

EFFECT OF SOWING DATE AND SEED TREATMENT WITH GAUCHO (IMIDACLOPRID) ON THE POPULATION ABUNDANCE OF COWPEA APHID, *Aphis craccivora* Koch.; YIELD AND ITS COMPONENTS OF FABA BEAN CROP IN BENI-SUEF, MIDDLE EGYPT

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ABSTRACT

Two field experiments were carried out in Sids, Agricultural Research Station, Beni-Suef Governorate, Middle Egypt, throughout 1997/98 and 1998/99 seasons. Area of half a feddan for each was cultivated with Giza 674 variety in every season. The first experiment; comprised four different planting dates at 15-days intervals; during October 7, October 21, November 7 and November 21, were applied. The second experiment; a systemic insecticide Gaucho (Imidacloprid) at four rates, 0.5, 1, 3 and 5 g / Kg seed weight, used to coat faba bean seeds before cultivation in each season. Weekly mean numbers of aphids per plant shoot and at final harvest the crop yields and its components were recorded.

The obtained results and conclusion can be summarized as follows:

- (1). In both 1997/98 and 1998/99 seasons, the sowing date applied to faba bean had a significant effect on the population abundance of cowpea aphid.
- (2). The second (October 21) and third sowing dates (November 7), seems to be more efficient time to avoidance high population of aphids and showing highest yields of faba beans.
- (3). Delaying-sowing date of faba bean during November 21 greatly reduced the seed yield of faba bean by 75.58 %, 73.93 %; and as well as, when moving the sowing date earlier to October 7; the seed yield reduced by 24.04 % and 76.23 %, in both 1997/98 and 1998/99 seasons, respectively.
- (4). Pre-sowing seed treated with Gaucho (Imidacloprid, 70 % WSP), at a rate 3 g / Kg seed weight was superior performance against cowpea aphid throughout 12-weeks after sowing, it gave over 80 % reduction in aphid populations and significantly improved plant stand which resultant a significantly increase in seed yield by 181.85 % over control.

INTRODUCTION

Faba bean (*Vicia faba* L.), the first most important pulse crop in Egypt, is subjected to attacks by a few destructive pests that cause a great extent damage to the crop. The cowpea aphid, *Aphis craccivora* Koch., is the most serious one that causes a severe economic reduction not only in the quantity but also, in quality of the crop yields (Bishara *et al.*, 1984). In the last decade, the annual average yields of faba beans are so fluctuated widely from year to year due to poor integrated pest management. In order to control this pest, an integrated control program should be initiated.

The agricultural measures of pest control are mainly concerned with the development or adjustment of the different agricultural practices, so as to enable the

plants to escape as much as possible the attack of high insect populations. One of the most important measures generally recommended for field crop protection is to optimize the planting date, so as one or more date will coincide with the periods when the population levels of the insects are at their minimum level.

Recently, an interesting trend of insect control was adopted using environment friendly chemicals as spray on foliage or seed treatment characteristics with no phytotoxicity to the plants, which was attempted by (Amer *et al.*, 1995 and Salem *et al.*, 1998), who tested several compounds with discrepancy success.

In Egypt, however, it seems that such kind of study on faba bean crop had been neglected. Therefore, it was necessary to study the influence of some agricultural practices of which planting dates and seed treatment with systemic insecticides before sowing affect the occurrence and degree of infestation with the cowpea aphid in faba bean fields aiming to obtain high crop yield with low pest incidence.

MATERIALS AND METHODS

Two experiments were carried out at Sids Agricultural Research Station, Agricultural Research Center, Beni-Suef Governorate, middle Egypt, during two successive seasons of 1997/98 and 1998/99. For each season, an area of about one feddan was divided into two equal parts, each was seeded with a new recommended faba bean cultivar (var. Giza 674). The first experiment comprised four consecutive date of sowing at 2-week intervals (October 7; October 21; November 7 and November 21); and the second experiment, seeds of faba bean were treated before cultivation with a 70 % WSP formulation of the Chloronicotinyl insecticide Gaucho (Imidacloprid) [1- (6-chloro-3-pyridinyl) methyl - 4, 5 - dihydro - N - nitro - 1 H - imidazole - 2 - amine] at a rate of 0.5, 1, 3 and 5 g Gaucho / kg seed weight to coat the seeds. The treated seeds of faba bean with different rates were individually sown during the 1st. week of November in both tested seasons. Plots were 7x12 m (1/50 fed.), arranged in a completely randomized block with four replicates. The crop was sown on ridges 60 cm apart, in double rows with 20 cm between the holes along each row and two seeds per hole with seeding rate of 60 kg seed / feddan which expressed 33 plant / m². The fields were watered by furrow irrigation every 21 days. Spraying against pests or diseases was omitted but the whole experiment area was hand-weeded twice and weeds were kept well controlled. The plots were harvested between 7 and 15 May for each season. This was undertaken in order to record the occurrence of aphid infestation and to follow up their fluctuations, all over the faba bean growing season.

Samples of 10 plants per replicate were taken randomly at weekly intervals for each experiment after plant emergence. Aphids (nymphs and adults) found on the upper most two-thirds of the plants (one central shoot / plant), were checked using the inverse binomial sampling technique described by (Hafez, 1964). Mean aphids of the 4 replicates were worked out to represent the population density. The percent reduction in population density of aphids as a result of seed treatment with insecticide was computed using Abbott's formula (1925)

At final harvest, seed yield and its components were calculated from a net area of 100 m². Ten plants from each plot were selected at random; counts of the number of

Pods, and the weight of seeds per plant were made. Moreover, seed and straw yields per feddan were estimated.

All the obtained results were statistically analyzed according to completely randomized block design. The proper "F" and L.S.D. at 0.05 values were calculated as described by Snedecor and Cochran (1980).

RESULTS AND DISCUSSION

A. Planting Date Of Faba Bean:

A.1. Response to *Aphis craccivora* Infestations:

Data obtained are given in Table (1) and illustrated in Fig. (1), revealed that the four date of sowing (October 7, October 21, November 7 and November 21) applied to faba bean plantations showed drastically affect the population densities of cowpea aphid, *A. craccivora* on both tested seasons. Statistical analysis showed significant differences between means of population densities of aphids harboring throughout the twenty-five successive counts within the four dates of sowing on both seasons.

During the first season 1997/98, faba bean plants which planted on October 7 harboured the highest mean of population density (132.9 aphids / plant shoot), followed by those planted on November 7 and November 21; which their means were 126.3 and 109.9 aphid individuals / plant shoot, respectively, form together one group. Meanwhile, plants which sown on October 21 harboured the lower level of aphid populations being 65.9 aphids / plant shoot, form alone one separate group (Table, 1). The same results were also confirmed in the second season 1998/98; with slight differences. The faba bean plants of the first date of sowing (October 7) harboured the highest mean of aphid population; while those planted on October 21 sheltered the least mean of aphid population. The four means of population densities of aphids occurring on faba bean plantations showed the same trend of the first season being 487.4; 362.4; 265.0 and 169.5 aphids / plant shoot, for plants sown on October 7; November 21; November 7 and October 21, respectively. Their means found to form three separated groups.

The previously mentioned data indicate that faba bean plants of the first sowing date (October 7) and the fourth one (November 21) confronted higher degree of aphid infestations; meanwhile, those of the 2nd. and 3rd. sowing date during October 21 and November 7 were encountered the lowest degree of aphid infestation levels (Fig., 1).

Table (1). Population fluctuations of *Aphis craccivora* per plant shoot on non-treated faba bean plants cultivated in 1997/98 and 1998/99 growing seasons through four different planting dates (2-week intervals) at Sids, ARC, Beni-Suef Governorate.

Sampling Date	Mean number of <i>A. craccivora</i> / plant shoot							
	1997/98 season				1998/99 season			
	1 st planting date	2 nd planting date	3 rd planting date	4 th planting date	1 st planting date	2 nd planting date	3 rd planting date	4 th planting date
October, 24	37.7	-	-	-	396.6	-	-	-
October, 31	62.2	-	-	-	543.0	-	-	-
November, 7	135.0	52.8	-	-	627.8	161.8	-	-
14	273.0	98.8	-	-	803.3	203.2	-	-
21	196.0	134.4	107.0	-	1041.0	354.6	186.5	-

	28	468.8	186.6	253.3	-	1556.4	367.0	246.7	-
December,	5	479.0	277.7	389.4	47.7	1468.5	466.6	405.8	-
	12	306.4	218.8	477.2	74.0	1476.4	645.8	675.8	245.5
	19	211.0	97.4	242.2	166.0	1200.8	578.4	757.0	237.4
	26	148.4	30.7	200.8	258.0	1068.7	469.5	799.5	465.7
January,	3	82.2	12.2	114.6	261.0	847.5	258.0	564.8	557.0
	10	31.5	8.8	71.0	117.4	345.8	104.5	557.4	658.4
	17	31.2	5.3	34.5	105.5	176.6	91.4	412.3	1024.0
	24	27.4	6.3	37.8	81.4	154.0	64.2	324.8	920.0
	31	36.0	16.5	39.4	65.5	87.5	21.4	168.4	728.5
February,	6	74.8	56.8	86.0	53.8	64.5	13.5	58.7	234.2
	13	144.5	108.8	105.5	94.4	35.7	13.6	21.5	202.5
	20	137.0	45.5	128.6	143.2	62.8	11.7	64.2	184.3
	27	68.5	9.9	73.5	205.0	33.8	14.6	77.4	105.8
March,	6	77.0	2.7	11.0	86.4	82.5	21.0	81.2	311.8
	13	20.0	8.8	13.4	70.0	74.5	14.5	106.0	426.4
	20	5.3	2.7	8.5	31.5	22.2	11.8	45.0	100.5
	27	2.6	2.0	5.3	7.8	10.3	7.0	7.7	85.4
April,	3	-	-	-	-	4.7	5.2	3.6	24.6
	10	-	-	-	-	0.0	0.0	1.4	11.0
Total		3055.5	1383.5	2399.0	1868.6	12184.9	3899.3	5565.7	6523.0
Mean		132.9	65.9	126.3	109.9	487.4	169.5	265.0	362.4
L.S.D. at 5%		28.4				104.6			

1st planting date: October 7

2nd planting date: October 21

3rd planting date: November 7

4th planting date: November 21

These results are in complete agreement with those obtained by (Way, 1967), who stated that the sowing date of the crop greatly affects the size of the aphid population. In Britain, *V. faba* sown in late autumn (winter beans) are uncommonly damaged by *Aphis fabae* because during the critical period of primary migration from mid-May to mid-June, they are relatively unattractive, first because the foliage is beginning to cover the ground and therefore provides less optomotor stimulus to potential colonies and, secondly, those aphids which land are more likely to leave without reproducing because the maturing plants are nutritionally unattractive. In the present study, faba bean crop sown earlier in October 7, are usually very attractive to primary colonies (strong fliers) came from late summer crops *i.e.*, cowpea or other wild host plants (El-Defrawi, 1999) but not to secondary migrants as in October 21, so chemical treatment should be done at the initial of primary migration for gives good control (El-Defrawi *et al.*, 1998) for the whole seasons. These results goes in lines of similar results obtained by those (Gould and Graham, 1969 ; El-Defrawi *et al.*, 1994 and Abeer, 1998). In contrast, crops sown in late November are not only colonized by primary migrants (smaller population size) but may also remain attractive to secondary migrants and to new emerged apterous aphids stretching out within the crop from initially colonized plants. Thus, crops sown unduly late may require chemical treatment against both primary and secondary migrations and may justify treatment against a secondary migration even when the primary migration is small, possibly current view is that aphids came earlier could be carry the virus

disease agent into a newly sown field crop from some other host plants or earlier planting most (Abeer, 1998).

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A. craccivora populations on faba bean plants reached its maximum activity at two dates of sowing earlier (October 7) and delaiier (November 21) as shown in Fig. (1). At these two dates of planting faba beans become more susceptible to infestation with *A. craccivora* and subsequently induce development in population, which may cause serious damage to the crops (Bishara *et al.*, 1984 and Abeer, 1998). El-Heneidy *et al.*(1998) found that the population of cowpea aphid was relatively higher in an early planting date (October, 18-25) of faba bean than in late one (November, 27), but without significant differences, during 1992/94 at Sids, Beni-Suef Governorate.

These results suggest that planting faba bean cv. Giza 674 in a period between the last week of October and extended to the first week of November, could be recommended for avoidance high cowpea aphid population, *A. craccivora* and the environmental of this region (Ben-Suef Governorate, Middle Egypt).

A.2.Seed Yield and its Components:

Data obtained from the agro-technique studies during 1997/98 and 1998/99 seasons, concerning the effect dates of sowing on crop yields and its components of faba bean cv. Giza 674, are presented in Table (2). The results indicated that, on the average of all sowing dates, seed and straw yields were significantly affected by date of sowing. The mean seed yield for field plots sown in October 7, October 21, November 7 and November 21 were 4.28, 5.63, 5.58 and 1.37 Ardab / fed. during 1997/98; while these values were 1.35, 4.11, 3.97 and 1.07 Ardab / fed., during 1998/99, respectively, confirming the great yield loss in early- and late- grown crops.

Planting faba beans in period between October 21 and November 7 appeared to give significantly the highest seed yields in both seasons. The loss of seed yield of late sowing (November, 21) was greater in both seasons by 75.58 % and 73.93 %, respectively, and these values were reduced, when moving the sowing date earlier to first week of October by 24.04 % and 76.23 % in the first and second season, respectively.

The straw yields for field beans sown in October 7, October 21, November 7 and November 21 being 884.3, 2051.2, 2033.5 and 1977.5 kg / fed., during 1997/98; while these values were 622.4, 1645.4, 1610.0 and 1406.2 kg / fed., during 1998/99, respectively. The greatest decrease in straw yields achieved in case of earlier sowing date on both seasons, being 56.89 % and 62.17 % reduction in weight, respectively.

More pods per plant were obtained from plants planting during October 21 and November 7 in both tested season, while about 24.83 % and 36.67 % reduction in number of pods per plant in field beans sown in late November of both seasons. With later sowing date there were also confirm fewer seeds per pod and the weight seed yield per plant was smaller (Table, 2).

These results are in accordance with those reported in Egypt by Ali (1969) who found that highest yields of seeds / plant and per feddan were obtained from planting between last week of October and November 23. He also pointed out that late sowing delaying flowering and reduced the number of flowers, pods, seed yield and 100-seed weight. Mohamed (1972) stated that better yields of faba bean were obtained from plantings during the third week of November; while delaying planting decreased the number of tillers, number of pods / plant, number of seeds / pod and 100 seed weight. Hakam and Ibrahim (1973), reported that the optimum planting date was from October 15 to November 1 for Giza 2 and Rebaya 40 cultivars at Middle and Upper Egypt. Ibrahim *et al.* (1982) mentioned that, there was a significant effect of sowing date on the average yield of Giza 2 and Giza 4; while the interaction between cultivars and sowing dates was not significant. They also found, planting on October 15 – November 1, gave the highest yield; meanwhile, planting on October 1 has satisfactory positive effect on crop yields. Salih (1987) found that, the earlier planted faba bean crop during October 25 significantly outyielded the later planted crop during November 24 by 37 %.

Field observations indicate that, planting early during October 7 initiates early flowering and pod setting period is then subjected to fluctuations in temperature and possible frost during January and February in Middle Egypt, resulting in high flower and pod shedding. And as flowering terminates early the plant will not be able to compensate for shedding when the temperature becomes more stable towards the end of the season. Late planting in November 21 results in late flowering after a slow vegetative growth and few flowers set pods during the greatly shortened season. A balance between the vegetative and reproduction stages occurs if the crop is sown in the first half of November and less fluctuating temperatures then prevail during the reproductive stage. Also, the season is then long enough to enable more pods set of late flowers, thus compensating for any clearly shedding that may have occurred. On the other hand, aphid infestation slows the rate of stem elongation and leaf production by the removal of plant nutrients, which are needed for plant growth. Flower production may be much-decreased abort and the pods become distorted and produce relative few, undersized seeds.

A aforementioned discussion indicate that, the amount of damage caused by aphids then depended upon the time, size and duration of aphid attack in relation to the growth stage and vigor of the plant. Yield loss is due to fewer pods per plant and fewer and smaller seeds perpod. Such results were agreed with similar results obtained by (Bouchery, 1977 and Amer, 1986).

B. Faba Bean Seed Treatment With Gaucho And Its Productivity:

B.1. Aphid populations:

Studies to investigate the potential applications of Gaucho (Imidacloprid) a new systemic insecticide as seed treatment before crop cultivation's during 1997/98 and 1998/99; aiming to suppress the early aphid set-up (migrants) (El-Defrawi, 1999).

Data in Table (3) revealed that, even 5 weeks after sowing, there was outstanding control of *A. craccivora* on plants grown from seeds of faba bean treated with Gaucho, at various application rates (0.5, 1, 3 and 5 g / Kg seed weight). After 6 weeks at most, the level of efficacy in all the variants was nearly over 80 % reduction in aphid populations, except in case of the lower rate of 0.5 g / kg seed in the first season. Aphids are able to scan new hosts over considerably greater distance than could otherwise be achieved by the direct flight (Kennedy and Fosbrooke, 1973).

In the 7th week after sowing, the only variant having a marked effect was in the two higher rates (3 and 5 g / kg seed); which the population of *A. craccivora* fell throughout the first 10 weeks after sowing. This variant was distinctly superior performance to all the other tested rates in both seasons.

The four rates of Gaucho being 0.5, 1, 3 and 5 g / Kg seed gave 48.6 %, 81.9 %, 94.3 % and 90.8 % reduction in cowpea aphid populations, respectively, over a period starting from 6th. week till 12th. week after sowing in 1997/98 season. The same trend of reductions in aphid populations resulting for fields cultivated with seed treated with Gaucho which confirmed during 1998/99 season; where mean reductions were 55.5 %, 74.1 %, 82.9 % and 85.2 %; for the four tested rates of Gaucho, respectively. The previous period was completely free from aphid infestations for the four tested rates except some individuals observed on that plants treated with the lower rate (0.5 and 1 g / kg seed) without any newly borne (offspring's) observed and on that time, could be considered as a departed aphids.

Statistical analysis of the data revealed highly significant differences between the percentage reductions in aphid populations existed in field beans of the four tested rates of Gaucho (Table, 3). Thus, Gaucho with the rate of 1 g / Kg seed weight was enough to give adequate control cowpea aphid on faba bean which is indicative to their high persistence of their bioactivity over 10-weeks after sowing date. The two higher dosages of Gaucho i.e., 3 and 5 g / Kg seed displayed the highest bioactivity; toxicity percentages ranged between (83.4 % to 100.0 %) and (76.8 % to 100.0 %) for the two rates, respectively, during 1997/98 season. Meanwhile, odd results were achieved in the second season, whereas the reduction in aphid population reached up to 88.5 % and 87.8 % during the 10th. week later, for the 3 and 5 g Gaucho / Kg seed weight, respectively. This striking differences between the results in the two seasons may be attributed to variations in aphid behavior existed during the second season (whereas aphid population outbreaks existed in 1998 / 99 as shown in (Table, 1).

From previously mentioned results, the population density of *A. craccivora* was build-up to higher proportions in all plots after 12 weeks from seeds treated with Gaucho and reached a minimum bioactivity (less than 50 % reduction), meanwhile, as clearly observed in the second season, in case of 3 and 5 g Gaucho / Kg seed weight, during the first season, which giving more than 75 % reduction in aphid populations, it refers to the adequate bio-residual action for these two rates as toxicants.

Considering the overall performance, Gaucho seed treatments proved to be an effective material against cowpea aphid. Since the two dosages i.e., 3 and 5 g / kg seed, proved equally effect, the lower dose is preferable for economy and safety. Results obtained are in harmony with those found by some authors e.g., (Elbert *et al.*, 1990; Altmann & Elbert, 1992; Selim & Emam 1993; and Salem *et al.*, 1998)

B.2. Seed Yield obtained in Different Field Plots Treated with Gaucho:

All the field plots sown with faba bean cv. Giza 674 variety, seed treatments with Gaucho before cultivation gave significantly higher yield than control in both seasons, 1997/98 and 1998/99 (Table, 4). Among the dosage of Gaucho treatments, the highest yield was recorded in field beans treated with 3 and 5 g / kg seed, which in fact, differed significantly than all other treatments recording 14.91 and 15.89 Kg / 100 m², as compared with 5.29 Kg / 100 m²., for untreated field beans. Gaucho at the rate of 0.5 and 1 g / kg seed weight, was on a par but significantly superior to check control (untreated).

In conclusion, Gaucho a systemic insecticide used as seed treatment at the rate of 3 and 5 g / Kg seed weight may lead to gave adequate good control of *A. craccivora*

infestations up to at least 10-weeks, which in turn resulting in higher yields of the crop as exhibited by 200.38 and 181.85 % increase in seed yield obtained over the control. This corroborates the earlier finding by (Salem *et al.*, 1998).

Table (4). Seed yields of faba beans (Giza 674 variety) obtained in field beans treated with Gaucho a systemic insecticide before sowing under four rates of applications.

Rate of application (g / Kg seed w.)	Seed yield (Kg / 100 m ²)		Grand Mean (Kg / 100 m ²)	Increase in seed yield over control (Kg / 100 m ²)	Increase in seed yield %
	1997/98	1998/99			
0.5 g / Kg seed	4.96 b	7.11 b	6.04	0.75	14.18
1 g / Kg seed	5.59 b	8.32 b	6.96	1.67	31.57
3 g / Kg seed	12.17 a	17.64	14.91	9.62	181.85
5 g / Kg seed	10.17 a	21.60 a	15.89	10.6	200.38
Control (untreated)	4.33	6.25 a	5.29	-	-
L.S.D. at 0.05	4.72	3.96	-	-	-

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- تأثير ميعاد الزراعة ومعاملة البذور بمادة الجاوشو على الوفرة العددية لحشرة من اللوبيا والإنتاجية والمكونات المحصولية للبقول البلدي في محافظة بنى سويف- مصر الوسطى
جودة محمد الدفراوي* و إدريس سلام عبد الوهاب* و سعيد عبد العظيم مصطفى*
وفاروق حامد شلبي**
- * معهد بحوث وقاية النباتات- مركز البحوث الزراعية – الدقى – مصر.
** معهد بحوث المحاصيل الحقلية - قسم بحوث المحاصيل البقولية - مركز البحوث الزراعية – الجيزة - مصر.
أجريت تجربتان حقليتان بمحطة البحوث الزراعية – سدس – محافظة بنى سويف – مصر الوسطى
خلال موسمي ١٩٩٧/٩٨ و ١٩٩٨/٩٩ وغطت كلا منهما مساحة قدرها نصف فدان تم زراعتها بالبقول البلدي
صنف جيزة ٦٧٤.

التجربة الأولى: أقيمت للتجريب بغرض إيجاد انسب ميعاد لزراعة الفول البلدي الذي تكون فيه مستوى الإصابة بحشرة من اللوبيا منخفضة إلى أدنى حد ومناسب لإنتاج محصول غلة عالي دون استخدام مبيدات حشرية أو كيمويات ملوثة للبيئة. لذلك الغرض تم تجريب أربع مواعيد لزراعة الفول البلدي يفصل بين كلا منهما ١٥ يوما وكانت المواعيد كالتالي: ٧ أكتوبر و ٢١ أكتوبر و ٧ نوفمبر و ٢١ نوفمبر وبحيث نفذت في عامان متتاليين.

أما التجربة الثانية: أقيمت بهدف تجريب استخدام مادة الجاوشو (مبيد جهازى) بأربع معدلات هي ٥.٠ و ١ و ٣ و ٥ جرام لكل كيلو جرام بذرة , وبغرض معاملة التقاوي قبل الزراعة للوقاية من الإصابات العالية المبكرة بحشرة من اللوبيا والتي تكون مؤثرة في الغالب على إنتاجية ونجاح زراعة محصول الفول البلدي في محافظات مصر الوسطى.

ويمكن تلخيص النتائج التي تم الحصول عليها كآلاتي:-

(١) قد ثبت في كلا من موسمي التجريب ١٩٩٧/٩٨ و ١٩٩٨/٩٩ ان لميعاد زراعة الفول البلدي دور هام ومؤثر معنويا على الوفرة العددية لحشرة من اللوبيا الذي يصيب نباتاته.

(٢) زراعة محصول الفول البلدي في الميعاد الثاني (٢١ أكتوبر) والميعاد الثالث (٧ نوفمبر) كانوا لهم تأثير معنوي حيث أصيبت النباتات بأعداد أقل مقارنة بالميعادين الأول والأخير حيث الإصابة العالية و بذلك أمكن الهروب من الإصابات الشديدة والمؤثرة معنويا على حالة النباتات وفى ذلك الوقت فقد بينت النتائج ان أعلى كمية من المحصول قد تم الحصول عليها في هذان الميعادان.

(٣) وجد ان التأخير في زراعة الفول البلدي ألي الأسبوع الثالث من نوفمبر (٢١ نوفمبر) قد تسبب في نقص واضح في إنتاج المحصول ووصلت نسبة الفقد ٧٥.٥٨% و ٧٣.٩٣% و كذلك فأن للتبكير أيضا له نفس التأثير في نقص الإنتاج لمحصول البذرة بحوالي ٢٤.٠٤% و ٧٦.٢٣% خلال الموسم الزراعي ١٩٩٧/٩٨ و ١٩٩٨/٩٩ على التوالي.

(٤) ان العاملة تقاوي الفول البلدي قبل زراعتها بمادة الجاوشو وهو أحد المبيدات الجهازية بمعدل استخدام ٣ جرام لكل ١ كيلو جرام بذرة كان اكثر المعدلات تأثيرا معنويا على الإصابة الحشرية وثبات لمدة ١٢ أسبوع من بعد الزراعة حيث حقق اكثر من ٨٠% انخفاض في تعداد حشرة من اللوبيا و في نفس الوقت ساعد بشكل ملموس على تحسن حالة النباتات وقد ظهر ذلك جليا في إنتاج محصول بذرى عالي وبزيادة مقدارها ١٨١,٨٥% زيادة عن الإنتاج في الحقول التجريبية للمقارنة.

(٥) وعليه يمكن القول بان زراعة محصول الفول البلدي في الفترة من الأسبوع الأخير من شهر أكتوبر ألي نهاية الأسبوع الأول من شهر نوفمبر (ولمدة ١٥ يوما) قد ساعد نباتات الفول البلدي في الهروب من شدة الإصابة العالية التي يتعرض لها المحصول في الفترة الأولى من عمر النباتات (طور البادرة) وان معاملة البذور بمادة الجاوشو قبل الزراعة وبمعدل ٣ جرام لكل كيلو جرام تقاوي سوف يساعد بشكل فعال في خفض استخدام المبيدات رشا على النباتات وبالتالي خفض تلوث الهواء وحماية البيئة وعليه ينصح أن يدخل ميعاد الزراعة ومعاملة التقاوي بالجاوشو قبل الزراعة ضمن العناصر الأساسية للإدارة المتكاملة لمكافحة الآفات في الفول البلدي بمحافظة مصر الوسطى.

Table (3). Mean number and percentage of reductions in cowpea aphid, *A. craccivora* populations on faba beans as a result of using a systemic Gaucho (Imidacloprid) seed treatments sbefore cultivation throughout 1997/98 and 1998/99 at Sids, Beni-Suef, middle Egypt.

Rate of Application (g / Kg seed weight)	Mean no. of aphids / plant shoot and calculated Percentage of reductions At indicated weeks after treatment.							Mean Reduction In aphid populations ± s.e.
	6-w	7-w	8-w	9-w	10-w	11-w	12-w	
1997/98 season								
0.5 g / Kg seed	26.2 (60.4)	29.4 (66.3)	35.0 (62.0)	128.4 (42.9)	236.2 (38.9)	275.6 (41.1)	439.5 (28.5)	(48.6 ± 4.98)
1 g / Kg seed	11.2 (83.1)	8.4 (90.4)	8.5 (90.8)	31.0 (86.2)	61.8 (84.0)	106.7 (77.2)	238.0 (61.3)	(81.9 ± 3.57)
3 g / Kg seed	0.0 (100)	0.0 (100)	1.9 (97.9)	6.7 (97.0)	31.0 (92.0)	47.5 (89.9)	102.2 (83.4)	(94.3 ± 2.16)
5 g / Kg seed	0.0 (100)	0.0 (100)	4.3 (95.3)	15.5 (93.1)	53.6 (86.1)	73.0 (84.4)	143.0 (76.8)	(90.8 ± 3.04)

Control (untreated)	66.2	87.3	92.0	225.0	386.5	468.0	615.0	
L.S.D. at 0.05	6.16							
1998/99 season								
0.5 g / Kg seed	38.4 (82.2)	46.0 (72.2)	61.2 (62.1)	46.3 (55.5)	33.7 (55.4)	56.0 (40.1)	87.4 (20.8)	(55.5 ± 7.1)
1 g / Kg seed	10.5 (95.1)	17.5 (91.3)	18.2 (88.7)	16.5 (84.1)	15.8 (79.1)	44.2 (52.7)	80.2 (27.4)	(74.1 ± 8.69)
3 g / Kg seed	00.0 (100)	4.6 (97.7)	8.0 (95.1)	6.8 (93.5)	8.7 (88.5)	33.5 (64.2)	64.6 (41.5)	(82.9 ± 7.64)
5 g / Kg seed	0.0 (100)	0.0 (100)	0.0 (100)	7.2 (93.1)	9.2 (87.8)	30.7 (67.2)	56.8 (48.6)	(85.2 ± 6.97)
Control (untreated)	216.0	201.8	161.5	104.0	75.5	93.5	110.4	
L.S.D. at 0.05	8.89							

() Figures in parentheses are per cent reduction in aphid populations.

Table 2. Effect of sowing date on seed yield and some agronomic characters of unprotected faba bean var. Giza 674 at Sids Research Station, during 1997/98 and 1998/99 seasons.

Sowing date	Seed yield		Straw yield		Characters					
	Ardab/fed.	% Reduction	Kg/fed.	% Reduction	No. of pods / plant		No. of seeds / pod		Seed yield / plant	
					Numbers	% Red.	Numbers	% Red.	gm / plant	% Red.
1997/98 season										
October 7	4.28 b	24.04 %	884.3 b	56.89 %	13.7 a	3.45 %	2.7 ab	10.00 %	22.6 a	3.83 %
October 21	5.63 a	0.00 %	2051.2 a	0.00 %	14.5 a	0.00 %	3.0 a	0.00 %	23.5 a	0.00 %
November 7	5.58 a	0.89 %	2033.5 a	0.86 %	14.2 a	2.07 %	2.4 b	20.00 %	20.0 b	14.89 %
November 21	1.37 c	75.58 %	1977.5 a	3.59 %	10.9 b	24.83 %	2.0 c	33.33 %	17.0 c	27.66 %
Mean	4.22		1736.6		13.3		2.5		20.8	
± s.e.	± 0.86		± 246.4		± 0.71		± 0.18		± 1.27	
L.S.D. at 0.05	1.27		295.7		2.18		0.37		2.43	
1998/99 season										
October 7	1.35 b	76.23 %	622.4	62.17 %	8.5 b	29.17 %	2.2	12.00 %	10.3 b	34.81 %
October 21	4.11 a	0.00 %	1645.4	0.00 %	12.0 a	0.00 %	2.5	0.00 %	15.4 a	2.53 %
November 7	3.97 a	3.47 %	1610.0	2.15 %	11.4 a	5.00 %	2.2	12.00 %	15.8 a	0.00 %
November 21	1.07 b	73.93 %	1406.2	14.54 %	7.6 b	36.67 %	1.8	28.00 %	8.6 b	45.57 %
Mean	2.63		1321.0		9.9		2.2		12.5	
± s.e.	± 0.71		± 206.8		± 0.95		± 0.12		± 1.57	
L.S.D. at 0.05	0.75		318.4		2.55		NS		1.94	