ECOLOGICAL STUDIES OF FABA BEAN LEAFMINER *LIRIOMYZA TRIFOLII* (BURGESS) (DIPTERA – AGROMYZIDAE) ON COMMON BEAN PLANT *PHASEOLUS VULGARIS* (L.) IN EL – BEHERA AGROECOSYSTEM

OMAR, H.I.H., A.R.I.HANAFY, AFAF M.EL-ROBY AND WALAA A.YONES

Plant Protection Research Institute, ARC., Dokki , Giza

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Abstract

The rate of infestation of Faba bean of leaf miners *Liriomyza trifolii* (Berg.) represented by mean number of larvae and mines / 100 leaves of common bean plants were recorded weekly throughout 2002 and 2003 seasons in experimental farm at Etay El-Baroud Agricultural Research Station El – Behera Governorate . Data indicated that the mean number of *L. trifolii* (Burg.) Larvae on common bean plant increased as the season progressed and reached its maximum on October 3 rd (237.75 larvae - 307.5 minas / 25 leaves) during 2002 while during 2003 season the mean number of larvae population achieved the maximum on October 5th (235.00 larvae - 453.25 mines / 25 leaves) . Throughout the year , the abundance of *L . trifolii* was relatively law in the beginning of growing seasons but the infestation become more serious in the end of seasons. and produced three generations on common bean pants per season of 2002 and 2003. The 1St generation was low and occurred from August 29Th to September 12th and from August 29th, to September 14th in 2002 and 2003 respectively, with generation period of (3 weeks). The second generation begins from September 19th to October 10th and from September 21st to October 12Th on 2002 and 2003 season , respectively (4 weeks) .The third generation begins from October 17th To November 14th and from October 19th to the November 16th in 2002 and 2003 seasons , respectively , with generation period of (5 weeks) .

INTRODUCTION

Common been *Phaseolus vulgaris* (L.), is considered one of the most important leguminous vegetable crop in Egypt. The cultivated area of this crop was estimated as 37600 feddans for green pods and 27450 faddans for dry seed yield in 1998 (according to Agriculture) Economic Reports. Ministry of Agriculture 2003. The vegetable leafminer *Liriomyza trifolii* (Burg.) is one of the most important insect pests which attack common bean plants in Egypt. It causes losses at about 50% of this crop (Omar and Faris 2000). Larvae primary mine into the leaf layer where chloroplasts are located (Chandler and Gilstrap 1986), and adult females puncture both upper and lower lead surface to feed and lay eggs (Nagata et al, 1998). The lower part of common bean plants showed higher infestation rat of *L.* trifolii fllowed by th middle and the upper

part which harbored the least population level (Shalaby 2004). The population of *L. trifolii* (Burg.) immature has three peaks. The highest infestation level were on the middle partion of plants by (El- Gendi *et al.*, 1995) .Throughout the year , the abundance of *L . trifolii* was relatively low in the beginning of growing seasons but the infestation because more serious in the end of seasons (Dang et al, 2007) . The objective of this study was to investigate the infestation rate with . *L. trifolii* and number of field generations on common bean plants during two successive seasons of 2002 and 2003 seasons in El – Behera agroecosystem .

MATRIALS AND METHODS

To study the population fluctuation of Faba bean leaf miner *L. trifolii* (Burgess) on common bean plants , *Phaseolus vulgaris* (L.) two experiments were carried out during two successive seasons 2002 and 2003 at the experimental farm of Etay – El Baroud Agricultural Research Station El – Behera Governorate .

An area of one kerate was cultivated at 15 August with seeds of common bean cultivar Bronco. Agricultural practices were followed and no chemical insecticides were applied throughout the whole seasons. Weekly samples of 25 / Leaves were picked up at random from the middle level of bean plants and identified by Biological Control Dep. Plant Protection Research Institute, and transferred to the laboratory. The leaves were examined through a binuclear microscope to record numbers of larvae and mines. Number and duration of generations per season were estimated according to the method of Audemard & Miliare (1975).

RESULTS AND DISCUSSION

The rate of infestation of leaf miners *Liriomyza trifolii* represented by mean number of larvae and mines / 25 leaves) on common bean plants were studied from 2002 – 2003 are presented in Tables (1 , 2) and illustrated in Figures (1 , 2) . The mean number reached to maximum on October 3rd (237.75 larvae - 307.50 mines / 25 leaves) during 2002 while during 2003 season , the mean number of larvae population achieved its maximum on October 5th (235.00 larvae - 453.25 mines / 25 leaves) . In this respect Shalaby 2004 mentioned that the total *L. trifolii* larvae population reached its maximum on November 28th (62-5 larvae / 20 / Leaves) during 1999 , while during 2000 season , the total larvae population achieved its maximum on November 20th (24 . 8 larvae / 20 leaves) .

The infestation rate of L. *trifolii* (Burgess) begins as soon as plant emerge and increased as the season progressed recording three generations on common bean

plants for each of 2002 and 2003 seasons . The first generation was low and occurred from August 29th to September 12th and from August 31st to September 14th in 2002 and 2003 , respectively with generation period of 3 weeks . The second generation begins from September 19th to October 10th and from September 21st to October 12th in 2002 and 2003 seasons respectively (4 weeks). The third generation bens from October 17 to November 14th and from October 19th to November 16 th in 2002 and 2003 seasons, respectively (5 weeks). This agrees with results given by – Gl – Gundietal , 1995 , Geraud et al . , (1998) , Hannou (1992) , Marzouk (1990) Heyer et al (1989) who mentioned that *L. trifolii* produced three generation on beans per season . Infestation begins as soon as plant emerges.

Table 1. Population densities of Faba bean leaf miner *L. trifolii* on common bean plants cultivated at August 2002 in El- Behera Gavornorate .

Inspection Dates	Plant Age (Days)	Mean number of ..... /25 leaves	
		Larvae	Mines
29 August	14	28.25	35.25
5 September	21	58.25	53.75
12 September	28	80.00	110.00
19 September	35	204.00	229.25
26 September	42	102.50	188.25
3 October	49	237.75	307.50
10 October	56	185.00	287.75
17 October	63	215.50	460.00
24 October	70	85.00	335.00
31 October	77	55.00	235.00
7 November	84	26.75	180.25
14 November	91	28.75	109.00

Table 2. Population densities of Faba bean leaf miner *L trifolii* on common bean plants cultivated at August 2003 in El-Bhera Governorate

Inspection Dates	Plant Age (Days)	Mean number of ...../25 leaves	
		Larvae	Mines
31 August	14	31.75	34.25
7 September	21	60.25	88.00
14 September	28	180.25	233.75
21 September	35	114.25	153.75
28 September	42	127.75	287.75
5 October	49	235.00	453.25
12 October 56	56	204.25	230.75
19 October	63	155.00	304.00
26 October	70	79.00	235.25
2 November	77	102.50	202.50
9 November	84	47.75	179.00
16 November	91	32.00	107.50

Table 3. Number of generation periods of Faba bean leaf miner, L trifolii on common bean plants during 2002 and 2003 seasons, in El-Behra Governorate.

Number of Generation	Season ,2002			Season ,2003		
	Approximated date of occurrence		Generation Period	Approximated date of occurrence		Generation Period
	From	To		From	To	
1st generation	29 August	12 September	3 weeks	31 August	14 September	3 weeks
2nd Generation	19 September	10 October	4 weeks	21 September	12 October	4 weeks
3rd generation	17 October	14 November	5 weeks	19 October	16 November	5 weeks

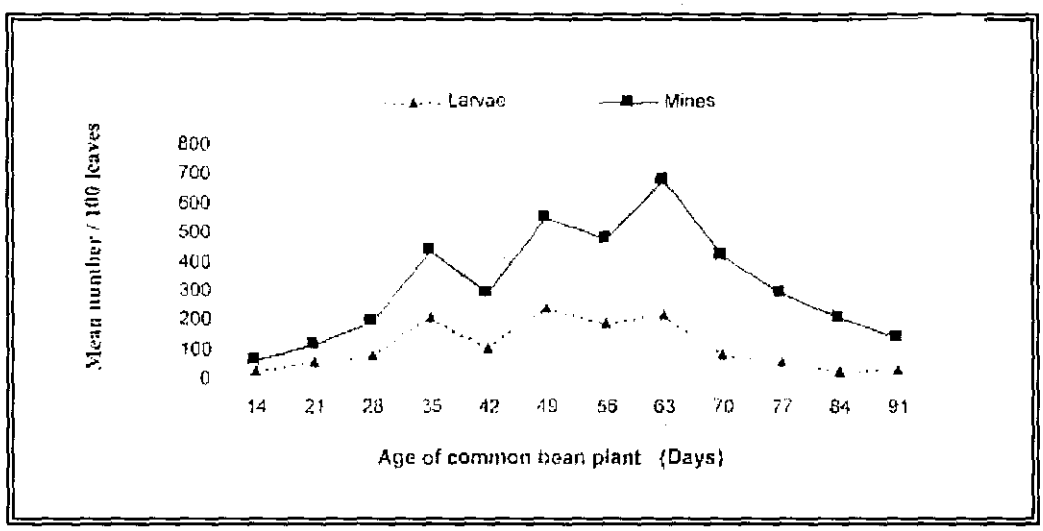

Figure (1): Population fluctuation of Faba bean leaf miner *L. trifolii* on common bean plants during 2002 season.

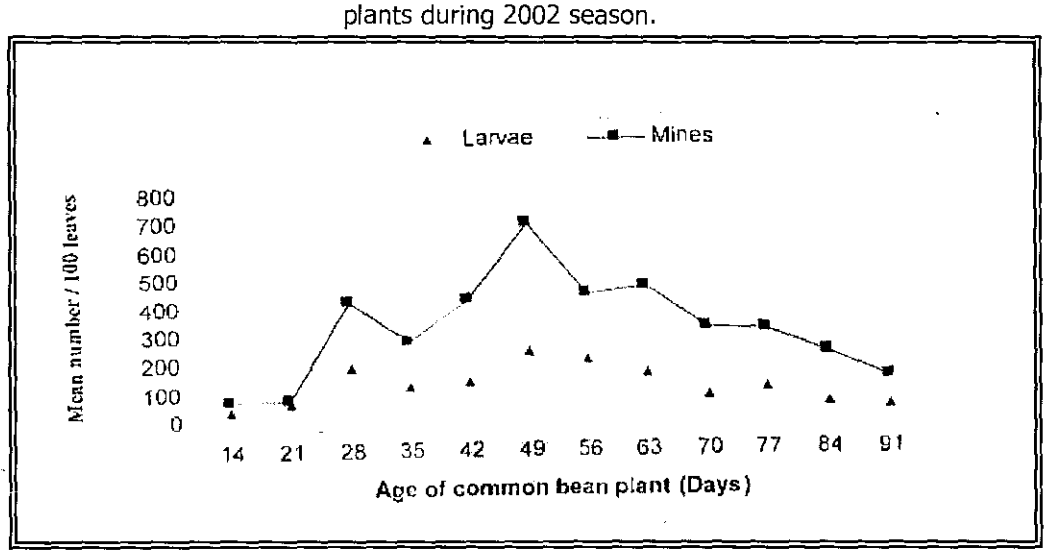

Figure (2) : Population fluctuation of leaf miner *L . trifolii* on common bean plants during 2003 season .

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دراسة بيئية لصانعة انفاق اوراق الفول (***Liriomyza trifolii*** **(Burgess** **Agromyzidae (:Diptera)**)علي نباتات الفاصوليا ***Phaseolus valgaris*** تحت ظروف النظام البيئي لمحافظة البحيرة

حافظ إسماعيل حافظ عمر ، احمد رمضان إبراهيم حنفي ، عفاف محمد الروبي ، ولاء أحمد يونس

معهد بحوث وقاية النباتات – مركز البحوث الزراعية – الدقي جيزه .

أجريت هذه الدراسة بمحطة البحوث الزراعية ايتاي البارود – محافظة البحيرة خلال الموسمين الزراعيين ٢٠٠٢ ، ٢٠٠٣ لتقدير الكثافة العددية وعدد الأجيال لصانعة انفاق اوراق الفول (*Liriomyza trifolii (Bmrgess*) علي نبات الفاصوليا *Phaseolus valgaris* خلال الموسمين الزراعيين ٢٠٠٢ و ٢٠٠٣ وقد أظهرت الدراسة أن الإصابة بصانعة أنفاق اوراق الفول تبدأ بمجرد أنبات أوراق الفاصوليا و تزيد أعدادها بتقدم الموسم الزراعي و تصل إلي أقصى عدد في الثالث من أكتوبر(٢٣٧,٥٧ يرقة – ٣٠٧,٥٠ نفق /٢٥ ورقة نبات) خلال عام ٢٠٠٢ م ، و الخامس من أكتوبر (٢٣٥يرقة – ٤٥٣,٥٦ نفق /٢٥ ورقة نبات). وتبدأ الإصابة بذبابه الفاصوليا مع بداية ظهور البادرات و تزيد بتقدم الموسم الزراعي مسجلة عدد ثلاث أجيال . الجيل الأول يكون ضعيف و يبدأ من ٢٩ /٨ – ١٢ / ٩ - ٣١ / ٨– ١٤ / ٩ خلال الموسمان الزراعيان ٢٠٠٢ ، ٢٠٠٣ علي التوالي حيث تستمر فترة الجيل (٣ أسابيع) و الجيل الثاني يبدأ من ١٩/٩– ١٠ / ١٠ ، ٢١ / ٩ – ١٢ / ١٠ خلال الموسمان الزراعيان ٢٠٠٢ ، ٢٠٠٣ حيث تستمر فترة الجيل ٤ أسابيع . و الجيل الثالث يبدأ من ١٧ / ١٠ – ١٤ / ١١ ، ١٩ / ١٠ – ١٦/ ١١ خلال الموسمان الزراعيان ٢٠٠٢ م ، ٢٠٠٣ م حيث تستمر فترة الجيل (٥ أسابيع) .