The utilization of honey-bees for the production of seeds of cucumber Cornichon type

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Abstract
The paper presents the results of researches performed upon the use of honey-bees in the seed production of three hybrids in Cornichon type of Cucumis sativus (‘Cornișa’, ‘Cornibac’, and ‘Cornirom’). Honey-bees are very efficient in pollination of cucumber flowers, resulting in an increase of seed quantities per fruit ranging from 150 % (‘Cornirom’) to 214 % (‘Cornișa’), as compared to hand pollination.

INTRODUCTION
The cucumber seed production has a special technology because the flowering plants require cross pollination (Calin et al. 1999; Kremen 2001; McCormack 2005). In hybrid seed production, cucumbers are pollinated by honey-bees, bumblebees or hand pollinated (Calin 1999). Many farmers rent honey-bee colonies to provide pollination services for their crops in order to obtain a larger quantity of seeds (Kremen, 2001). In the present paper the authors present how the type of pollination is influencing the hybrid seed production. We used the gynoecious parental female lines and monoecious parental male lines of following hybrids: ‘Cornirom’, ‘Cornibac’ and ‘Cornișa’.

MATERIAL AND METHODS
The biological material utilised in our experiment is represented by the gynoecious female and monoecious male line of three hybrids of cucumber that belongs to Vegetable Research and Development Station Bacau, Romania: ‘Cornirom’, ‘Cornibac’ and ‘Cornișa’.

The main purpose was the determination of the influence of the type of pollination over the seed production of the hybrid genotypes. The experimental variants were: V1 - pollination with honey bees and V2 – hand pollination.

The seed production of the parental hybrids line: ‘Cornișa’, ‘Cornibac’ and ‘Cornirom’ pollinated by honey-bees were compared with hand pollination.

For each hybrid, the parental male and female lines were placed in a 156 m² tunnel covered with polystyrene and textile nets for good isolation of pollination fauna. A honey bee colony with 4 frames and a queen was used in each tunnel for the V1 treatment.

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RESULTS AND DISCUSSION

The number of fruits/plant is significantly higher in the V1 treatment than in the V2 treatment for the three genotypes (Fig. 1). In the V1 treatment (pollination with honey bees), a higher number of seeds was harvested than in the V2 treatment (hand pollination) (Tab. 1). The number of seeds in fruit was 46.4% higher than the variant V2. The same situation was observed for the seed weight per fruit with 150% more seeds in V1 than in V2.

Table 1. Comparison of honeybees and hand pollination for hybrid seed production of three hybrid cultivars: ‘Cornirom’, ‘Cornibac’ and ‘Cornișa’

<table>
<thead>
<tr>
<th>Character</th>
<th>Honey bees</th>
<th>Hand pollination</th>
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<tbody>
<tr>
<td>‘Cornirom’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of seeds per fruit</td>
<td>227.2</td>
<td>155.2</td>
</tr>
<tr>
<td>Quantity of seeds/fruit (g)</td>
<td>7.5</td>
<td>5.0</td>
</tr>
<tr>
<td>‘Cornibac’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of seeds per fruit</td>
<td>258.9</td>
<td>124.8</td>
</tr>
<tr>
<td>Quantity of seeds/fruit (g)</td>
<td>8.5</td>
<td>4.2</td>
</tr>
<tr>
<td>‘Cornișa’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of seeds per fruit</td>
<td>256.3</td>
<td>119.9</td>
</tr>
<tr>
<td>Quantity of seeds/fruit (g)</td>
<td>9.1</td>
<td>4.3</td>
</tr>
</tbody>
</table>

Figure 1. Graphical representation of the number of fruits/plant for three genotypes: ‘Cornișa’, ‘Cornibac’, and ‘Cornirom’.
In Figure 1 is represented the variation registered for the number of fruits per plant. After the pollination of flowers with honey bees the number of fruits per plant was much higher than with hand pollination.

As shown in Table 1, the utilisation of honey bees in the process of pollination of cucumber is a much better method, the quantity of seeds per fruits being much higher than the variant in which the pollination was made by hand.

The data obtained in our experiments proved the superiority of the method with honey bee pollination, the dimension of fruits, the number of seeds, and the quantity of seeds per fruits being 214 % higher than the control.

CONCLUSIONS

The utilization of honey bees for the seed production of cucumber hybrids permitted a good fruit setting and ripening of the fruits per plant.

The number of seeds in fruit was 46.4 % higher than the control (hand pollination). The quantity of seeds per fruit was 150 % higher than hand pollination.

The obtained results show that the honey bee pollination is the best method for the hybrid seed production because the quantity of seed increases with 50 %.

The data obtained in our experiments proved the superiority of the method with honey bees pollination, the dimension of fruits, the number of seeds, the quantity of seeds per fruits being 214 % higher than the control.

Literature cited