SEASONAL VARIATION OF THE GREEN BEANS APHID, APHIS CRACCIVORA KOCH AND ITS NATURAL ENEMIES ON THE GREEN BEANS PLANTS, PHASEOLUS VULGARIS L. AT MENOUFIA GOVERNORATE

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ABSTRACT: Population density of Aphis craccivora attacking green beans plants cultivated at Ashmoon, Menoufia cleared that the summer season was the highest abundance, since the total average recorded 3226.0 immature insects / 10 leaves and 340 mature insects / 10 leaves, whereas in the winter season the total numbers average 81.1 immature insects / 10 leaves and 60.0 mature insects / 10 leaves. The percentages of predators to aphid numbers reached to 34.1 and 19.7 in both seasons of study, respectively.

Key words: Population density, Aphis craccivora, Green beans, Phaseolus vulgaris L.

INTRODUCTION
The green beans Phaseolus vulgaris L form an important food and cash crop in different countries all over the world. In Egypt, the cultivated area reach about 53000 Fadden 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 sabb suckers such as aphids cause inflict significant damage. Aphids are important pests of most cultivated crops worldwide (Abate and Ampofo, 1996, Boivin et al., 2012, May, Guri et al., 2011) Aphis gossypii (Glov) populations were generally low throughout the year; the largest numbers were being recorded in November (Becquer et al., 1981). The population of Aphis craccivora were lowest on crops sown in May Metwally (1999). In Egypt, observed that the population density of the cowpea aphid, Aphis craccivora had two main periods of activity, with highest counts during the third week of December and February in the first season, and during the fourth week of December and third week of March in the second season El-Def rawi et al., (2000). In India reported that red kidney bean is an important cash crop is attacked by insect pests which cause considerable damage. They included aphids, Aphis craccivora; whitefly, Bemisia tabaci. Abrol et al., (2006). The present work aimed to determine the population density of bean aphid and its natural enemies.

MATERIALS AND METHODS
This experiment was conducted at Abo Yossef, Ashmoon, Menoufia during a period extended from September, 2016 until December, 2016 (winter season) and from Marsh, 2017 to May, 2017. Samples represented 50 leaves of green bean were picked up weekly in 5 paper bags, transferred into the laboratory, examined by aid of stereoscopic microscope and the different insects isolated as pest and natural enemy, counted and calculated the different ecological items.
RESULTS AND DISCUSSION


Regarding, the population density of aphid immature stage during winter season as presented in Fig. (1) detected that the aphid density fluctuated from the low abundance in third week of October to reach the highest average of 320.0 insects/10leaves during the end of October, then the population decreased gradually, till the end of December, since the average numbers ranged between 21.0 insects/10leaves in fourth week of December and 120 insects/leaves during the first week of November.

As for, the mature stage data obtained showed few numbers occurred during mid–October and mid–November ranging between 5.0 – 35.0 insects, the highest average of 35.0 insects occupied the last day of October (Table 1). The prevailing natural conditions ranged between 21-26°C and 68.0 percent R.H.

On the other hand, the green beans aphid during the summer season fluctuated with average numbers of 20.0 insects on February, 25, after that the population increased gradually to reach the highest peak with average numbers of 353.0 immature insects, with beginning of fourth week of April, 2017. The population decreased to recorded 286.0 insects/10 leaves, in the second week of May (Fig. 2).

During the summer season, the population of aphid mature individuals (Fig. 2) occurred with 20.0 insects in second week of March, 2017 and the population fluctuated to reach the highest average of 45.0 insects during fourth week of April and decreased gradually and averaged 25.0 mature insects/10 leaves mature insects in mid-May, 2017. The natural conditions dominated when the aphid population was in the highest numbers ranged between 28-35°C and 53% R.H.

<table>
<thead>
<tr>
<th>Month</th>
<th>Aphid Num.</th>
<th>Predator Num.</th>
<th>Preda (%)</th>
<th>Temp (°C)</th>
<th>Humidity (%)</th>
<th>Monthly Total</th>
<th>Winter season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov.</td>
<td>35.7</td>
<td>12</td>
<td>34.1</td>
<td>24.0</td>
<td>89.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec.</td>
<td>27.6</td>
<td>16.3</td>
<td>79.3</td>
<td>8.4</td>
<td>475.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar.</td>
<td>34.1</td>
<td>27.6</td>
<td>89.3</td>
<td>6.3</td>
<td>465.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apr.</td>
<td>17.4</td>
<td>30.5</td>
<td>68.0</td>
<td>6.3</td>
<td>398.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>16.4</td>
<td>30.5</td>
<td>68.0</td>
<td>6.3</td>
<td>398.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (1): Comparison between the number of different predators and the number of green bean aphid during two successive seasons.
Seasonal variation of the green beans aphid, *aphis craccivora koch* ..................

Fig. 1: Mean numbers of *Aphis craccivora* infesting green bean plants during winter season 2016 at Maroua Governorate.
Fig. 2: Population fluctuations of Aphis craccivora green bean plants during summer season 2017 at Menoufa Governorate.
The obtained result showed that the comparing of the density in both seasons of study verify that the summer population was the higher, since the total average of the season recorded 3226 immature and 340 mature insects, while the winter season recorded total average 973 immature and 60 matures, these results meaning that the natural conditions during the summer season (28-35°C. and 53 % R.H.) the most suitable climate for the population built up. El-Defrawy et al. (2000) founded that the population density of A. craccivora had two main periods of activity, with the counts during the third week of December and February in the first season and during the fourth week of December and third week of March in the second one.

The Peak of aphid population was observed in mid-May of 1996 (17.44 individuals) and in 1997 (16.20) on beans (Gaber and Sourial, 2001).

2. Population fluctuation of predators associated with green bean aphid, A. craccivora:

The obtained results in Table (1) clear that the highest average of different predators reached 12.0 individuals in November (34.1 % comparing with the total average of aphid in winter season. On the other hand, during the summer, the highest numbers of predators recorded 54.0 individuals then the population percentage recorded 19.7 % during April. The natural conditions ranged between 25.5 -29.0 °C and 62.5-83.5% R.H.in both seasons of study.

REFERENCES
دراسة التذبذب العددي لحشرة المن التي تصاب نباتات الفاصوليا والأعشاب الحيوية المرتبطة بها تحت الظروف الحقلية في محافظة المنوفية

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الملخص العربي
تعتبر الفاصوليا من أهم محاصيل الخضرة الاقتصادية في مصر والعالم والتي تصيب بالعديد من الأعشاب التي تسبب أضراراً بالغة خصوصاً خلال أشهر الصيف، وتساهم هذه الأعشاب في تسهيل تطور حشرة من العديدين التي تجبب أوراق الفاصوليا وتسبب أضراراً بالغة في المحاصيل الزراعية. وقد أجريت هذه التجربة في مراكز الاصطناعية في المحافظة، وتمت الكمية المتبقية من الفاصوليا والاعشاب الحيوية المرتبطة بها. وقد وصفت الدراسة أن الكمية العدديّة للمن كانت أعلى خلال شهور الصيف حيث بلغ إجمالي التعداد 3226 حشرة غير بالغة لكل 10 أوراق بالإضافة إلى 340 حشرة بالغة، أما في شهور الشتاء كان مجموع التعداد 81.1 فرد غير بالغ بالإضافة إلى 60 حشرة بالغة لكل 10 أوراق. وقد سجلت المفترسة المصاحبة للمن أعلى نسبة مئوية خلال شهر نوفمبر وأبريل (19.7 & 1.34) خلال موسم الدراسة.

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