SUSCEPTIBILITY OF SOME TOMATO VARIETIES AND HYBRIDS TO WHITEFLY BEMISIA TABACI (GENN.) INFESTATION IN RELATION TO RATE OF TYLCV INFECTION AND THE YIELD

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Abstract

Eight tomato varieties were investigated to evaluate the mean numbers of Bemisia tabaci adults coincident to the occurrence of TYLCV and yield. Tomato hybrids of Dora, Jakal and Facolta were the lower susceptible at B. tabaci adult infestation, while TY-20 and Sheva variety were moderately infested. The most susceptible to the insect infestation were Strain-B, Edkawy, and Castle Rock varieties (Doss, 1982).

TYLCV symptoms infection occurred coincident with the mean numbers of B. tabaci adult infestation (Rossier et al., 1990). Meanwhile, yield per plots (1/16 Feddan) showed the highest yield in case of the lower infection of TYLCV as well as the insect adult mean numbers, viz. Facolta, Jakal and Dora hybrids. While the lower yield was given in case of the highest infection of TYLCV and insect adult means, viz. Castle Rock, Edkawy and Strain-B.

INTRODUCTION

In Egypt, tomato is considered to be one of the most important vegetable crop. Bemisia tabaci is a destructive pest on tomato plants (Shahin, 1977). Damage of this insect is not only direct effect viz. sucking the plant sap, but also the indirect effect in transmission of the tomato yellow leaf curl virus (TYLCV) (Abdel-Salam, 1991). Abu-Gharbieha et al. (1978) found that 6 of 108 tomato tested varieties, showed slightly tolerance to TYLCV.

Present study, which extended over two years of investigations, was undertaken to throw light on the susceptibility of some tomato varieties and hybrids to Bemisia tabaci infestation.

MATERIALS AND METHODS

In an applied study to evaluate the sensitivity of 8 tomato cultivars viz. Castle Rock, Edkawy, Super strain-B varieties and Sheva, TY-20, Dora, Jakal, and
Facolta hybrids, were tested at Nobarela district during NII plantation of 1995 & 1996. Studies were conducted in an area of about 2 feddams, divided into 32 plots (1/16 feddan each) and distributed in a complete randomized block design with 4 replicates.

Transplantations were located in the second week of August in the two successive seasons of 1995 and 1996. One week after transplantation, weekly inspections were carried out in early morning. Samples size were 30 randomized leaves collected from 330 plants per plot, on which number of adult insects were counted and recorded.

To determine percentages of tomato yellow leaf curl virus infection at the different treatments, two inspections were carried out. First inspection was conducted about 30 days after transplanting, where the second one was carried out after 60 days. Meanwhile, 100 plants per plot were randomly taken for inspection to estimate TYLCV infection. At harvest time, yield of each replicate was determined as kg/plot.

At the end of the two successive seasons, statistical analysis was worked out by "F" test to get the differences between treatments. Duncan's multiple ranges were worked out to arrange the tested varieties and hybrids in groups according to their susceptibility to whitefly infestation.

RESULTS AND DISCUSSION

As shown in Table 1, data indicated that Super-strain, Edkawy, Castle Rock varieties were more susceptible to B. tabaci infestation, comparing with the other tested hybrids and varieties. Mean number of B. tabaci adults on these varieties were 58.25, 79.85 and 81.25 in 1995 season; and 59.45, 78.70 and 79.88 in 1996 season per sample, respectively. However, TY-20 and Sheva tomato hybrids were moderately infested. The mean number of adults were 38.45, 31.82 and 32.53 in 1995 season; and 31.23, 31.38 and 32.22 in 1996 season per sample, respectively. Meanwhile, the lowest of adult insects numbers were recorded on hybrids of Dora, Jakal and Facolta, where there were 41.25, 41.38 and 41.22 adults per sample, respectively. Meanwhile, statistical analysis by "F" test showed significant difference at 8.07 (Doss, 1982).

By working out F test and L.S.D. value (11.64), the tested varieties could be
divided into three categories as follows:
a. First group: having a low B. tabaci infestation, like Dora, Jakal and Facolta hybrids.
b. Second group: having moderate infestation, viz. TY-20 and Sheva hybrids.

The present data indicated that there are no significant difference in the mean number of whitefly adults among the three tomato tested varieties of Super-strain-B, Edikawy and castle Rock (Shaheen, 1977). On the contrary, these varieties were the most susceptible among the tested cultivars, although, there was no significant difference in the mean number of B. tabaci adults among hybrids in the other two tested cultivars groups, while it was significant among cultivars from group to group (Abdel-Aziz, 1978).

Table 1. Rate of tomato yellow leaf curl virus (TYLCV) infection percentage on the different tomato cultivars, and the coincident yield at Giza Governorate during 1995 and 1996 seasons.

<table>
<thead>
<tr>
<th>Season Tomato cultivar</th>
<th>1995</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean no. of B. tabaci/sample</td>
<td>% of TY-LCV infection after 30 days</td>
</tr>
<tr>
<td>Facolta</td>
<td>32.53</td>
<td>2</td>
</tr>
<tr>
<td>Jakal</td>
<td>31.82</td>
<td>3</td>
</tr>
<tr>
<td>Dora</td>
<td>33.45</td>
<td>3</td>
</tr>
<tr>
<td>Sheva</td>
<td>57.75</td>
<td>9</td>
</tr>
<tr>
<td>TY-20</td>
<td>57.68</td>
<td>11</td>
</tr>
<tr>
<td>Castle</td>
<td>58.25</td>
<td>10</td>
</tr>
<tr>
<td>Rock</td>
<td>79.85</td>
<td>18</td>
</tr>
<tr>
<td>Edikawy</td>
<td>81.25</td>
<td>19</td>
</tr>
</tbody>
</table>

- Block area: 1/16 feddan
- Sample size : 30 leaves
- Inspections were taken at 7-day intervals early in the morning.
- *F* value for varieties (F) at 1% level = 1.52 (Sig.).
- L.S.D. between varieties at 1% level = 11.64.
Although, Super-strain-B, Edkawy and Castle Rock varieties contained the highest level of *B. tabaci* infestation, comparing with other tested hybrids, it seems to have the lowest level of infestation among tested varieties which worked by Kishna (1984), due to the resistance criteria in the new tested hybrid tomato cultivars.

On the other hand, occurrence of Tomato yellow leaves curl virus infection was determined twice at 30 and 60 days after transplanting date, where it was coincident with the *B. tabaci* adults infestation, Table 1. In the mean time, yield/plot was determined. Occurrence of TYLCV infection were 2 & 7, 3 & 7, & 3 & 8% at Facolta, Jakal and Dora hybrids during the first and second inspections, 1995, respectively. It was 9 & 21, 11 & 23 at Sheva and Ty-20 hybrids, respectively. Castle Rock, Edkawy and Super strain-B varieties were recorded the highest occurrence of TYLCV infection, with the percentage of 10 & 22, 18 & 65 and 19 & 68% in the two inspections, respectively.

Yield in 1995 season was 1613 1624 & 1612 kg/plot in Facolta, Jakal and Dora hybrids, respectively, while it was 921, 928, 886, 379 and 368 kg/plot in Sheva, Ty-20, Castle Rock, Edkawy and super-strain-B, respectively.

During 1996, percentage of infection occurrence of TYLCV having nearly the same trend of 1995. It was 3 & 7, 3 & 8,2 & 8,10 & 20, 10 & 22, 9& 24, 19 & 67 and 18 & 67 and 18 & 68% in the tested cultivars of Facolta, Jakal, Dora, sheva, Ty-20, Castle Rock, Edkawy and super-strain-B cultivars at the first and second inspection, respectively. Tested varieties could be arranged descendingly according to the yield (kg/plot) as follows: Jakal (1685), Dora (1648), Facolta (1642), Ty-20 (815), Sheva (895), Castle Rock (892), Edkawy (391), and super-strain-B (383).

Present data indicated that the occurrence of TYLCV infection in the tested cultivars during the two inspections was coincident with the mean number of *B. tabaci* adult during two seasons. The lowest infection percentage of TYLCV occurrence (2 & 7, 3 & 7, 3 & 8%) were recorded in case of the lowest *B. tabaci* adult infestations (39.53, 31.82 and 33.45 adults/30 leaves) on Facolta, Jakal and Dora cultivars during 1995; and 3 & 7, 3 & 8, 2 & 8% against 32.22, 31.38 and 31.25 adults/30 leaves during 1996, respectively.

Meanwhile, Sheva and Ty-20 hybrids showed a moderate percentage of TYLCV infection occurrence. It was 8 & 21 and 11 & 23 during 1996, respectively, against 57.75, 57.68 (1995) and 58.59, 58.63 (1996) adults/30 leaves, respectively.
On the other hand, the rest tested varieties showed the highest level of B. tabaci infestation and TYLCV infection during the two seasons. It was 58.25 insects with 10 & 22% infection in 1996 on Castle Rock. Where it was 79.85 insects with 18 & 65% infection (1995) and 78.70 insects with 19 & 67% infection (1996) on Edkawy cultivar, and 81.25 insects with 19 & 68% (1995) and 79.88 insects with 18 & 66% (1996) on Super strain varieties (Mazyad et al., 1979).

On the other hand, yield of tested cultivars are in the opposite of the mean number of B. tabaci adult infestation, and occurring of TYLCV infection percentages. While Facolta, Jakal and Dora hybrids having the lower insect mean numbers and TYLCV infection percentage, they are the highest tomato yield. On the contrary, Castle Rock, Edkawy and Super strain varieties recorded the lowest tomato crops in the opposite of the higher B. tabaci adult infestation and TYLCV percentage infection (Rosset et al., 1980).
REFERENCES


حساسية بعض أصناف هجين الطماطم للاصابة بالذباب البيضاء
و العلاقة ذلك معدلات الإصابة بمرض تجعد الأوراق الطماطم
الفيروسي، وتأثير ذلك على المحصول

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معدل بوران وقاية النباتات - مركز البحوث الزراعية - الدقي - جيزة

أجريت تجربتان في عروض النباتية لعامي 1991 و1992 بمنطقة النوبية، وذلك
لدراسة حساسية ثمانية أصناف من الطماطم، من بينها ثلاثة أصناف وخمسة هجن وذلك
للإصابة بمرض تجعد الأوراق الفيروسي، وتأثير ذلك على المحصول. وقد اتفقت من الدورة الزمنية-

1. يمكن ترتيب الأصناف المشتركة في مجموعات وذلك بالنسبة لحساسيتها للاصابة
بمصدر الذباب البيضاء كالآتي: قليلة الإصابة وهي: هجن مأرب، جبلة ولكن، وسطية الإصابة وهي: هجين: ث - 30 - 20 - 10 - 8 - 6 - 4 - 2 - 0، وشيكة، ومتاحة الإصابة وهي: هجين: هج: 30 - 20 - 10 - 8 - 6 - 4 - 2 - 0
استثنى، وهي: كافور، كلاسيكي، وكلاسيكي أصفر في مجموعات درجة الإصابة بهذه
الصغرية زوأر مختلفة بين أصناف كل مجموعة وأصناف الأوراق الأخرى في حين
لاوجد فروق معنوية بين أصناف نفس الجماعة.

2. انخفض من الدورة أن هناك زيادة في متوسط النسبة المشتركة للاصابة بمرض تجعد
أوراق الطماطم الفيروسي على كل الأصناف المشتركة مع زيادة الإصابة بمرض
الذباب البيضاء، حيث كان متوسط الأصابة بهذه الحشرة مماثلاً مع تعداد الحشرة.

3. ارتبطت متوسط كمية المحصول في القطر المزرعة بهذه الأصناف وكمسكاً مع تعداد
الحشرة، وكذا تسبب الإصابة بمرض تجعد الأوراق الفيروسي، حيث سجفت
على محصول في القطر المزرعة في متوسط تعداد الحشرة، وأقل نسبة إصابة فيروسية
(الصنف: جبلة)، وفي الطفيل كان السن (فازور ستيرين ب) هو أقل الأصناف المشتركة
محصولاً وأقلها إصابة بالحشرة والفيروس.

وعلى ذلك يمكن التوصية برعاية هجين الدوار، جبلة ولكن، كأفضل نوعية
الاستثناء، وتناول نكاليك المكثفة لحشرة الذباب البيضاء، ومرض تجعد الأوراق الفيروسية.
الفيروسي.