Experiments were carried out at the farm of the Agriculture Research Center of the Faculty of Agriculture, Mansoura University during the two successive seasons 2011 and 2012 to investigate some ecological aspects such as seasonal abundance; effect of some weather factors and the annual generation of certain aphid species infesting cowpea plants at Mansoura district.

The obtained results recorded three aphid species attacking cowpea plants. These species namely: *Aphis craccivora* (Koch.), *Aphis gossypii* (Glov.) and *Myzus persicae* (Sulz.).

The data revealed that, *A. craccivora* individuals began to appear on the plants on the first week of April and the population fluctuated to reach a maximum on the first week of August in the first season 2011 and in last week of July in the second season 2012. The population density of this insect decreased gradually until the end of October during the two seasons of investigation.

The results indicated that, *A. gossypii* began to appear on cowpea plants in the beginning of April, thereafter the population fluctuated to reach its maximum in the second week of August during the two seasons of study, then decreased gradually until the end week of October.

The obtained results revealed that, *M. persicae* individuals began to appeared on cowpea plants on the first week of April, there after the population fluctuated to reach its maximum in the third week of July in the first season 2011 and in first week of August in the second season 2012, respectively. Then the population density decreased gradually until the end of October during the two seasons of study. The results cleared that the temperature and relative humidity effecting greatly on the population density of these aphid species.

**Keyword:** *Aphis craccivora*; *Aphis gossypii*; *Myzus persicae*; Ecology; Weather factors.

**INTRODUCTION**

The vegetable cowpea crop is consider as a very important crop from either, the fresh consumption or food processing point of view. It is well known that insects especially piercing-sucking species cause yield losses in cowpea crop as well as other vegetable crops (Angayarkanni and Nadarajan, 2008).

*Aphis craccivora* Koch. *Aphis gossypii* (Glov.) and *Myzus persicae* (Sulz.) (Homoptera: Aphididae) are the main aphid species attacking cowpea plants. Aphids feed by sucking up plant juices and at the same time, inject saliva into the host. Light infestations are usually not harmful to plants, but higher aphid infestations may result in leaf curl, wilting, stunting of shoot.
growth and delay in production of flowers and fruit, as well as a general decline in plant vigor. Some aphid are also important vectors of plant diseases, transmitting pathogens in the feeding process. Numerous authors in different parts of the world recorded certain aphid species infesting cowpea plants (Shlyakhovoi and Bobnih, 1975; Hmid et al., 1977; Buxton et al., 2005; Munyuli et al., 2006; Brosius et al., 2007 and Huesing et al., 2012). Several investigator in different parts of the world studied the population density and the effect of some weather factors on some aphid species attacking certain vegetables crops (Nonita et al., 2007 and Huesing et al., 2012). Therefore the present investigation aimed to study the population density of some aphid species infesting cowpea plants and the effect of certain weather factors on these insect pests.

**MATERIALS AND METHODS**

The experiments were carried out at the farm of the Agriculture Research Center of the Faculty of Agriculture, Mansoura University during the two successive seasons 2011 and 2012, to investigate some ecological aspects such as seasonal abundance, effect of some weather factors and the annual generation of some aphid species insects infesting cowpea plants at Mansoura district. The cowpea variety was Giza 3. An area of about ¼ feddan was used for this study. The plants received the normal agricultural practices without insecticidal treatments. Two sampling method were used for recorded the aphid species:

A. **Sweep net:**
   
   For estimating the seasonal abundance, effect of some weather factors of certain aphid species insects infesting cowpea plants. The area was divided to five longitudinal plots. Weakly randomized samples were taken by an sweep net of regular size. The first samples were taken on the first week of April and the last sample was secured on the end of October in the two seasons, respectively. The samples were obtained on particular day, weakly, one at 10 a.m and the other at 2 p.m. Each samples was represented by fifty double strokes with the sweep net from each plot area. Thus 250 double stroke were fulfilled in the tested area, and Samples were secured during the two season.

B. **Direct count:**
   
   From the whole area about one hundred plants were visually examined weakly. Inspection was started from the beginning of vegetative stage and continued through the flowering and fruiting stages of the plants, collected specimens were kept in paper bags and transferred to the laboratory for identification. The collected insects from each fifty double strokes were placed in a plastic sac immediately anesthetized by ether and then transferred to the laboratory for identification and counting. The weekly catch of each species was recorded. The number of annual generation of some were estimated from mean number data that caught throughout two successive seasons. Each season extended from the time at which the
maximum mean number of caught has been attained could be representing as a peak for a generation.

Statistical analysis:
Data were analyzed by the analysis variance (ANOVA) and Duncan multiple range.

RESULTS AND DISCUSSION

1. Population density of some aphid species attacking cowpea plants:
   1- Aphis craccivora
Data illustrated in (Figure 1) revealed that the population densities of the common aphid species A. craccivora in cowpea plants during the two seasons of study 2011 and 2012. A. craccivora nymphs and adults began to appear on the plants on 1st week of April with an average number of two individuals in 2011 and 2012, respectively. There after the population fluctuated to reach a maximum of 560 individuals in the first week of August in the first season and 296 in the last week of July in the second season of study. Then the population density of A. craccivora decreased gradually until the end of October during the two seasons of study. These results are in practical agreements with those of Mathew, et al. (1972) and Ali and Risk (1980) in Egypt found that A. craccivora is the key pest infesting broad bean in the new valley.

![A. craccivora](image)

Figure (1): Population density of A. craccivora in cowpea fields during the two seasons 2011 and 2012 at Mansoura district.

2- Aphis gossypii
Data presented in (Figure 2) showed that the population densities of A. gossypii in cowpea plantation during the two seasons of study 2011 and
2012. The *A. gossypii* nymphs and aptera began to appear on the plants on 1st of April with an average of six individuals in 2011 and one individual in 2012 respectively. Thereafter the population fluctuated to reach a maximum of 578 individuals in the second week of August in first season and 396 in the second week of August in the second season of study. Then the population density of *A. gossypii* decreased gradually until the end of October during the two seasons of study. These results are in general agreement with the results of Ghanim *et al.* (1988). They reported that the dominant species infesting soybean in Mansoura region were *A. gossypii* and *A. craccivora*.

![Graph](image)

**Figure (2):** Population density of *A. gossypii* in cowpea fields during the two seasons 2011 and 2012 at Mansoura district.

### 3- *Myzus persicae*

Data arranged in (Figure 3) cleared that the population densities of the *A. gossypii* in cowpea plantation during the two seasons of study 2011 and 2012. The *M. persicae* nymphs and adults began to appeared on the plants on 1st of April with an average of zero individuals in 2011 and one individuals in 2012 respectively. Thereafter the population fluctuated to reach a maximum of 194 individuals in the third week of July in first season and 380 in the first week of August in the second season of study. Then the population density of *M. persicae* decreased gradually until the end of October during the two seasons of study. Salim *et al.* (1987) in Egypt, mentioned that *A. craccivora* and *M. persicae* population showed only one peak for each of them on cowpea plants.
Figure (3): Population density of *M. persicae* in cowpea fields during the two seasons 2011 and 2012 at Mansoura district.

2. Evaluating the effect of some weather factors on the population density of certain aphid species infesting cowpea plants:

1- *A. craccivora:

Data given in (Table 1 and 2) showed that the simple correlation coefficients values between the temperature, relative humidity and the weekly catch of *A. craccivora* during the two seasons of study (2011 and 2012). The results in this table revealed that both temperature and relative humidity exerted positive and negative effect varying from slight to significant on the population density of *A. craccivora*. The temperature parameters indicated highly significant positive in 2011 and 2012. While the relative humidity parameters revealed that the maximum relative had non significant negative correlation during the two seasons of study. The minimum and the mean relative humidity had significant and highly negative significant on the population density of *A. craccivora* during the period of investigation. The obtained results cleared that temperature and relative humidity affected greatly on the population density of *A. craccivora*. This is in complete agreement with the results of El-Serafi (1991) and El-Mashaly (2013). She reported that combined effect of temperature and relative humidity are the major factors affecting the activity of *A. craccivora*.

2- *A. gossypii:

The obtained results in (Table 1 and 2) revealed that the simple correlation coefficients values between the temperature, relative humidity and the weekly catch of *A. gossypii* during the two seasons of study (2011 and 2012). The results in this table revealed that both temperature and relative humidity exerted positive and negative effect varying from slight to significant on the population density of *A. gossypii*. The temperature parameters showed highly significant positive in 2011 and 2012. While the relative humidity parameters revealed that the maximum relative had significant negative correlation in 2011 and non significant negative correlation in 2012 .The minimum and the mean relative humidity had highly negative significant in 2011 and non significant negative in 2012 on the population density of *A. gossypii* during the period of investigation. The obtained results cleared that
temperature and relative humidity affected greatly on the population density of *A. gossypii*. These results are in agreement with the results of El-serafi (1991) and El-Mashaly (2013).

3- *M. persicae*

Data presented in (Table 1 and 2) cleared that the simple correlation coefficients values between the temperature, relative humidity and the weekly catch of *M. persicae* during the two seasons of study (2011 and 2012). The results in this table revealed that both temperature and relative humidity exerted positive and negative effect varying from slight to significant on the population density of *M. persicae*. The temperature parameters showed highly significant positive in 2011 and 2012. While the relative humidity parameters revealed that the maximum relative had non significant negative correlation during the two seasons of study. The minimum and the mean relative humidity had significant and highly negative significant on the population density of *M. persicae* during the period of investigation. The obtained results cleared that temperature and relative humidity affected greatly on the population density of *M. persicae*.

**Table (1). Simple correlation coefficient between the population density of some aphid species and the temperature and relative humidity components in season 2011 at Mansoura district.**

<table>
<thead>
<tr>
<th>Weather factors</th>
<th>Temperature</th>
<th>Relative humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aphid Species 2011</td>
<td>Max.</td>
<td>Min.</td>
</tr>
<tr>
<td><em>A. craccivora</em></td>
<td>0.78495502</td>
<td>0.77973065</td>
</tr>
<tr>
<td><em>A. gossypii</em></td>
<td>0.82640685</td>
<td>0.83454432</td>
</tr>
<tr>
<td><em>M. persicae</em></td>
<td>0.72965465</td>
<td>0.74346449</td>
</tr>
</tbody>
</table>

ns = in significant  * = significant with varied degree where r = correlation coefficient  p = probability  s = significant sign.

**Table (2). Simple correlation coefficient between the population density of some aphid species and the temperature and relative humidity components in season 2012 at Mansoura district.**

<table>
<thead>
<tr>
<th>Weather factors</th>
<th>Temperature</th>
<th>Relative humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insect Species 2012</td>
<td>Max.</td>
<td>Min.</td>
</tr>
<tr>
<td><em>A. craccivora</em></td>
<td>0.81029369</td>
<td>0.80590612</td>
</tr>
<tr>
<td><em>A. gossypii</em></td>
<td>0.84290450</td>
<td>0.91584760</td>
</tr>
<tr>
<td><em>M. persicae</em></td>
<td>0.85236977</td>
<td>0.82226415</td>
</tr>
</tbody>
</table>

ns = in significant  * = significant with varied degree where r = correlation coefficient  p = probability  s = significant sign.
REFERENCES


دراسات ايکولوجیہ علی بعض انواع المن التي تهاجم نباتات الودیا في منطقه المنصورة

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أجريت التجارب في مزرعة مركز البحوث الزراعیة بكلیة الازراعیة، جامعة المنصورة خلال موسمين متتالین 2011 و 2012. لدراسة بعض الجوانب الگینیة مثل الازراعیة الاسبوعیة، تأثیر بعض الععمال الجرویة والأجیال السنویة لانواع المن التي تسبب نباتات الودیا في منطقه المنصورة التی تم الحصول Aphis craccivora عليها مسجل ثلاثة انواع من المن التي تهاجم نباتات الودیا. هذه الانواع هي Aphis Myzus persicae و Aphis gossypii (Koch).

وأوضحت النتائج ان Myzus persicae و Aphis gossypii (Koch) أبدا في الظهور على الگینیات في الأسبوع الأول من آب ووصلت الكثافة الحدودية إلى الحد الأقصی لله في الأسبوع الأول في الأسبوع الأول من أب ووصلت الكثافة الحدودیة في الأسبوع التالي. اتضح أن النتائج التی تم تدریجیا حتى نهایة أكتوبر خلال المواسم. اشارت النتائج إلى أن أبدا شریع علی نباتات الودیا في الأول من أب، بعد ذلك زادت الگینیات ولم تصل إلى الحد الأقصی في الأسبوع الثاني وآب و.springboot المشارک هذا العامل أن هناك علاقة ارتباط علی الشعور موجب في موسم الگینیة. أثبت النتائج ان درجة الحرارة والعطوبیة النسبیة أثرت بشكل كبير علی كثافة الگینیة لأنواع الگینیات محل الدراسة.