BIOLOGICAL CONTROL OF RED RUST BANANA THRIPS: PRELIMINARY RESULTS IN THE LABORATORY

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INTRODUCTION
The indiscriminate use of pesticides of similar formulation has increased populations and damage by Chaetanapothrips signipennis (red rust banana thrips) due to resistance and resurgence. Damage was initially reported during the dry season between August and September, but right now, different degrees of severity are presented throughout the year (1). In Venezuela and Peru, the Orius insidiosus bug and the Frankliniaphris vespiformes and Neohydrotatrichs sp. thrips were reported as predators of thrips; and species of mites of the family Phytoseidae of the gender Amblyseius Phytoseius (3, 4). In Peru Isoria jumrosorosea was efficient in the laboratory and the field to control nymphs of Frankliniaphris parvula and C. signipennis (2). In Ecuador, preliminary studies are being carried out on the presence of predators and entomopathogenic microorganisms that effectively can control this pest.

OBJECTIVE
To evaluate the efficacy of two predators and entomopathogenic microorganisms for biological control of C. signipennis under laboratory conditions.

MATERIALS AND METHODS

Predatory capacity of Orius sp. and of A. swirskii on C. signipennis.
On pieces of dissected banana peels, different predator prey relationships were confined, in Petri dishes of 9.5 cm x 1.5 cm, with five individuals of red rust banana thrips in each state of development (Table 1), with 4 replicates per experimental unit. The design was completely at random (DCR) and the units were analyzed with Infostat. For seven days the number of individuals consumed by predators was recorded (Photo 1A, 1B and 1C).

Table 1. Predator-prey relationships mite and bug

<table>
<thead>
<tr>
<th>Orius sp.</th>
<th>Number of C. signipennis by Petri dish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>5 nymphs I; 5 nymphs II; 5 nymphs III; 5 prepupa; 5 pupa; 5 adults</td>
</tr>
<tr>
<td>Female</td>
<td>5 nymphs I; 5 nymphs II; 5 nymphs III; 5 prepupa; 5 pupa; 5 adults</td>
</tr>
<tr>
<td>Fifth nymphal state</td>
<td>5 nymphs I; 5 nymphs II; 5 nymphs III; 5 prepupa; 5 pupa; 5 adults</td>
</tr>
<tr>
<td>Fourth nymphal state</td>
<td>5 nymphs I; 5 nymphs II; 5 nymphs III; 5 prepupa; 5 pupa; 5 adults</td>
</tr>
<tr>
<td>Third nymphal state</td>
<td>5 nymphs I; 5 nymphs II; 5 nymphs III; 5 prepupa; 5 pupa; 5 adults</td>
</tr>
<tr>
<td>Absolute control group (without Orius sp.)</td>
<td>5 nymphs I; 5 nymphs II; 5 nymphs III; 5 prepupa; 5 pupa; 5 adults</td>
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</tbody>
</table>

A. swirskii

<table>
<thead>
<tr>
<th>Number of C. signipennis by Petri dish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Absolute control group (without mites )</td>
</tr>
</tbody>
</table>

Efficiency of entomopathogenic microorganisms on C. signipennis
5 couples of thrips were confined in sterilized plastic bags with young banana fingers per experimental unit, with 5 replicates for each treatment. The application of the following formulated products was performed: Beauveria bassiana, Bacillus thuringiensis, Beauveria bassiana + Metarrhizium anisopliae + Paecilomices lilacinus, Purpureocillium lilacinum, R. lilacinum nativo and Saccharopolyspora spinosa. Mortality of C. signipennis by these microorganisms was verified in culture media (Photo 2A, 2B and 2C).

RESULTS

Predatory capacity of Orius sp. on C. signipennis.
Figure 1 shows the predation percentages of Orius sp., on different development stages of C. signipennis (Photo 3).

Predatory capacity of A. swirskii on C. signipennis.
The mite A. swirski de predated eggs, prepupas, nymphs II and nymphs I of C. signipennis thrips (Figure 2 Photo 4).

Efficacy of entomopathogenic microorganism on C. signipennis
Figure 3 and Photo 3, show the mortality of adults of C. signipennis by the formulated products of entomopathogenic microorganisms.

CONCLUSIONS
- Female, male and nymphs V of Orius sp. consume between 60 % and 95 % of nymphs III, prepupae, pupae and adults of C. signipennis.
- A. swirski predate between 80 % and 95 % of nymphs I y nymphs II of C. signipennis.
- P. lilacinum and B. bassiana cause mortality of 96 % to 100 % and B. thuringiensis and S. spinosa 100 % of adults of C. signipennis.

REFERENCES

ACKNOWLEDGEMENTS
Koppert Biological Systems from the Netherlands for the provision of A. swirskii for the laboratory tests.