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INTEGRATED MANAGEMENT PROGRAM AND THE ECONOMIC EFFECTS OF *(APHIS CRACCIVORA* KOCH*) (*HOMOPTERA: APHIDIDAE*)* INFESTING GREEN BEANS, *PHASEOLUS VULGARIS* L. AT MENOUFIA GOVERNORATE, EGYPT

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ABSTRACT: ***The integrated control of aphid achieved highly significance differences, so that the aphid population in IPM field formed 18.4% comparing with the total average in the farmer field. The green beans yield gained net return about 10000 Egyptian pounds / feddan as a result to apply the IPM program.***

Key words: ***IPM program, Aphis craccivora, Green beans plant, Phaseolus vulgaris L.***

INTRODUCTION

The green beans *, Phaseolus vulgaris* L. is considered one of very important vegetable crops in different countries all over the world. In Egypt the cultivated area reach about 53000 feddan give dry and snap bean yield about 3-5 Tons /feddan, (FAO, 2017). The green beans is considered one of the most important source of human dietary protein and it comes in the second order as export crop after potato crop. Damage caused by the insect pests is considered the limit factor of beans production. The sab suckers such as aphids cause inflict significant damage, aphids are important pests of most cultivated crops worldwide (Abate and Ampofo, 1996 and Boivin *et al.,* 2012, May-Guri *et al.,* 2011). Biological control provided by natural enemies play an important role in integrated pest management. Generalist insect predators provide an important biological service in the regulation of agriculture insect pests (Ouyang Fang, 2013, Trottin-Caudal, *et al*., 2012). The present work is focusing on the important insect pest *(Aphis craccivora*) infesting the green beans specially the integrated pest management and the comparison between the yield and the cost of production.

MATERIALS AND METHODS

To apply the IPM program one feddan of lands was planted with Green bean (Bronco cultivar) in Ashmoon region, Menoufia Governorate, during February, 2017. Half area (12 kerats) was divided and applied to serve the farmer treatment as follow:

1- **Lambada 5% at the rate 250 ml /200 liter water.**
2- **Mosblan 20 (Asetampraid) at the rate of 50 g / feddan.**
3- **Clorburefios 48% at the rate of 500ml /200 liter water.**

The second half of area (12 kerats) was served to apply the suggested IPM program.

During May, 10 and 25, 2017 samples of 10 leaves and 10 fruit were collected and transferred to the laboratory of the Department of Economic Entomology and Agricultural Zoology of the Faculty of Agriculture, Menoufia University, Shebin Elkom, Egypt.

The predator was obtained from the laboratory of biological control - rearing

predators unit at Faculty of Agriculture, Cairo University, Egypt, under the supervision of Prof. Dr. Ashraf Elarnaouty.

The treatments of the IPM program where different agents were applied are listed in Table (1).

RESULTS AND DISCUSSION

To indicate the integrated control of green beans aphid, *Aphis craccivora*, Koch, Data obtained of comparison between the average numbers of aphid in both IPM field and farmer field (Fig. 1 & 2) revealed that the mean numbers of aphid in farmer field showed three picks of abundance of 25, 35 and 40 individual during mid-Marsh, April, 8 and April, 29, 2017, respectively. While the mean numbers of aphids recorded 0.2, 0.7 and 0.3 insects in IPM field in the same period and these values were the lowest abundance. Generally, the total mean numbers of farmer and IPM field were 17.38 and 2.86 individuals /leaf, respectively. The average percentage of IPM field during the period of experiment recorded 16.5 % of aphid comparing with total average of aphid in the farmer field. Statistical analysis were applied by using T. test showed highly significant differences between the population density in both field of IPM program and the farmer , this results confirm the role of integrated control in *Aphis craccivora* control.

Respecting, the economic effects of integrated control program has achieved a great impact in the production of green beans, since the cultivated feddan by green beans give about half ton more than farmer field and the net return reached about 10000 Egyptian pound per feddan (Tables 2 and 3).

Table (1): Insecticides used to control *Aphis cracovora* Koch in the IPM program

Treatment date	Trade name	Active ingredient	Rate of application
25/02/2017	Actara	Thiamethoxam25% WG	20 g / 100 liter water
10/03/2017	Aphid lion	*Chrysoperla carnea*	360 larvae/ feddan
01/04/2017	Asitaplan	Acetamiprid 20 % SP	50 g / feddan
16/04/2017	Danksweet	Dimethoate 40 % EC	30cm /100 liter water
01/05/2017	Vertimc	Abamectin 1.8%EC	40cm /100 liter water
10/05/2017	Biovar	*Beauveria bassiana*	10% ($32x10^6$) conidia/g 200 g / feddan
25/05/2017	Dipel 2X	*Bacillus thuringiensis*	6.4% ($32 x10^3$) Iu/mg 200 g / feddan

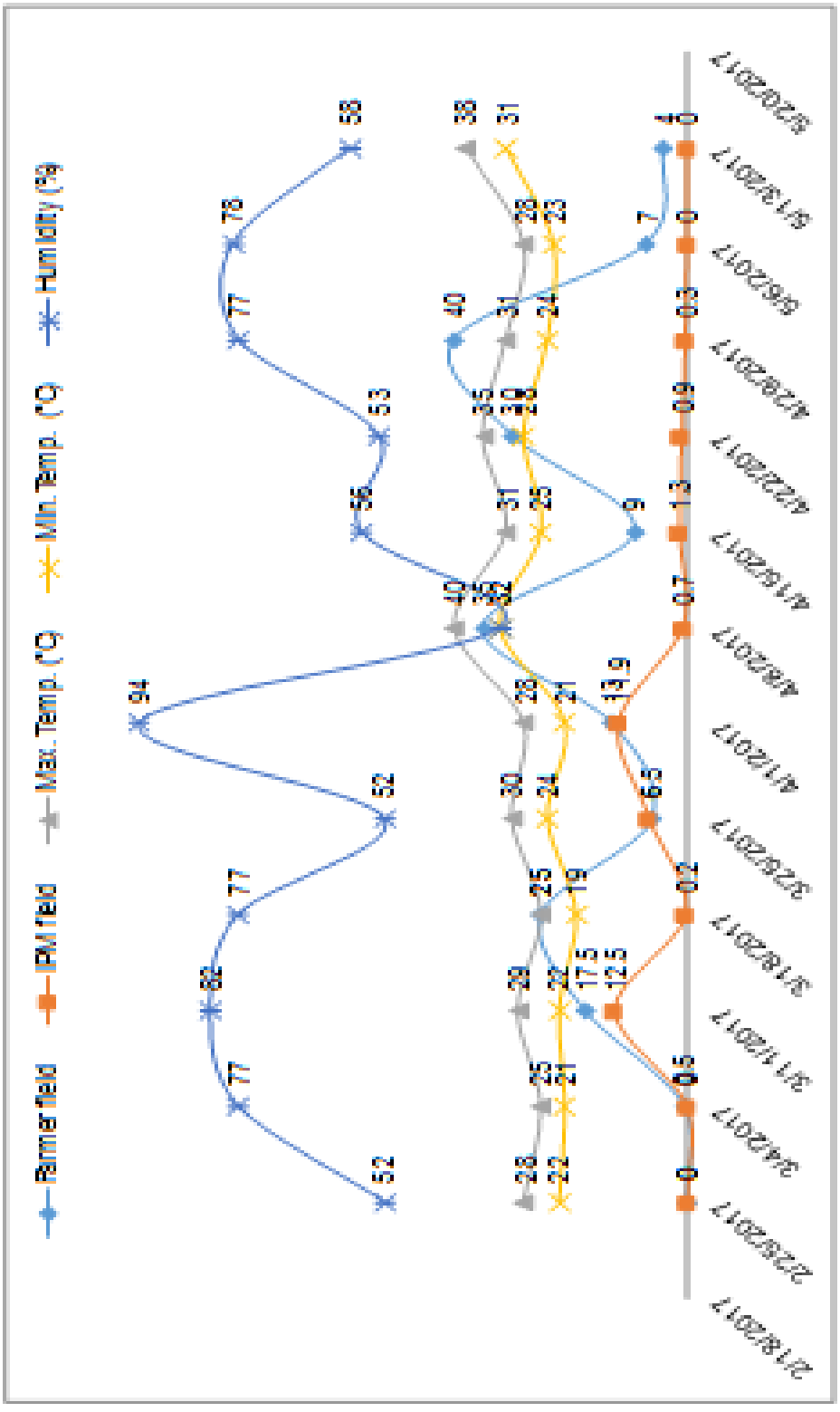

Fig. 1: Comparison of the mean numbers of *Aphis craccivora* L.in farmer and IPM field applications

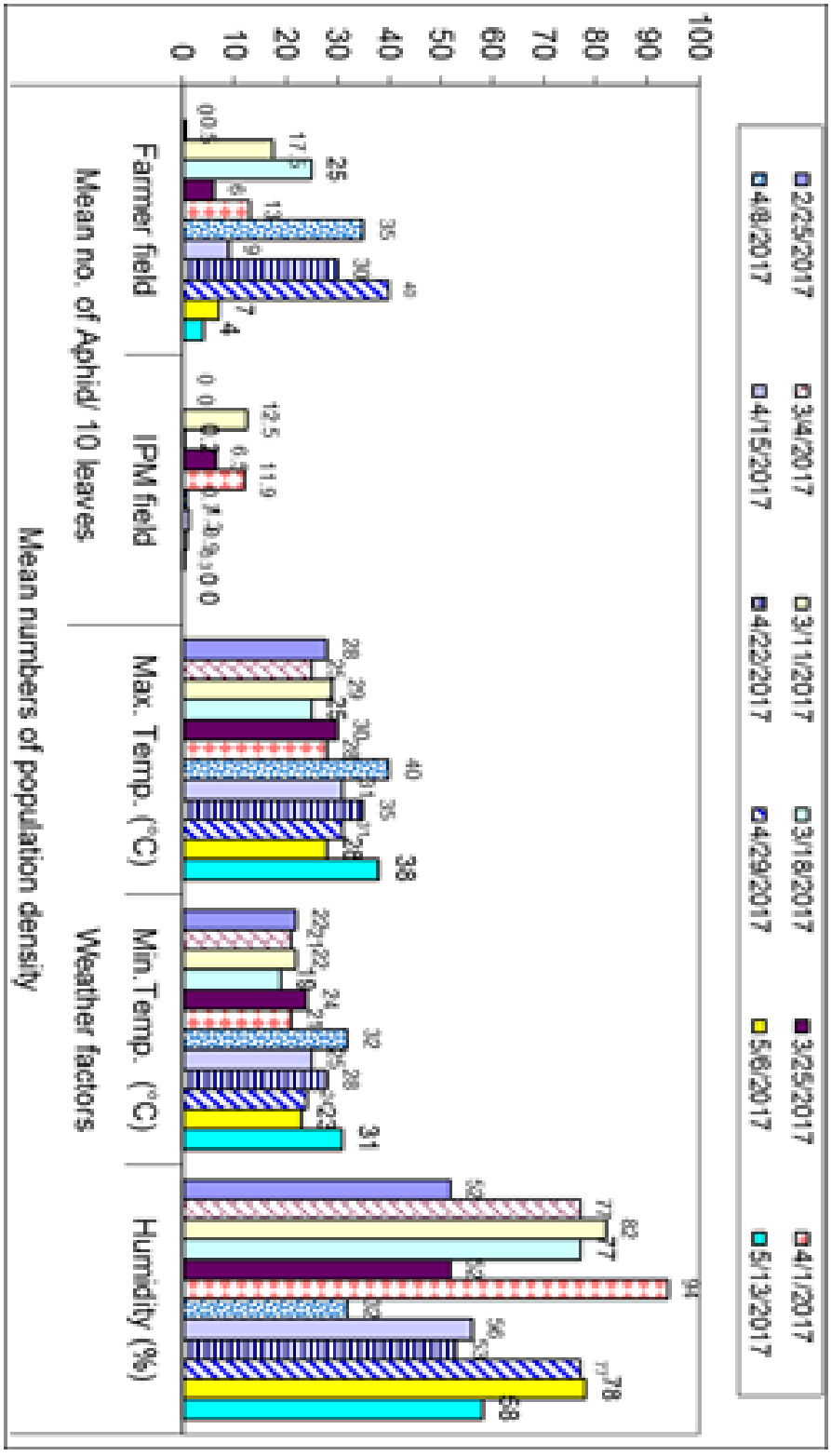

Fig. 2: Comparison of the mean numbers of *Aphis craccivora* L.in farmer and IPM field applications.

Table (2): Comparison between Yield and cost of production of both IPM and farmer field during the summer season of 2017

Yield weight (kg) / feddan	Yield return (LE)/ feddan	Cost of Insecticidal Treatments (LE) / feddan	Cost of Predacious Release Treatments/ feddan	Cost of agriculture Practices (LE) / feddan	Cost of net applications /feddan	Net return (LE) / feddan
IPM						
1560	24960	400	300	5500	6200	18760
Farmer						
1080	15120	800	0	5500	6300	8820

Table (3): Economic evaluation of IPM and farmer field applications

Economic Item	Farmer field	IPM field
Total of costs	6300	6200
Yield/ Ton	1.080	1.560
Price /kg	14	16
Total price / feddan	15120	24960
Average net return/feddan	8820	18760

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برنامج للمكافحة المتكاملة لحشرة المن *Aphis craccivora* التى تصيب نباتات الفاصوليا تحت الظروف الحقلية فى محافظة المنوفية

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الملخص العربى

تعتبر الفاصوليا من أهم محاصيل الخضر الاقتصادية فى مصر والعالم والتى تصاب بالعديد من الافات التى تسبب اضرارا بالغة خصوصا حشرة المن والتى تعد من الآفات الحشرية التى تسبب اضرارا بالغة فى المحصول فهى تصيب أجزاء النبات بالكامل وتقوم بامتصاص العصارة مما يقلل من قيام الاوراق بوظائفها الحيوية ومن اخطر الاضرار التى تسببها هو نقلها للامراض الفيروسية وقد أجريت هذه التجربه فى مركز اشمون – محافظة المنوفيه – مصر فى احدى المزارع الخاصه لتجربة برنامج للمكافحه المتكامله وتوضيح دور المكافحة المتكاملة فى الحد من اضرار تلك الافة . وقد اوضحت الدراسة ان برنامج المكافحة المتكاملة قد حقق نتيجة معنوية فى خفض تعداد المن حيث كان تعداده مع المكافحة المتكاملة حوالى 18.4٪ من تعداد المن فى حقل المزارع العادى – كما ان المحصول الناتج حقق 10.000 جنية زيادة للفدان عن المحصول لدى المزارع العادى، مما ترتب عليه زيادة في المحصول حيث أعطى حقل المزارع العادى 1.080 طن/ للفدان ، بينما الحقل المعامل بطريقة المكافحة المتكاملة اعطى 1.560 طن/ للفدان ، ولذلك ننصح مزارعى الفاصوليا فى المنوفية بالاخذ بذلك البرنامج فى مكافحة من الفاصوليا .

أسماء السادة المحكمين

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