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EFFECT OF PLANTING DATE ON POPULATION ABUNDANCE OF CERTAIN LEAF PESTS INFESTING SOME VEGETABLE CROPS AT GEMMEZA REGION, EGYPT

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Abstract

Planting potato in summer and winter seasons as well common bean and squash during summer and nili plantations were practised to show their effects on occurrence of *Ahpis gossypii* Glover, *Aphis craccivora* Koch, *Myzus persicae* Sulz., *Empoasca decipiens* Paoli, *Thrips tabaci* Lind., *Bemisia tabaci* (Genn.) ant *Tetranychus* sp. infesting leaves of the above mentioned vegetable crops during the two successive years 1991 and 1992 at Gemmaza region, Egypt. The obtained results showed that the population density of *B. tabaci* and *Tetranychus* sp. on potato plants grown in the winter season was higher than in summer, while the opposite was true in case of the other pests .

In both summer and nili plantations of 1991 and 1992, the sowing date of common bean plants had a significant effect on the incidence of all pests except for *M. persicae* duirng the nili season of 1991 which was insignificantly influenced by changing the time of sowing. The third sowing date, mid-April (summer) and mid-September (nili) was more suitable for common bean cultivation showing the highest yield and recording relatively low number of most of the studied pests.

Pests that occurred on summer squash plants were highly influenced by the date of sowing . In case of nili plantation , the differences between the population density of *A. craccivora* and *T. tabaci* in 1991 and *M. persicae* in 1992 attacking squash plants sown at five intervals were statistically insignificant. The fourth summer sowing date (mid-May_ and the third nili one (mid-September) for squash vegetable crop were recommended, because they gave the highest yield and showed the lowest population of all pests except for *Tetranychus* sp. and *B. tabaci* during the summer season of 1991 and nili season of 1992, respectively.

INTRODUCTION

The vegetable crops, potato (*Solanum tuberosum* L.), common bean (*Phaseolus vulgaris* L.) and squash (*Cucurbita pepo* L.)are considered in many parts of the world as cash crops . In Egypt, these crops are attacked by several leaf-pests which cause considerable damage to yield. Te most injurious pests are the cotton aphid, *Aphis gossypii* Glover, the leguminous aphid, *Aphis craccivora* Koch, the green peach aphid, *Myzus persicae* Sulz, the potato leaf hopper, *Empoasca decipiens* Paoli, the cotton thrips, *Thrips tabaci* Lind., the cotton white fly, *Bemisia tabaci* (Genn) and the red spider mite , *Tetranychus* sp.

The available literature shows that much work had been done on the effect of planting date on the infestation by different pests; Varis (1958), Zamirov (1962), Abul-Nasr *et al.* (1974), Harakly (1974), Marzouk (1975) , Helaly (1978) Hemeida (1981) , El-Dakroury and Khalil (1982) , El-Borolosy *et al.* (1984) , El-Borolosy and Hemeida (1986), El-Deeb *et al.* (1987), Hassanein *et al* . (1988) and Helaly *et al.* (1990).

In Egypt, however, it seems that such kind of study on vegetable crops had been neglected. Therefore, it was necessary to study the influence of different planting dates on the occurrence and degree of infestation of the previously mentioned pests attacking the different vegetable crops aiming at determining the optimum planting date which leads to high crop yield with low pest occurrence.

MATERIALS AND METHODS

The experiments were conducted at the experimental farm of Gemmaza Research station, Agricultural Research Centre, Ministry of Agriculture, Gharbia Governorate, Egypt, during the two successive years 1991 and 1992. The potato variety (Diamont) was planted on the 14th of October and 29th of January of both years in winter and summer plantations, respectively. The common bean variety (Giza-3) and squash variety (Skandarany) were sown on five consecutive sowing dates at monthly intervals of the two years in both summer and nili cultivations (February 15th, March 15th, May 15th and June 15th for the summer season and July 15th, August 15th, September 15th, October 15th and November 15th for the nili one). An area of about $64m^2$ for potato and common bean and $90m^2$ for squash was divided into six replicates (3 for vegetative samples and 3 for the yield)in complete ran-

domized plot design. Normal agricultural practices were followed and no pesticidal treatments were applied . The major leaf pests which were prevailing on the aforementioned vegetable crops were *Aphis gossypii* Glover, *A. cracccivora* Koch, *Myzus persicae* Sulz., *Empoasca decipiens* Paoli, *Thrips tabaci* Lind., *Bemisia tabaci* (Genn.) and *Tetranychus* sp.

Samples of 20 leaflets (potato) and 20 leaves (common bean and squash) per replicate were taken randomly at weekly intervals from different levels of plant height (one leaflet or leaf per plant) after about 30-40 days for potato and 14 days for common bean and squash. These were kept in tightly closed paper bags and the included pests were assorted counted in the laboratory in the same day with the aid of a stereomicrospe. the total number of nymphs and adults of *A. gossypii, A. craccivora, M.persicae, E.decipiens* and *T. tabaci* found on both surfaces of each unit sample was taken as an indication of the populatin size of these insects at the respective date for each planting time. The population density of *B. tabaci* was estimated by counting the total number of immature stages (eggs, larvae and pupae) found per inch^2 on both surfaces of each leaflet (potato), middle leaflet (common bean) and the whole leaf (squash). In case of *Tetranychus* sp., counting of eggs and moving individuals was made on each surface in an area of one inch^2. The tested area was chosen at the base of the leaflet (potato and common bean) or leaf (squash) and around its mid-rib.

All the obtained results were statistically analyzed according to completely randomized design. The proper "F" and L.S.D. values were calculated as described by Fisher (1944) and Snedecor (1957).

RESULTS AND DISCUSSION

Pests infesting potato plants

Concerning the effect of planting potato in two dates i.e., summer and winter plantations on the incidence of certain leaf-pests invading this crop in the field during the first year of 1991, the level of population abundance of *A. craccivora, T. tabaci B. tabaci*, and *Tetrancyhus* sp. attacking potato leaves varied significantly according to the season of planting. In 1992 season, the differences between average numbers of *A. gossypii, M. persicae, B. tabaci* and *T. tabaci* which occurred in summer and winter on potato plants were statistically significant.

Generally , the occurrence of *M.persicae, E. decipiens* and *T. tabaci* on potato

plants grown in summer plantation was much higher than in winter. Individulas of both *B. tabaci* and *Ttrancyhus* sp. attacked heavily winter potato plants as compared with summer plantation population. The abundance of *A. gossypii and A. craccivora* on potato plants was higher during winter season than during summer in the first year of study, whereas in the second year the opposite was true. (Table 1).

Pests infesting common bean plants

Summer plantation

Data in Table 2 show the effect of five different summer sowing dates on infestation of common bean leaves with certain leaf pests.

A. gossypii

In both 1991 and 1992 seasons, the highest average number occurred on common bean plants sown in the first sowing date (15th of February) recording 7.46 and 19.20 aphids/leaf, respectively. Retarding sowing date caused high reduction in aphid's abundance showing the average number of 0.26 insect/leaf on common bean plants sown on 15th of April of the first season, and 0.02 on plants sown on 15th of May in the second season.

A. craccivora

It is worth to mention that summer common bean plants sown in mid-February were heavily attacked with leguminous aphids recording the highest average of 0.12 and 9.60 insects/leaf in 1991 and 1992, respectively. The insect population abundance greatly decreased in the other tested summer sowing dates and the pest was completely absent during the growing season of bean plants sown on the three last dates of 1991 and on plants of the fourth sowing date of 1992.

M. persicae

Summer common bean plants sown on April 15th, May 15th and June 15th, showed the lowest level of abundance of the green peach aphid (0.01 aphid/leaf) in the first year whereas, plants sown on 15th of May, and 15th of June were competely free in the second season. Also, as indicated with the two previously mentioned species of aphids, the population density of this species of aphids was higher on bean plants sown in the first date (mid -February) as compared with those obtained with the other tested summer sowing dates.

E. decipiens

In the first year, jassids occurred in high numbers on summer common bean plants sown on mid-May and mid-June compared with the early dates. In the second year, the jassid maximum population was recorded on the first and fifth dates

Table 1. Effect of differnt planting dates on infestation of potato plants by certain leaf pests and the yield during 1991 and 1992.

Season	Average number /leaflet					Av. No./inch^2 of leaflet		Yield (ton/f)
	A. gossypii	*A.craccivora*	*M.persicae*	*E.decipiens*	*T.tabaci*	*B.tabaci*	*Tetranychus sp.*	
				1991				
Summer	0.12	0.00a	0.03	0.00	0.38a	0.78a	0.03a	13.82a
Winter	0.03	0.05b	0.02	0.00	0.00b	11.16b	12.09b	8.00b
F.test	N.S.	* *	N.S.		*	* *	* *	* *
				1992				
Summer	0.76a	0.07	0.73 a	0.02	0.89a	0.00a	0.00	12.48a
Winter	0.04b	0.04	0.02 b	0.02	0.0b	9.04b	0.00	8.00b
F.test	* *	N.S.	* *		* *	* *	*	*

N.S. not significant
* indicates significance at 5% level of probability.
** indicate significance at 1% level of probability.
The differens between averages followed by similar letters were statistically insignificant.

Table 2. Effect of differnt sowing dates on infestation of common bean plants by certain leaf pests and the seed yield during summer seasons of 1991 and 1992.

Sowing date	Average number /leaflet					Av. No./inch^2 of leaflet		Yield (kg/f)
	A. gossypii	*A.craccivora*	*M.persicae*	*E.decipiens*	*T.tabaci*	*B.tabaci*	*Tetranychus sp.*	
				1991				
Feb. 15	7.46 d	0.12 b	0.29 d	0.34 b	2.96 a	0.44 a	0.40 a	0.00 a
Mar. 15	0.32 a	0.02 a	0.04 a	0.31 b	6.88 b	0.65 a	2.57 b	142.22 b
Apr. 15	0.26 a	0.00 a	0.01 a	0.15 d	5.19 c	0.32 a	10.52 c	704.76 c
May 15	4.55 b	0.00 a	0.01 a	0.82 a	2.68 a	4.22 b	11.74 d	660.32 d
June 15	0.59 a	0.00 a	0.01 a	0.75 a	0.95 d	23.66 c	4.92 e	241.27 e
F. test	* *	*	*	* *	* *	* *	* *	* *
				1992				
Feb. 15	19.20 d	9.60 c	3.47 c			0.01 a	0.00 d	0.00 b
Mar. 15	5.10 c	2.52 b	0.36 b	1.32 d	6.37 b	0.02 a	1.32 c	88.89 a
Apr. 15	0.08 a	0.06 a	0.04 a	0.38 b	4.55 c	0.00 a	7.60 b	558.73 c
May 15	0.02 a	0.00 a	0.00 a	0.35 b	3.24 d	0.03 a	4.83 a	495.24 d
June 15	1.27 b	0.01	0.00 a	0.94 a	1.82 e	39.29 b	5.41 a	132.06 a
F. test	* *	* *	* *	* *	* *	* *	* *	* *

showing the highest average number of 0.92 and 0.94 insects/leaf, respectively. The third sowing date proved to be unfavourable to jassid development.

T. tabaci

In both 1991 and 1992 seasons, the individuals of the cotton thrips were more abundant during the growing season of summer bean plants sown on the 15th of March showing the highest average number. Sowing earlier or later reduced insect incidence showing the lowest populations (0.95 and 1.82 insects/leaf in the fifth date of the first and second seasons, respectively).

B.tabaci

The obtained results clearly indicated that the white fly insects were more abundant on common bean plants sown on the latest date in summer season (mid-June) in both years showing the highest averages of 23.656 and 39.290 immature individuals/inch^2 of middle leaflet in 1991 and 1992 seasons, respectively.

Tetranychus sp.

The highet activity of the common red spider mite attacking summer common bean plants occurred on the third and fourth sowing dates showing the maximum number of 11.74 and 7.60 in 1991 and 1992 seasons, respectively. Changing the time of sowing caused high reduction in pest population.

According to the present results , it could be stated that the third sowing date (mid-April) was the most suitable for summer common bean production, because the population of all tested pests for *T.tabaci* and *Tetranychus* sp. were relatively low. Moreover, bean plants yielded high amount of seeds as compared with the other sowing dates.

Nili plantation

Data presented in Table 3 reveal the influence of different sowing dates during nili plantation on the incidence of certain pests invading common bean leaves during the two successive seasons. In both 1991 and 1992 seasons, the average numbers of all pests varied significantly according to the date of sowing except in case of *M.persicae* in 1991 where the differences were insignificant at the five tested sowing dates. It is worthy to mention that common bean plants grown during nili plantation of both 1991 and 1992 years were attacked with all leaf pests except for *Tetranychus* sp. which was not recorded on nili common bean plants grown in 1992 season.

Comparing the sowing date with bean production of seeds, it was obvious that the third date (15th of September) proved to be the best as it showed the highest

Table 3. Effect of differnt sowing dates on infestation of common bean plants by certain leaf pests and the seed yield during nili seasons of 1991 and 1992.

Sowing date	Average number /leaflet					Av. No./inch^2 of leaflet		Yield (kg/Fed.)
	A. gossypii	*A.craccivora*	*M.persicae*	*E.decipiens*	*T.tabaci*	*B.tabaci*	*Tetranychus sp.*	
				1991				
Jul. 15	3.63 c	0.00 b	0.00	1.39 c	0.43 b	397.84 b	1.11 a	209.52 a
Aug. 15	0.94 b	0.00 b	0.00	1.85 a	0.02 a	587.99 d	0.00 b	209.52 a
Sep. 15	0.09 a	0.00 b	0.00	0.11 b	0.04 a	278.29 c	0.00 b	349.21 d
Oct. 15	0.13 a	0.10 a	0.09	0.13 b	0.02 a	1.70 a	0.00 b	184.13 a
Nov. 15	0.18 a	0.12 a	0.13	0.00 d	0.04 a	0.71 a	0.00 b	0.00 b
F. test	* *	*	N.S.	**	* *	* *	* *	* *
				1992				
Jul. 15	2.93 c	0.75 d	0.04 a	[illegible]	[illegible]	65.57 b	0.00	215.87 a
Aug. 15	0.96 b	0.36 c	0.04 a	0.13 b	0.11 b	467.47 d	0.00	199.36 a
Sep. 15	0.16 a	0.10 b	0.02 c	0.17 a	0.02 a	358.28 c	0.00	279.37 b
Oct. 15	0.00 a	0.00 a	0.00 b	0.02 a	0.01 a	20.64 a	0.00	130.79 c
Nov. 15	0.00 a	0.00 a	0.00 b	0.00 a	0.00 a	12.68 a	0.00	0.00 d
F. test	* *	* *	* *	* *	* *	* *		* *

Table 4. Effect of differnt sowing dates on infestation of squash plants by certain leaf pests and the yield during the summer seasons of 1991 and 1992.

Sowing date	Average number /leaflet					Av. No./inch^2 of leaflet		Yield (ton/Fed.)
	A. gossypii	*A.craccivora*	*M.persicae*	*E.decipiens*	*T.tabaci*	*B.tabaci*	*Tetranychus sp.*	
				1991				
Feb. 15	0.94 a	0.00	0.08 a	0.00	1.14 a	1.42 a	0.10 b	0.58 d
Mar. 15	0.32 a	0.00	0.06 ab	0.00	1.80 a	1.04 a	1.10 ab	5.37 a
Apr. 15	0.81 a	0.00	0.03 bc	0.00	2.10 c	1.43 a	3.66 a	2.49 c
May. 15	1.43 a	0.00	0.08 a	0.00	1.03 a	3.37 a	15.01 c	8.80 b
June. 15	6.96 b	0.00	0.00 c	0.00	0.60 d	38.73 b	9.38 d	5.33 a
F. test	* *		* *		* *	* *	* *	* *
				1992				
Feb. 15	78.12 b	0.47 b	0.39 b			0.00 a	0.00 b	0.71 a
Mar. 15	26.14 d	0.17 d	0.24 c	0.04 b	2.88 a	0.01 a	0.20 c	5.11 b
Apr. 15	0.51 a	0.01 a	0.00 a	0.22 c	3.26 a	0.04 a	0.78 a	2.62 c
May. 15	0.02 a	0.00 a	0.00 a	0.05 b	0.02 b	0.01 a	0.72 a	10.36 d
June. 15	6.03 c	0.03 a	0.05 d	0.11 a	0.41 b	49.47 b	1.19 d	5.89 e
F. test	* *	* *	* *	* *	* *	* *	* *	* *

yield in both seasons and recorded the lowest number of *A. gossypii, A. craccivora, M. persicae, E.decipiens, T. tabaci* and *Tetranychus* sp. In case of *B. tabaci*, the insect population at this sowing date was relatively low as compared with that in the two former dates.

Pests infesting squash plants

Summer plantation

As clearly shown from Table 4, summer squash plants were compelety free from the individuals of both *A. craccivora* and *E. decipiens* only during 1991 season. It was apparent that sowing date had a high significant effect on the occurrence of all studied pests.

All the tested pests invading summer squash plants except for Tetranychus sp. in 1991, showed relatively low numbers on plants sown on the fourth summer date, 15th of May and at the same time gave the highest yield of fruits as indicated by 8.80 and 10.36 tons/F in the first and second seasons, respectively.

Nili plantation

The data presented in Table 5 clearly show that no significant differences were detected between the average numbers of both *A. craccivora* and *T. tabaci* in 1991 season and *M. persicae* in 1992. On the other hand, the other pests were highly affected by changing the sowing date of nili squash plants in both years.

The third nili sowing dae of squash crop could be recommended as it gave the highest yield and the incidence of most pests was relativeley low.

Table 5. Effect of differnt sowing dates on infestation of squash plants by certain leaf pests and the seed yield during the nili seasons of 1991 and 1992.

Sowing date	Average number /leaflet					Av. No./inch^2 of leaflet		Yield (kg/Fed.)
	A. gossypii	*A.craccivora*	*M.persicae*	*E.decipiens*	*T.tabaci*	*B.tabaci*	*Tetranychus sp.*	
				1991				
Jul. 15	5.11 b	0.00	0.01 a	0.11 a	0.11	389.39 c	0.63 b	2.67 a
Aug. 15	0.50 a	0.00	0.00 a	0.08 a	0.04	989.65 b	0.00 a	2.71 a
Sep. 15	0.31 a	0.00	0.03 a	0.01 b	0.01	212.86 d	0.08 a	3.27 b
Oct. 15	0.36 a	0.62	0.03 a	0.00 b	0.05	73.71 a	0.00 a	1.74 c
Nov. 15	0.38 a	0.05	0.10 b	0.00 b	0.09	11.50 a	0.00 a	0.40 d
F. test	* *	N.S.	* *	* *	N.S.	* *	* *	* *
				1992				
Jul. 15	7.98 b	0.11 a	0.02			22.32 a	0.09 a	2.96 a
Aug. 15	4.07 c	0.50 b	0.00	0.03 a	0.03 b	316.00 c	0.00 b	2.44 b
Sep. 15	0.09 a	0.00 a	0.01	0.02 ab	0.00 a	526.28 b	0.00 b	3.00 a
Oct. 15	0.01 a	0.00 a	0.00	0.00 b	0.00 a	60.96 a	0.00 b	1.90 b
Nov. 15	0.00 a	0.00 a	0.00	0.00 b	0.00 a	37.84 a	0.00 b	0.00 c
F. test	* *	* *	N.S.	*	* *	* *	*	* *

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تأثير مواعيد الزراعة على وفرة تعداد بعض آفات الأوراق التي تصيب بعض محاصيل الخضر فى منطقة الجميزة- جمهورية مصر العربية

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معهد بحوث وقاية النبات - مركز البحوث الزراعية - الدقى - الجيزة .

أجريت هذه التجربة فى مزرعة محطة بحوث الجميزة - محافظة الغربية بهدف دراسة تأثير ميعادين لزراعة محصول البطاطس (صيفى وشتوى) وخمسة مواعيد لزراعة كل من الفاصوليا والكوسة فى عروتين هما الصيفية والنيلية (١٥/٢ ، ١٥/٣ ، ١٥/٤ ، ١٥/٥ ، ١٥/٦ ، ١٥/٧ ، ١٥/٨ ، ١٥/٩ ، ١٥/١٠ ، ١٥/١١ على التوالى) على وفرة تعداد حشرات من القطن، من البقوليات، من الخوخ الاخضر، جاسيد اوراق البطاطس، تربس البطاطس، ذبابة القطن والطماطم البيضاء وأكاروس العنكبوت الأحمر العادى التى تصيب أوراق محاصيل الخضر السابق الاشارة اليها وذلك خلال عامين متتاليين ١٩٩١ ، ١٩٩٢. ولقد أظهرت النتائج المتحصل عليها ان الكثافة العددية لذبابة القطن والطماطم البيضاء وكذا أكاروس العنكبوت الأحمر على نباتات البطاطس الشتوية تكون أكثر بكثير مما سجلته تلك الآفات فى العروة الصيفية بينما وجد العكس فى حالة الآفات الأخرى المختبرة.

لقد وجد أن لميعاد زراعة نباتات الفاصوليا فى كل من العروة الصيفية والنيلية لعامى الدراسة تأثيرا معنويا على تعداد كل الآفات المختبرة فيما عدا حشرة من الخوخ الأخضر أثناء الموسم النيلى لعام ١٩٩١ والذى ثبت ان اعدادها تأثرت بدرجة غير معنوية إحصائيا نتيجة لتغير ميعاد الزراعة. ولقد إتضح أن الميعاد الثالث لزراعة الفاصوليا فى كلتا العروتين وهو منتصف أبريل فى العروة الصيفية ومنتصف سبتمبر فى العروة النيلية هو الأكثر مناسبة لزراعة ذلك المحصول حيث أعطت نباتات هذا الميعاد أعلى إنتاجية وكذا سجلت أعداد قليلة لمعظم الآفات المدروسة.

ثبت ان أعداد كل الآفات السابق الإشارة اليها والتى سجلت على نباتات الكوسة الصيفى تأثرت بدرجة عالية المعنوية نتيجة لتغير ميعاد الزراعة، بينما فى حالة العروة النيلية وجد ان الفروق بين تعدادات حشرات من البقوليات وتربس القطن فى عام ١٩٩١ وكذا من الخوخ الأخضرفى عام ١٩٩٢ والتى سجلت على نباتات الكوسة المنزرعة فى خمسة مواعيد كانت غير معنوية احصائيا. وأمكن التوصل الى أن نوصى بزراعة الكوسة فى

الميعاد الرابع (منتصف مايو)أثناء العروة الصيفية والميعاد الثالث (منتصف سبتمبر) أثناءالعروة النيلية حيث أعطت النباتات أعلى كمية محصول فى تلك المواعيد بالاضافة الى ان معظم الآفات المدروسة كانت بأعداد قليلة على نباتات تلك المواعيد مع استثناء تعدادات أكاروس العنكبوت الأحمر العادى وذبابة القطن والطماطم البيضاء أثناء الموسم الصيفى لعام ١٩٩١ والموسم النيلى لعام ١٩٩٢ على التوالى.