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POPULATION DENSITY OF *Liriomyza trifolii* (BURGESS) ON FOUR SUMMER PLANT HOSTS IN RELATION TO SOME WEATHER FACTORS AT SOHAG GOVERNORATE

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ABSTRACT

The current work was carried out in Shandweel Agricultural Research Station, Sohag Governorate in two successive summer seasons of 2021 and 2022 to study the population density of *L. trifolii* on four vegetable host plants in relation to some weather factors. Results indicated that *L. trifolii* formed 2, 1, 2 and 4 peaks in the 2021 season, and 2, 2, 2 and 4 peaks in 2022 season on common bean, cantaloupe, okra and cowpea, respectively. The highest activity period was observed during March for common bean and April for cantaloupe and okra plants, however, the highest rate of infestation was observed during July in case of cowpea. According to simple correlation (r) simple regression (b) and partial regression (p.reg.) values between some weather factors and population density of *L. trifolii* on the four studied crops, maximum and minimum temperature almost affected negatively on the pest population, while, relative humidity showed a positive correlation. The combined effect of the three factors on *L. trifolii* population was 60.80%, 33.42%, 3.88% and 29.75% in 2021 season, and 74.46%, 60.74%, 70.63% and 36.11% in 2022 season on common bean, cantaloupe, okra and cowpea, respectively. Concerning the host preference of *L. trifolii*, it is clear that common bean

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plants recorded the highest mean numbers of 9.53 and 8.56 mines/ 10 leaves in the two seasons, respectively, followed insignificantly by cantaloupe in the second season, however, okra recorded the lowest significant mean number of mines with 2.30 and 2.32 mines/ 10 leaves in the two seasons, respectively.

Keywords: *Liriomyza trifolii*, population, weather factors, host preference

INTRODUCTION

Family Agromyzidae is a member of small flies, whose larvae often feed on leaf mesophyll and internal tissue of stem. The genus of *Liriomyza* contains about 23 species being considered economically important from about 300 species distributed all over the world **(Kang *et al.*, 2009)**. The American serpentine leaf miner, *Liriomyza trifolii* (Burgess) (Diptera: Agromyzidae) is perennial and phytophagous fly infesting many economic plants worldwide **(Seal *et al.*, 2002)**. The leafminer adults attack leaves and lay eggs between the upper and lower epidermis layers of the leaves. When egg hatched, the larvae feed and make snake-like mines, these mines increase in size with larvae grow **(Karthikeyan *et al.*, 2010)**. In Egypt, *L. trifolii* attacks many economic crops, like common bean, cantaloupe, okra and cowpea resulting in damaging of leaves and low photosynthesis of attacked plants **(Abdel Hamed *et al.*, 2011; Abou Hatab and Elgendy, 2013; Abdou *et al.*, 2019; Manjy, 2019; El-Torkey *et al.*, 2020)**. Many *Liriomyza* species have proved to show a host plant preference, and, hence, the infestation can depend on crop species and variety **(Tran *et al.*, 2007)**. **Bassiony *et al.* (2017)** suggested that a higher rate of leafminer infestation on broad bean compared to common bean showed the presence of host plant preference. **Elkhouly *et al.* (2020)** found that preference of *L. trifolii* differed significantly towards the four studied winter hosts. The population fluctuation including the number of peaks and the period of high activity had attention by many investigators **(Amaar *et al.*, 2014; Al-Ghadban *et al.* 2017; Sadiq *et al.*, 2020)**. They reported that leafminer infestation level verified significantly in relation to weather

factors. The successful IPM program of *L. trifolii* requires investigation of host preference and their relation to weather factors under differing circumstances. Therefore, the present study aimed to evaluate the population dynamics of *L. trifolii* on four summer vegetable crops under the agro-climatic conditions of Sohag Governorate, and to assess the influence of selected weather parameters and host plant species on infestation levels

MATERIALS AND METHODS

Experimental design

The experiment was conducted in Shandweel Agricultural Research Station, Sohag Governorate in two successive summer seasons of 2021 and 2022 to study the population density of *L. trifolii* on four vegetables plants. Common bean, *Phaseolus vulgaris* L. (Nebraska cultivar), Cantaloupe, *Cucumis melo* var. cantalupensis, galia type (Shahd Zaman hybrid), Okra, *Abelmoschus esculentus* L. (Balady Green cultivar) and cowpea, *Vigna unguiculata* L. (Sakha 1 cultivar) were put under investigation. Common bean was sown in 1st March, also, Cantaloupe and Okra were planted in 15th in the same month, however, cowpea was sown in 5th April in both seasons of the study (2021 and 2022). For each crop, an area of about 126 m² approximately divided into 3 replicates (1/100 Feddan) was cultivated to study population dynamics and host preference of *L. trifolii*. Throughout the duration of the study, for each crop, conventional agricultural methods were employed, except for pesticides which avoid completely.

Leafminers inspection

Inspection was started after about 10 days from sowing and continued in weekly intervals until the harvest. Each sample consisted of 10 leaves per plot was collected randomly at early morning. The samples were kept in plastic bags and transferred to the laboratory to examine the active mines and numbers were tallied.

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Meteorological data

The data of maximum temperature, minimum temperature and mean relative humidity (R.H%) were obtained from http://www.wunderground.com.

Statistical analysis

The simple correlation analysis (r) and regression (b) between the weekly average numbers of leafminers infesting each crop and maximum temperature, minimum temperature and mean relative humidity (R.H %) were calculated. Also, the partial regression (b) was used to study the effect of the abovementioned factors on leafminers population dynamics. The previous analyses were carried out according to **Fisher (1950)**. For the host preference of *L. trifolii*, the data were statistically analysis using one – way analysis of variance and the least significant difference test (LSD) was used to compare means **(Gomez and Gomez, 1984)** using the SPSS statistical software package 16.0 (SPSS, 2016).

RESULTS AND DISCUSSION

Population density *Liriomyza trifolii* on four summer plants

On common bean

From the data illustrated in Figure 1, common bean plants have been attacked by leafminers from the first sample on 10th March (after plant emergence) in both seasons of 2021 and 2022. Active mines were observed during the whole season, but the highest density was observed during March, followed by April in both years of the study. Two peaks were observed, the highest one was detected on 31st March with 34.7 and 28.0 mines/ 10 leaves in 2021 and 2022 seasons, respectively, while the lowest one was found on 28th April with 5.3 and 5.0 mines/ 10 leaves in the two seasons, respectively. After that, the mean number of

infestations decreased gradually to the end of the two seasons. The present results are going in line with **Amaar *et al.* (2014)** who indicated that *L. trifolii* population recorded two peaks on common bean plants in the first season, while one peak was recorded in the second one, **Selem *et al.* (2016)** who revealed that the population of *L. trifolii* recorded three peaks in the 2nd week of April, 1st week of May and the 1st week of June and **Abdou *et al.* (2019)** who found that the highest mean number of mines due to *L. trifolii* larvae were represented March and April, they added that one peak was found in each month.

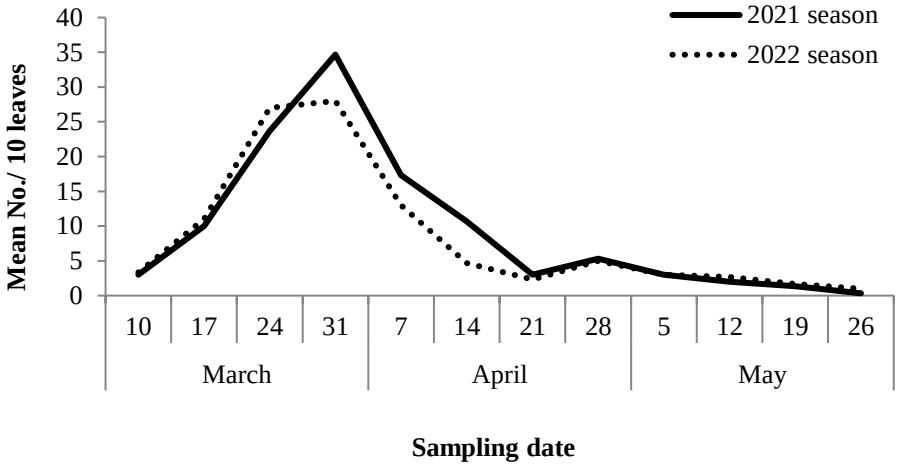

Figure 1. Population density of *L. trifolii* infesting common bean plants during 2021 and 2022 seasons at Sohag Governorate**.**

On cantaloupe

The infestation with *L. trifolii* was recorded on cantaloupe plants on all sampling dates during the two seasons. One and two peaks were detected in 2021 and 2022, respectively (Figure 2). In the first season, the maximum number of 19.3 mines/ 10 leaves was identified as the highest mean number on 14th April, and in the second season, sampling dates of 31st March and 28th April were found as peaks with 16.0 and 14.3 mines/ 10 leaves, respectively. After that, in each season, the active mines decreased to the harvest time. The highest density was observed during April, followed by May in both years of the study. In partial agreement, **El-Solimany and Mostafa (2019)** indicated that *L. trifolii*

attacked cantaloupe plants from the first week of inspection and its number peaked three and two times in 2017 and 2018 seasons, respectively. The same results were obtained by **Ammar *et al.* (2021)** reported that in both seasons of the study *L. bryonae* started to appear in cucumber plants from the first week of inspection period. However, they recorded three peaks of activity for this pest.

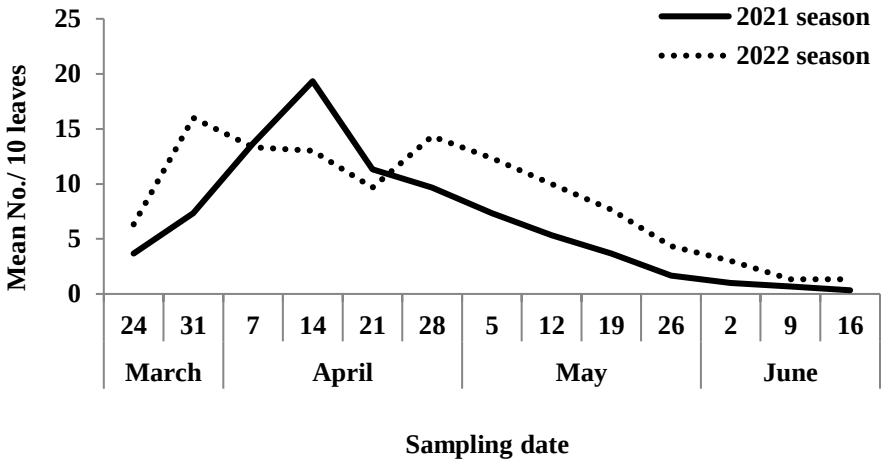

Figure 2. Population density of *L. trifolii* infesting cantaloupe plants during 2021 and 2022 seasons at Sohag Governorate.

On okra

It is clear from the data in Figure 3 that the infestation with leafminers observed from the first sampling date on 24th March, continued to 12th May and then disappeared completely to the end of the two studied seasons. Data revealed that the activity period of *L. trifolii* on okra plantation during two seasons was expressed by two peaks, the highest one was firstly recorded on 7th April with 15.7 and 20.0 mines/ 10 leaves in 2021 and 2022 seasons, respectively, while, on 28th April, lower peak was detected by 7.7 and 13.3 mines/ 10 leaves in 2021 and 2022 seasons, respectively. Samplings of April showed the highest population in the two seasons. In partial agreement, **Tran *et al.* (2007)** reported that the *Liriomyza sativae* infestation on okra found in the beginning of the growing season, however, the numbers were very low after that. **Abdel Hamed *et al.* (2011)** found that the infestation of okra

by *L. trifolii* started with low rates (0.60-0.40 individuals/leaf) after one month from planting date, and then increased gradually to reach its peak then decreased gradually by the time to the end of the two growing seasons. Also, **Faleh *et al.* (2019)** found that the highest infestation intensity of *Liriomyza sativae* on okra plants was 3 mines/ leaf on 16th April 2017, while the lowest one was 0.4 mines/ leaf at the end of the season.

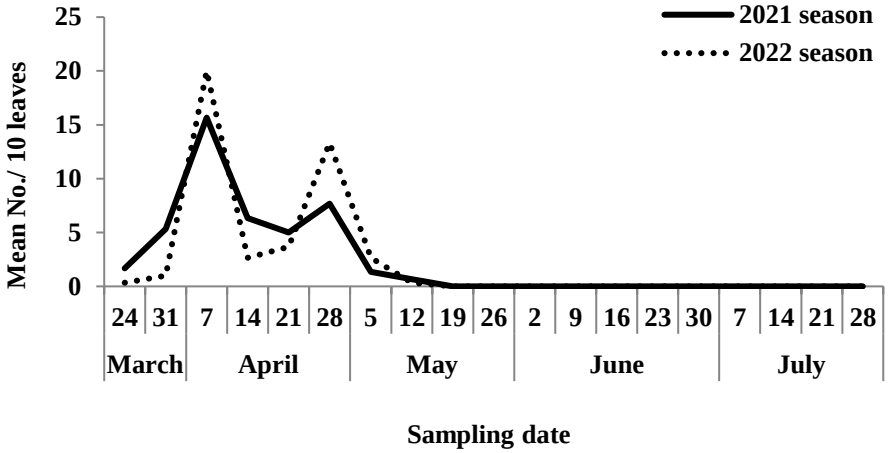

Figure 3. Population density of *L. trifolii* infesting okra plants during 2021 and 2022 seasons at Sohag Governorate.

On cowpea

Concerning the activity period of *L. trifolii* on cowpea plantation, active mines were observed from the first and second sampling dates on 14th and 21st April in 2021 and 2022 seasons, respectively and continued to the last inspection one (26th August) in both seasons (Figure 4). The mean number of mines per 10 leaves was fluctuated and forms four peaks in both seasons. In the first season the peaks were detected on 12th May, 2nd and 16th June and 14th July by 6.7, 3.3, 3.7 and 7.7 mines/ 10 leaves, respectively. Meanwhile, in the second season, average numbers of 4.0, 5.7, 6.3 and 6.3 mines/ 10 leaves were recorded on 12th May, 16th June, 7th July and 4th August, respectively. Results indicated that cowpea leaves showed high rate of infestation with *L. trifolii* during July which contained the highest peak of activity

in both seasons, followed by May and August which contained the second higher one in the two seasons, respectively. In the same line, **Abdel Salam *et al.* (2015)** found that the population density of *L. trifolii* gave 2-4 peaks of activity according to the planting date in both seasons of the study. **Al-Ghadban *et al.* (2017)** indicated that the presence of *L. trifolii* on cowpea plants started at the beginning of seedling growth and continued to the end of the season formed three peaks on local cowpea variety (Bayader). Also, **Manjy (2019)** reported that the infestation by *L. trifolii* began at the lowest rate, followed by a gradual increase, fluctuated to form three peaks, and then reduced until the end of the season.

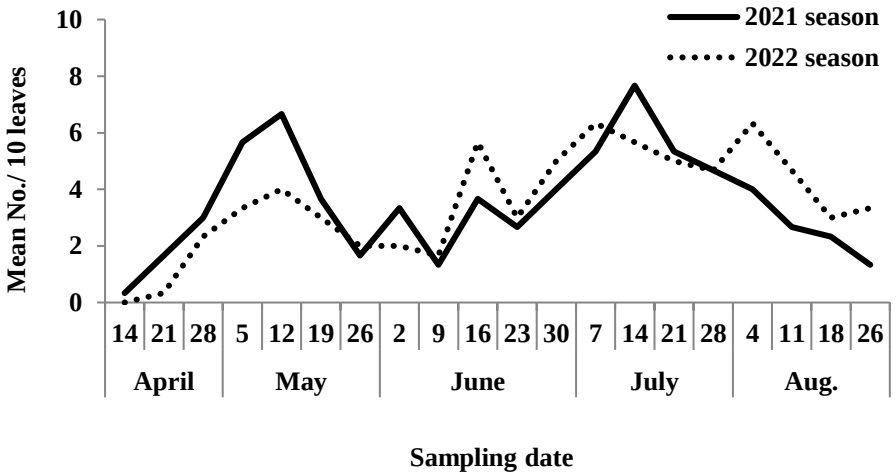

Figure 4. Population density of *L. trifolii* infesting cowpea plants during 2021 and 2022 seasons at Sohag Governorate.

Effect of some weather factors on population density of *Liriomyza trifolii* on four summer plants

Data presented in Tables 1 to 4 showed the simple correlation (r), simple regression (b), partial regression (p.reg.) coefficients and explained variances (E.V.) for relationships between maximum temperature, minimum temperature and daily mean relative humidity and *L. trifolii* activity attacking common bean, cantaloupe, okra and cowpea plants, respectively, during 2021 and 2022 seasons.

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On common bean

The results of analysis in Table 1 showed that the correlation between *L. trifolii* population and maximum temperature and minimum temperature were found to be negatively significant in the first season, and negatively significant and high significant, respectively, in the second season, however, positive insignificant correlation was found with RH% in both seasons. The 'r' values were -0.611, -0.575 and 0.283 in 2021 season and -0.634, -0.805 and 0.448 in 2022 season for maximum, minimum temperature and RH%, respectively. The same results were obtained for simple regression in the two seasons. The simple regression coefficients were -1.22, -1.198 and 0.381 in 2021 season and -0.927, -1.628 and 0.517 in 2022 season for previous factors, respectively. However, values of partial regression were significant with maximum temperature and mean of R.H% in 2021 season and highly significant with minimum temperature in 2022 season. The combined effect of the three factors on *L. trifolii* population was 60.80% and 74.46% in 2021 and 2022 seasons, respectively.

Our results in agreement with those of **Amaar *et al.* (2014)** who found that the combined effect of the maximum temperature, minimum temperature and RH% on population dynamics of larvae of *L. trifolii* using of explained variances (E.V.) was 22% and 51% in the two seasons, respectively. **Selem *et al.* (2016)** showed that both of mean temperature and mean relative humidity was responsible of 45.05 % and 47.7% from the population change of *L. trifolii* throughout the two seasons, respectively. **Elkhouly (2024)** revealed that the correlation values between the population of *L. trifolii* and mean temperature were 0.81 and -0.27 in the summer and winter plantations, respectively, while these values were -0.27 and 0.19, respectively with relative humidity (RH%).

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Table 1. Simple correlation and regression coefficients and values of partial regression between some weather factors and population density of *L. trifolii* on common bean plants during 2021 and 2022 seasons at Sohag Governorate.

Season	Factor	Simple correlation		Simple Regression		Partial regression		Analysis of variance	
		r	P	b	P	p. reg.	P	F	E.V.%
2021	Max. Temp.	-0.611	0.017	-1.122	0.035	-4.242	0.021	6.70**	60.80%
	Min. Temp.	-0.575	0.025	-1.198	0.050	1.184	0.396		
	RH%	0.283	0.187	0.381	0.374	-1.763	0.015		
2022	Max. Temp.	-0.634	0.0130	-0.927	0.027	1.489	0.158	11.69**	74.46%
	Min. Temp.	-0.805	0.002	-1.628	0.002	-3.872	0.005		
	RH%	0.448	0.072	0.517	0.144	-0.208	0.622		

r: Simple correlation coefficient. B: Simple regression coefficient. B.reg.: Partial regression coefficient. C.V.%: explained variances. *: significant. **: highly significant.

On cantaloupe

The correlation between *L. trifolii* population and maximum temperature and minimum temperature were found negatively significant and highly significant, respectively in the first season, while in the second season, their effects were negatively insignificant and significant, respectively (Table 2). For RH%, a positive insignificant correlation was found in both seasons. The 'r' values were -0.522, -0.666 and 0.423 in 2021 season and -0.392, -0.619 and 0.219 in 2022 season for maximum, minimum temperature and RH%, respectively. The results of simple regression showed that only the effect of minimum temperature was significant in the two seasons. The simple regression coefficients were -0.545, -0.769 and 0.364 in 2021 season and -0.356, -0.592 and 0.157 in 2022 season for previous factors, respectively. However, values of partial regression were insignificant for all weather

factors in 2021 season, whereas, in 2022 season, its values were significant and highly significant for maximum temperature and minimum temperature, respectively, and insignificant for R.H%. The combined effect of the three factors on *L. trifolii* population was 33.42% and 60.74% in 2021 and 2022 seasons, respectively, with insignificant F value in the first season.

Our results are in agreement with **de Sousa (2021)** who found that *L. sativae* population density on *Cucumis melo* L. crop was lower when the minimum temperature was higher and the maximum was lower. **Supartha *et al.* (2023)** stated that the mean numbers of *L. trifolii* infesting Cucurbitacous plants were higher in dray season than wet seasons.

Table 2: Simple correlation and regression coefficients and values of partial regression between some weather factors and population density of *L. trifolii* on cantaloupe plants during 2021 and 2022 seasons at Sohag Governorate.

Season	Factor	Simple correlation		Simple Regression		Partial regression		Analysis of variance	
		r	P	b	P	p. reg.	P	F	E.V.%
2021	Max. Temp.	-0.522	0.034	-0.545	0.067	0.709	0.453	3.01 N.S.	33.42%
	Min. Temp.	-0.666	.006	-0.769	0.013	-1.443	0.078		
	RH%	0.423	.075	0.364	0.150	0.049	0.918		
2022	Max. Temp.	-0.392	0.092	-0.356	0.185	1.867	0.029	7.19**	60.74%
	Min. Temp.	-0.619	0.012	-0.592	0.024	-2.238	0.004		
	RH%	0.219	0.236	0.157	0.472	0.210	0.468		

r: Simple correlation coefficient. B: Simple regression coefficient. B.reg.: Partial regression coefficient. C.V.%: explained variances. *: significant. **: highly significant.

On okra

From data analysis presented in Table 3, it is clear that no significant correlations were found between population of *L. trifolii* and each of maximum temperature and minimum temperature and RH% in both seasons of the study, except of RH% in 2022 season. Also, the simple regression analysis indicated the same results. This may due to the short activity period of the insect pest on okra plants. The 'r' values were -0.594, -0.574 and 0.641 in 2021 season and 0.534, 0.290 and -0.530 in 2022 season for maximum, minimum temperature and RH%, respectively. While, the simple regression coefficients were -0.449, -0.531 and 0.436 in 2021 season and 0.649, 0.472 and -0.455 in 2022 season for previous factors, respectively.

The values of partial regression were insignificant for all weather factors in 2021 season, whereas, in 2022 season, its values were significant for maximum temperature and minimum temperature and insignificant for R.H%. The combined effect of the three factors on *L. trifolii* population was 3.88% and 70.63% in 2021 and 2022 seasons, respectively, with insignificant F value in the first season.

Abdel Hamed *et al.* (2011) recorded correlation between maximum and minimum temperature and *L. trifolii* population was positive insignificant, while, a significant negative relation was observed with RH%. The combined effect of all tested factors was 73.4% and 69.2%.

On cowpea

The *L. trifolii* population was positively correlated in highly significant way with maximum temperature and minimum temperature in the two seasons, while, significant and insignificant negative correlations were obtained in 2021 and 2022 seasons, respectively, in case of RH% (Table 4). The 'r' values were 0.636, 0.545 and -0.517 in 2021 season and 0.638, 0.645 and -0.078 in 2022 season for maximum, minimum temperature and RH%, respectively.

Table 3. Simple correlation and regression coefficients and values of partial regression between some weather factors and population density of *L. trifolii* on okra and plants during 2021 and 2022 seasons at Sohag Governorate.

Season	Factor	Simple correlation		Simple Regression		Partial regression		Analysis of variance	
		r	P	b	P	p. reg.	P	F	E.V.%
2021 season	Max. Temp.	-0.594	0.060	-0.449	0.122	0.887	0.635	1.09 N.S.	3.88%
	Min. Temp.	-0.574	0.069	-0.531	0.137	-0.664	0.626		
	RH%	0.641	0.043	0.436	0.087	0.780	0.448		
2022 season	Max. Temp.	0.534	0.086	0.649	0.173	4.378	0.023	6.61*	70.63%
	Min. Temp.	0.290	0.243	0.472	0.485	-4.421	0.024		
	RH%	-0.530	0.088	-0.455	0.177	0.490	0.278		

r: Simple correlation coefficient. b: Simple regression coefficient. b.reg.: Partial regression coefficient. C.V.%: explained variances. *: significant. **: highly significant.

Similar results were found for simple regression analysis, in 2021 season, *L. trifolii* population highly significant affected by maximum temperature, and significant affected by minimum temperature and RH%. While, in 2022 season, its population highly significant affected by maximum and minimum temperatures and no significant effect was obtained in case of RH%. The simple regression coefficients were 0.360, 0.286 and -0.192 in 2021 season and 0.495, 0.354 and -0.029 in 2022 season for maximum and minimum temperatures and RH%, respectively.

However, values of partial regression were insignificant for all weather factors in the two seasons of the study. The combined effect of the three factors on *L. trifolii* population was 29.75% and 36.11% in 2021 and 2022 seasons, respectively. In the same line **Abdel Salam *et al.* (2015)** indicated that no significant effect of relative humidity on population density of *L. trifolii* in both seasons.

Table 4. Simple correlation and regression coefficients and values of partial regression between some weather factors and population density of *L. trifolii* on cowpea plants during 2021 and 2022 seasons at Sohag Governorate.

Season	Factor	Simple correlation		Simple Regression		Partial regression		Analysis of variance	
		r	P	b	P	p. reg.	P	F	E.V.%
2021	Max. Temp.	0.636	0.001	0.360	0.003	0.473	0.186	3.68*	29.75%
	Min. Temp.	0.545	0.006	0.286	0.013	-0.066	0.778		
	RH%	-0.517	0.010	-0.192	0.020	0.038	0.788		
2022	Max. Temp.	0.638	0.001	0.495	0.003	0.359	0.262	4.58*	36.11%
	Min. Temp.	0.645	0.001	0.354	0.002	0.151	0.467		
	RH%	-0.078	0.372	-0.029	0.744	0.054	0.519		

r: Simple correlation coefficient. b: Simple regression coefficient. b.reg.: Partial regression coefficient. C.V.%: explained variances. *: significant. **: highly significant.

Host preference of *Liriomyza trifolii* on four summer plants

According to statistical analysis of data presented in Figure 5, the leafminer, *L. trifolii* showed obvious host preference towards the four studied plants in both seasons. In 2021 season, common bean plants recorded the highest mean number of 9.53 mines/ 10 leaves, followed significantly by cantaloupe plants with 6.54 mines/ 10 leaves. Cowpea plants came next with 3.55 mines/ 10 leaves, however, the least preference was okra with 2.30 mines/ 10 leaves. In 2022 season, the same trend was obtained, but no significant difference was found between common bean and cantaloupe plants which arranged as a higher preferred hosts with 8.56 and 8.67 mines/ 10 leaves, respectively. However, okra recorded the lowest significant mean number of mines with 2.32 mines/ 10 leaves and cowpea came next with 3.57 mines/ 10 leaves.

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The host preference has attention by many investigators, **Bassiony *et al.* (2017)** reported that the infestation level of *L. trifolii* was significantly high in broad bean compared to snap bean. **Abou Hatab and Elgendy (2013)** indicated that leaf miner represented only 15% from the all-pest numbers recorded on okra leaves. **Elkhouly *et al.* (2020)** found that *L. trifolii* showed high preference against broad bean plants, followed by pea, snow thistle, while fenugreek was the lowest preference. **El-Torkey *et al.* (2020)** indicated that *L. trifolii* infested leaves of cantaloupe in moderate populations. The variation in host preference may due to variation in some morphological parameters of leaves like thickness of epidermis wall or hairs density on plant leaves **(Wei *et al.*, 2000)**, also, may due to variation in secondary compounds in leaves like Alkaloids, Tannins, Flavonoids and Phenols and their different concentrations **(Mahmoud and Sadek, 2020)**.

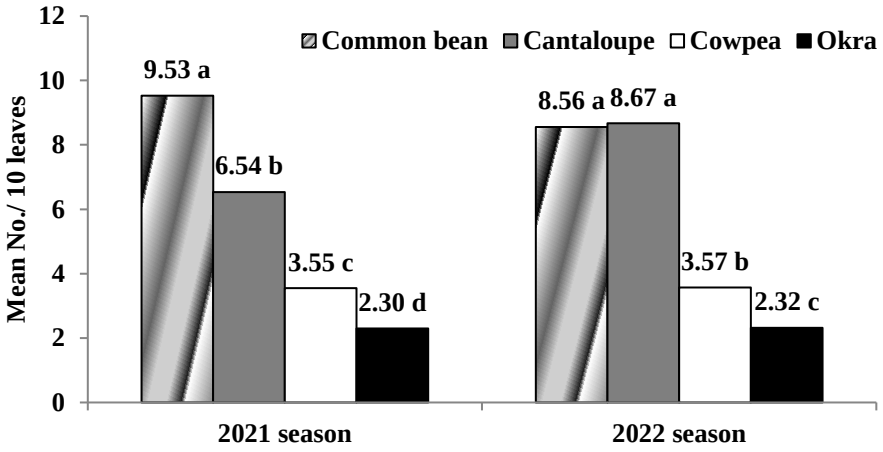

Figure 5. Host preference of ***L. trifolii*** on four summer plants during 2021 and 2022 seasons at Sohag Governorate.

CONCLUSION

From the previous results, it can be concluded that the activity period and the number of peaks of *L. trifolii* varied according to plant kind. Also, the effect of the temperature the relative humidity differed in the four studied crops, but it is clear that temperature and almost

affected negatively on the pest population, and in contrast, the relative humidity. Common bean and cantaloupe plants were found as a preferred hosts for *L. trifolii*, while, okra appeared as least preferred one.

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الكثافة العددية لصانعة أنفاق أوراق الفول ((*Liriomyza trifolii* (Burgess) على أربعة عوائل نباتية صيفية وعلاقتها ببعض العوامل الجوية بمحافظة سوهاج.

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صانعة أنفاق أوراق الفول (*Liriomyza trifolii* (Burgess) (Diptera: Agromyzidae) تعتبر آفة عديدة العوائل وتصيب العديد من النباتات الإقتصادية علي مستوي العالم. أجري هذا البحث في محطة البحوث الزراعية بشندويل بمحافظة سوهاج خلال الموسمين الصيفيين المتعاقبين 2021 و2022 لدراسة الكثافة العددية لصانعة أنفاق أوراق الفول علي أربعة نباتات خضر صيفية وعلاقتها بالحرارة العظمي والصغري والرطوبة النسبية. أظهرت النتائج أن صانعة أنفاق أوراق الفول كونت 2, 1, 2 و4 قمم للتعداد في موسم 2021 وكونت 2, 2, 2 و4 قمم للتعداد في موسم 2022 علي نباتات الفاصوليا, الكنتالوب, البامية واللوبيا, علي التوالي. تم ملاحظة أعلي فترة لنشاط الآفة خلال شهر مارس بالنسبة للفاصوليا, وشهر أبريل بالنسبة للكنتالوب والبامية وشهر يوليو في حالة اللوبيا. طبقا لنتائج معامل الإرتباط البسيط ومعامل الانحدار البسيط والجزئي بين بعض العوامل الجوية والكثافة العددية لصانعة أنفاق أوراق الفول علي محاصيل الخضر الأربعة, تبين أن الحرارة العظمي والصغري في الأغلب كانت تؤثر سلبيا علي التعداد وعلي العكس بالنسبة للرطوبة النسبية. اظهرت النتائج ان التأثير المشترك للثلاثة عومل المدروسة علي تعداد صانعة أنفاق أوراق الفول كان 60,80%, 33,42%, 3,88% و29,75% في موسم 2021 و74,46%, 60,74%, 70,63% و36,11% في موسم 2022 علي الفاصوليا, الكانتالوب, البامية واللوبيا, علي التوالي. بالنسبة للتفضيل العوائلي لصانعة أنفاق أوراق الفول, من الواضح أن نباتات الفاصوليا سجلت أعلي متوسط للتعداد, 9,53 و8,56 نفق/ 10 أوراق في كلا الموسمين, علي التوالي, يليها بشكل غير معنوي الكانتالوب في الموسم الثاني, بينما سجلت البامية أقل تعداد للأنفاق بمتوسط 2,30 و2,32 نفق/ 10 أوراق في كلا الموسمين, علي التوالي.