

**DAMAGE CAUSED BY THREE INSECTS ATTACKING
CABBAGE SEEDLINGS IN TWO SITES AT GIZA
GOVERNORATE**

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ABSTRACT

Thrips tabaci (Lind.) and *Bemisia tabaci* (Genn.) increased the counts of shrinkled and silvered leaves during cabbage seedling growth at Embaba district in 2000 and 2001 summer seasons. The dried - dropped leaves were affected by the action of both insects. Thus the healthy leaves on seedlings decreased until they have none. The final injury based on both seasons was 5.39 shrinkled & silvered leaves / seedling, 2.0 dried & dropped leaves and no healthy leaf, compared with 1.75 shrinkled & silvered leaves / seedling, 0.58 dried & dropped leaves and 5.17 healthy leaves / seedling in seedlings sprayed twice. The degradation percentage was 100% in untreated and 31.09% in treated seedlings. At Ausem district : *T.tabaci* and *Brevicoryne brassicae* (L.) caused an increase in counts of shrinkled & silvered leaves and dried & dropped leaves during the seedling growth. The final injury in untreated seedlings was 5.11 shrinkled & silvered leaves , 2.22 dried & dropped leaves and 0.0 healthy leaf, compared with 2.0 shrinkled & silvered, 0.77 dried & dropped and 4.722 healthy leaves in sprayed seedlings. The degradation percentage was 100% and 37.04% in untreated and treated seedlings, respectively.

Key words: *Bemisia tabaci*, *Brevicoryne brassicae*, cabbage.insect infestation, *Thrips tabaci* .

1. INTRODUCTION

The small seedlings of cabbage before transplantation are very susceptible to insect infestation, especially the piercing sucking insects such as the cotton thrips, *Thrips tabaci* (Lind.) sweetpotato whitefly, *Bemisia tabaci* (Genn.) and the cabbage aphid, *Brevicoryne brassicae* (L.).

The leaves of infested cabbage plants by *T. tabaci* are silvered and flecked, while heavy attacks lead to the wilting of young plants (Hill 1975). In Poland *T. tabaci* attacked 73 – 100% of cabbage plants (Legutowska 1997).

Cabbage aphids usually do not affect seedlings, but they begin to build up after transplantation or thinning. Large colonies may stunt or kill small plants (Anonymous, 1987). Hill (1975) mentioned that infested seedling with *B. brassicae* may be stunted and distorted. *B. brassicae* caused 70-80% losses in mustard yield (Rustamani *et al.*, 1988).

The present work aimed to follow up the combined injury caused by natural complicated infestation with piercing sucking insects during the seedling stage, and to investigate the final injury by different levels of infestation.

2. MATERIALS AND METHODS

The experiments were conducted during 2000 and 2001 summer seasons at El – Moatamedia, Embaba district; and during summer season of 2001 at Kafr – Hakeem, Auseem district, at Giza Governorate. In each site and season, an area of about ¼ feddan was seeded with cabbage variety Baladi; *Brassica oleraceae* var. *Capitata* on May 13 and May 20 of both seasons, respectively at Embaba and on April 30, 2001 at Auseem. All the recommended agricultural practices were followed except for the use of insecticides. This area was divided into two parts, each part was divided to six experimental plots. Two treatments were applied, the 1st treated twice with Lannate 90% at a rate of 300 gr / fed. to avoid the infestation of chewing insects. The second was treated against piercing sucking and chewing insects, by using Lannate 90% and Actellic 50% (1.5 litre / fed.) in two sprays. Applications began 2 weeks after sowing and continued in

biweekly intervals until transplantation. Each treatment was replicated randomly on 6 plots. Samples of 18 plants / treatment (3 plants / plot) were examined weekly from germination until transplantation to count piercing sucking insects: (all stages of thrips and whitefly) at Embaba ; and (all stages of thrips and aphids) at Auseem. The infestation symptoms on leaves were categorized and recorded (no. of shrinkled & silvered leaves, dried & dropped leaves and healthy leaves). The degradation percentages in seedling leaves were calculated / sample by using the formula :

$$\text{Degradation percentage} = \frac{\text{No. shrinkled \& silvered leaves} + \text{No. dried \& dropped leaves}}{\text{Total counts of seedling leaves}} \times 100$$

To calculate the final injury, a sample of 18 seedling/ treatment was examined to measure the injury parameters on seedling leaves at transplantation time, the degradation percentage was calculated/ treatment in every season.

3. RESULTS

3.1. Relationship between infestation level and damage

3.1.1. Embaba district: The dominant piercing sucking insects on cabbage seedlings were *T.tabaci* and *B.tabaci*, therefore their counts together were regarded as insect complex counts / seedling . Thrips constitute about 70.15% from insect complex in the two seasons together (Table 1). Numbers of shrinkled and silvered leaves / seedling increased by increasing counts of the insect complex. When the insects reached 9.67 , 34.11, 29.56, 42.11, 101.22 and 685.56 individuals / seedling, the shrinkled & silvered leaves were 0.55, 1.22, 1.89, 2.78, 4.0 and 6.89 leaves / seedling in 2000 season. The same parameter was 1.33, 2.33, 3.67, 3.89, 3.89 and 2.89 leaves/seedling, at counts of 6.67, 18.22 , 35.22 , 39.22 , 51.0 and 82.11 insects/ seedling in 2001 season.

Heavy injury caused drying and dropping leaves. The cotyledon leaves were the first leaves to pass out gradually. They became silvered and shrinkled firstly, then dried and dropped. Table (1), shows that leaves were dried and dropped by the action of insect complex counts mentioned previously during 2000 and 2001 seasons. The

counts mentioned previously during 2000 and 2001 seasons. The counts of treated leaves were 0,0,0,0.67,2.0 and 2.44 leaves/seedling at consecutive counts of 6.67, 18.22,35.22, 39.22, 51.0 and 82.11 insects/seedling.

Table (1) :Combined injury of *Thrips tabaci* and *Bemisia tabaci* on cabbage seedlings at Embaba , Gize Governorate during summer seasons of 2000 and 2001.

| Season | Inspection date | Insect complex counts/seedling | No. of injured leaves / seedling | | Healthy leaves | Degradation percentage | |
|--------|-----------------|--------------------------------|----------------------------------|------------------------|----------------|------------------------|-------|
| | | | Shrinkled & silvered leaves | Dried & dropped leaves | | | |
| 2000 | May | 23 | 9.67 | 0.555 | 0.0 | 1.45 | 27.75 |
| | | 30 | 34.11 | 1.22 | 0.0 | 1.45 | 45.7 |
| | June | 6 | 29.56 | 1.89 | 0.22 | 1.89 | 52.75 |
| | | 13 | 42.11 | 2.78 | 1.22 | 1.22 | 76.63 |
| | | 20 | 101.22 | 4.0 | 1.22 | 1.11 | 82.5 |
| 27 | 685.56 | 6.89 | 1.56 | 0.0 | 100 | | |
| 2001 | May | 29 | 6.67 | 1.33 | 0.0 | 0.67 | 66.5 |
| | | June | 5 | 18.22 | 2.33 | 0.0 | 0.23 |
| | 12 | | 35.22 | 3.67 | 0.0 | 0.0 | 100 |
| | 19 | | 39.22 | 3.89 | 0.67 | 0.0 | 100 |
| | 26 | | 51.0 | 3.89 | 2.0 | 0.0 | 100 |
| | July | 3 | 82.11 | 2.89 | 2.44 | 0.0 | 100 |

Based on the aforementioned results, healthy leaves remaining on seedling have decreased by increasing counts of either insect complex, shrinkled and silvered leaves or dried and dropped leaves (Table 1). It is worth to mention that the seedlings of cabbage had no healthy leaves at the transplantation age (six weeks after sowing) in both seasons.

Degradation percentage (Table1) was graded from 27.75% , 45.7 , 52.75 , 76.63 , 82.5 to 100% at levels of 9.67 , 34.11 , 29.56 , 42.11 , 101.22 and 685.56 insect / seedling , in arrangement. The degradation percentages were 66.5 , 91.02 , 100 , 100 and 100% at rates of 6.67 , 18.22 , 35.22 , 39.22 , 51.0 and 82.11 insects / seedling , respectively.

3.1.2. Auseem district : The dominant piercing sucking insects found on cabbage seedling were *T.tabaci* and *B. brassicae* , therefore their numbers were considered as an insect complex / seedling. Thrips constituted about 88,8% from the insect complex in summer season of 2001. Numbers of both shrinkled & silvered leaves and dried & dropped leaves appeared in the same trend of the summer season of 2001 at Embaba. Counts of shrinkled & silvered leaves were 2.0 2.78 , 3.89 , 4.11 , 5.22 and 5.0 leaves / seedling , and counts of drying & dropping leaves were 0.0 , 0.0, 0.0 to 0.89 , 2.0 and 2.22 leaves / seeding , when insect complex counts were 12.45 42, 73.12, 73.12 , 117 , 232 and 175 individuals / seedling , in arrangement. At Auseem district, no healthy leaves were found, starting from the first appearing of cotyledon leaves until transplantation. Thus, the degradation percentage was 100% during all seedling life (Table 2).

Table(2): Combined injury of *Thrips tabaci* and *Brevicoryne brassicae* on cabbage seedlings at Auseem, Giza Governorate during the season of 2001.

| Inspection date | Insect complex counts/ seedling | No. of injured leaves / seedling | | Healthy leaves | Degradation percentage |
|-----------------|---------------------------------|----------------------------------|------------------------|----------------|------------------------|
| | | Shrinkled & silvered leaves | Dried & dropped leaves | | |
| May | 7 | 12.45 | 2 | 0.0 | 100 |
| | 14 | 42 | 2.78 | 0.0 | 100 |
| | 21 | 73.12 | 3.89 | 0.0 | 100 |
| | 28 | 117 | 4.11 | 0.89 | 100 |
| June | 4 | 232 | 5.222 | 2.0 | 100 |
| | 11 | 175 | 5.0 | 2.22 | 100 |

3.2. The final injury on seedlings

3.2.1. At Embaba district: The final injury as presented in (Table 3) was 5.39 shrinkled & silvered leaves/seedling and 2.0 dried & dropped leaves/ seedling, with no healthy leaves on seedlings. Such injury was caused by a mean population of 94.56 individuals/seedling. In comparison, 25.1 individuals/seedling in the treated seedlings caused 1.75 shrinkling & silvering leaves / seedling and 0.58 drying & dropping leaf/seedling; while 5.17 leaves/secdling were found healthy. The final percentage of degradation was 100 % in infested seedlings

Table (3) : The final injury on seedlings cabbage due to piercing sucking insects complex at Gize Governorate.

| Region | Mean no. of insect complex/seedling | | Mean no. of leaves/seedling | | | | | | Degradation percen | | t |
|----------------|-------------------------------------|---------|-----------------------------|---------|-----------------|---------|-----------|---------|--------------------|---------|---|
| | | | shrinkled & silvered | | dried & dropped | | Healthy | | Untreated | treated | |
| | Untreated | treated | untreated | treated | untreated | treated | Untreated | treated | | | |
| Embaba* | 94.56 | 25.1 | 5.39 | 1.75 | 2.0 | 0.583 | 0.0 | 5.17 | 100% | 31.09% | |
| Auseem | 108.595 | 29.17 | 5.11 | 2.0 | 2.22 | 0.778 | 0.0 | 4.722 | 100% | 37.04% | |

* Mean of both seasons collectively.

(untreated) and 31.09% in treated seedlings.

3.2.2. At Auseem: Each untreated seedling harboured 108.595 individuals injuring 5.11 shrinkled & silvered and 2.22 dried & dropped leaves / seedling (Table 3). But the treated seedling harboured 29.17 individuals injuring 2.0 and 0.778 leaves / seedling by the same arrangement. The final percentage of degradation in untreated seedlings was 100%.

During this work, it was observed that heavy infested seedlings were less in the stem diameter than healthy seedlings, and their petioles were shorter.

4. DISCUSSION

Thrips attack all seedlings, injuring 100% of leaf seedling when combined with the whitefly or with the cabbage aphid. This observation is homogenous with that of Legutowska (1997) who found that 73–100% of cabbage plants were attacked by *T. tabaci*. While *B. brassicae* caused 70 – 80% losses in mustard yields (Rustamani *et al* 1988).

The infestation symptoms such as shrinkled & silvered leaves counts followed by dried & dropped leaves and counts of healthy leaves agreed with Hill (1975) who mentioned that leaves were silvered and flecked when attacked by thrips. Silver leaf symptoms of squash and severe chlorotic spots on the leaves of *Brassica* spp. were induced by lower density of whitefly nymphs (Matsui & Nakashima 1992). Lopez – Avila and Cock (1986) showed that chlorotic spots appeared at feeding sites on leaf surface, causing leaf wilting and leaf shedding as a damage of *B. tabaci*.

Cabbage aphid was presented only at one region with relatively low numbers, 11.2% of the insect complex counts. This result is similar with that finding of Anonymous (1987) who mentioned that cabbage aphid usually does not affect seedlings, but they begin to build up after transplanting.

5. REFERENCES

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الضرر الناتج عن الإصابة بثلاثة أنواع حشرية على بادرات الكرنب في منطقتين بمحافظة الجيزة

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ملخص

يزداد تأثر بادرات الكرنب بالضرر الحشري خلال الفترة من الانبات وحتى الشتل. لذا فإن هذا البحث يهدف الى تعقب وتتبع الضرر الناتج عن الاصابة بالحشرات الثاقبة الماصة خلال هذه المرحلة وتحديد الضرر النهائي الناتج عن الاصابة ببعض الحشرات التي تصيب بادرات الكرنب.

في منطقة إمبابية سببت الإصابة بتربس البصل والذبابة البيضاء زيادة في عدد الأوراق ذات اللون الفضي الباهت والمجعدة خلال نمو البادرات. تأثر عدد الأوراق الجافة والمتساقطة للبادرات بالعدد الحشري بدرجة عالية. وتناقص عدد الأوراق السليمة المتبقية على البادرات تدريجياً لدرجة أنه لم يوجد أى أوراق سليمة عليها عند الشتل في موسمي ٢٠٠٠ و ٢٠٠١.

قدر الضرر النهائي في موسمي الدراسة معا فكان ٥,٣٩ ورقة فضية مجعده، ٢ ورقة جافة ومتساقطة / بادرة ولم توجد أي أوراق سليمة بالمقارنة مع ١,٧٥ ورقة فضية مجعدة، ٥,٥٨ ، ورقة جافة ومتساقطة و ٥,١٧ ورقة سليمة / بادرة في الشتلات المعاملة مرتين ضد الحشرات الثاقبة الماصة. لذا فإن نسبة التدهور كانت ١٠٠% في الشتلات غير المعاملة وكانت ٣١,٠٩% في الشتلات المعاملة.

في منطقة أوسيم نتج عن وجود التربس ومن الكرنب زيادة في عدد الأوراق المصابة (الفضية المجعدة ، الجافة المتساقطة) أثناء نمو البادرات في صيف ٢٠٠١ وكان الضرر النهائي في الشتلات المصابة يعادل ٥,١١ ورقة فضية مجعدة / شتلة ، ٢,٢٢ ورقة جافة متساقطة ولم يتبق على الشتلات أي أوراق سليمة بالمقارنة بعدد ٢,٠ ورقة فضية مجعدة ، ٠,٧٧ ورقة جافة متساقطة ، ٤,٧٢٢ ورقة سليمة / شتلة في الشتلات المعاملة. كانت نسبة التدهور ١٠٠% في أوراق الشتلات غير المعاملة و ٣٧,٠٤% في أوراق الشتلات المعاملة.