16.43 ± 19.88	17.53 ± 4.25	29.73 ± 2.18	23.34 ± 3.16	47.48 ± 5.49	75.93 ± 4.76	61.71 ± 4.68

SD = Standard Deviation

PARASITISM OF *NEZARA VIRIDULA* L. EGGS UNDER FIELD  
CONDITIONS AT KAHR EL-SHEIKH GOVERNORATE

Table 2. Parasitism of *Nezara viridula* L. eggs under field conditions during 2000 year at Kafr El-Sheikh

Month	Mean no of eggs/mass	Mean no. of parasitized eggs/mass	% parasitism	Mean no. of emerged parasitoids	%emerged parasitoids	Weather factors					
						Temp <sup>o</sup> C			RH %		
						Min.	Max.	Mean	Min.	Max.	Mean
April	79.50	3.25	4.09	0.00	0.00	12.00	24.50	18.25	41.70	74.00	57.85
May	104.75	2.50	2.39	0.00	0.00	14.80	28.50	21.65	41.50	69.00	55.25
June	94.25	60.00	63.66	53.00	56.23	19.30	32.20	25.75	41.30	71.40	56.35
July	79.75	66.50	83.39	66.00	82.76	21.00	31.50	26.25	51.50	80.50	66.00
Aug.	74.50	16.75	22.48	14.50	19.46	21.60	33.90	27.75	53.50	82.80	68.15
Sept.	81.50	14.75	18.10	12.25	15.03	18.60	31.30	24.95	52.50	80.50	66.50
Oct.	74.00	2.25	3.04	0.40	0.54	14.00	26.60	20.30	38.00	72.00	55.00
General mean $\pm$ SD	84.0 4 $\pm$ 11.33	23.71 $\pm$ 27.70	28.16 $\pm$ 32.45	20.88 $\pm$ 27.31	24.86 $\pm$ 32.38	17.33 $\pm$ 3.72	29.78 $\pm$ 3.36	23.56 $\pm$ 3.51	45.71 $\pm$ 6.49	75.74 $\pm$ 5.42	60.73 $\pm$ 5.87

SD = Standard Deviation

Data recorded in Table 2 reveal that in the second year (2000), the mean number of eggs/mass varied from 74 eggs during October to 104.75 eggs during May. The parasitism appeared in low rate during April and May recording 4.09 % and 2.39 %, respectively. The parasitoids failed to emerge from the parasitized eggs during these months. Then, the rate of parasitism increased sharply during June and July reaching the maximum value of 63.66 % and 83.39 %, respectively. It is noted that the emergence of the parasitoids started to appear during June by 56.23 %, then increased to record the highest value of 82.76% during July. The rate of parasitism and emerged parasitoids declined in the following remained months of the year to reach 3.04 % and 0.45 %, respectively during October.

Concerning the third year (2001), the results in Table 3 indicate that, the mean number of eggs/mass ranged from 68.25 eggs during October to 89 eggs in July. The parasitism started in low rate (4.52 %) during April and increased suddenly to record 37.22 % during May. The highest rate of parasitism (46.11 %) was recorded during June. After that, it decreased gradually during July (38.48 %) and August (34.50 %) and continued to decline sharply recording 2.20 % during October. The emergence of parasitoids started to appear in low rate (2.84 %) during May, then they increased sharply to record the maximum rate of 36.83 % during June. After that, they declined gradually during July and August with rates of 31.01 % and 30.99 %, respectively and continued to decrease recording 9.20 % during September. The emerged parasitoids disappeared completely during October.

From the previous results, it can be noted that, the rate of parasitism was variable among years, as it was relatively higher in the first and second year (27.57 % and 28.16 %, respectively) than in the third one (24.94 %), while the emergence rate of parasitoids was higher in the second year (24.86 %) than the first and third year (16.43 % and 15.80 %). Also the highest rate of parasitism and the parasitoids emergence were recorded during June, July and August for the three seasons and this was synchronized with the increase of temperature at these months. It is important to note that the parasitoids failed to emerge from the parasitized eggs at the low rate of parasitism.

PARASITISM OF *NEZARA VIRIDULA* L. EGGS UNDER FIELD CONDITIONS AT KAFR EL-SHEIKH GOVERNORATE

Table 3. Parasitism of *Nezara viridula* L. eggs under field conditions during 2001 year at Kafr El-Sheikh

Month	Mean no. of eggs/mass	Mean no. of parasitized eggs/mass	% parasitism	Mean no. of emerged parasitoids	%emerged parasitoids	Weather factors					
						Temp.°C			RH%		
						Min.	Max.	Mean	Min.	Max.	Mean
April	83.00	3.75	4.52	0.00	0.00	11.60	25.90	18.75	41.20	67.50	54.35
May	88.00	32.75	37.22	2.50	2.84	14.80	28.00	21.40	39.00	73.00	56.00
June	83.50	38.50	46.11	30.75	36.83	16.30	29.00	22.65	50.00	74.00	62.00
July	89.00	34.25	38.48	27.60	31.01	20.50	31.50	26.00	55.00	79.00	67.00
Aug.	85.50	29.50	34.50	26.50	30.99	21.20	34.60	27.90	55.80	81.70	68.75
Sept.	84.25	9.75	11.57	7.75	9.20	18.00	33.50	25.75	54.00	79.00	66.50
Oct.	66.25	1.50	2.20	0.00	0.00	15.80	29.00	22.40	44.00	70.00	57.00
General mean±	83.07	21.43	24.94	13.59	15.84	16.88	30.21	23.55	48.42	74.88	61.66
SD	6.91	15.79	18.20	14.05	16.41	3.33	3.11	3.15	6.97	5.21	5.91

SD = Standard Deviation

These results are in agreement with those of Jones *et al.* (1996) who reported that the parasitism of *N. viridula* eggs ranged from 0% to 11.1% during July to August, 1975 and reached 50% during August, 1976. Shepard *et al.* (1994) mentioned that the percentage of parasitism of *N. viridula* eggs in the field was variable among years and crops. Also, Awadalla (1996) reported that the rate of parasitism of *N. viridula* eggs by *Trissolcus megallocephalus* (Ashmead) and the number of emerged parasitoids increased when the temperature increased from 20°C to 25°C.

However, the gained results indicate the important role of parasitoids as a bio-control agents in the integrated control programs of *N. viridula*.

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## التطفل على بيض البقّة الخضراء تحت الظروف الحقلية لمحافظة كفر الشيخ

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إن طفيليات بيض البقّة الخضراء من أهم العوامل التي تتحكم في تعداد الحشرة، ولذا تم تقدير معدل التطفل على بيض البقّة الخضراء تحت الظروف الحقلية لمحافظة كفر الشيخ في الفترة من أوائل أبريل حتى نهاية أكتوبر خلال ثلاث سنوات متتالية ١٩٩٩، ٢٠٠٠، ٢٠٠١م.

أوضحت النتائج المتحصل عليها أن التطفل بدأ بمعدل منخفض خلال أبريل وسجلت أعلى نسبة للتطفل وكذا الطفيليات الخارجة خلال شهور يونيو ويوليه وأغسطس في السنوات الثلاثة وقد تزامن ذلك مع ارتفاع درجة الحرارة خلال هذه الشهور. وقد انخفضت نسبة الطفيليات الخارجة من البيض عندما كان معدل التطفل منخفضاً. بصفة عامة كان معدل التطفل أعلى في السنة الأولى والثانية عنه في السنة الثالثة، بينما كانت نسبة الطفيليات الخارجة أعلى في السنة الثانية عنها في السنة الأولى والثالثة. وقد تم تعريف الطفيليات الخارجة وكانت كلها تتبع النوع *Trissolcus megallocephalus* (Ashmead)

وعلى أية حال فإن النتائج المتحصل توضح الدور الهام للطفيليات كأحد عناصر المكافحة الحيوية في برامج المكافحة المتكاملة للبقّة الخضراء.