

MICROBIAL BIOINSECTICIDES AND THEIR EFFECTIVENESS IN CORN PEST CONTROL

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Abstract:

Microbial biopesticides are considered natural elements of biological nature often used to control pests in various agroecosystems. In the present work, we proposed to test some biopesticides to see if they are effective in controlling relevant pests in organically grown corn. Among the frequent pests as target organisms, we considered aphids, chrysomelid (leaf) beetles and lepidopteran larvae. It is known that chemical products cannot be applied in an organic system, that's why we focused on 2 biopesticides (B1-Spinosad and B2-Bactospeine) in use and available on the European market.

Introduction

To give a definition of biopesticides, we focused on the most complex and recent one. In this sense, KUMAR ET AL. (2021) mention that biopesticides are control agents composed of microorganisms (such as bacteria, cyanobacteria, microalgae, plant-based compounds) useful in keeping under control different pests in agroecosystems. Bio efficacy is different from pest to pest and depending on the biopesticide (microbial or based on plant extracts). The best results were obtained especially against aphids (ALAM ET AL., 2019).

Material and method

The test researches were carried out during 2022, between July and August, in an organic corn crop in the western part of Romania. The culture was managed by the company MDF Agro SRL, Arad County

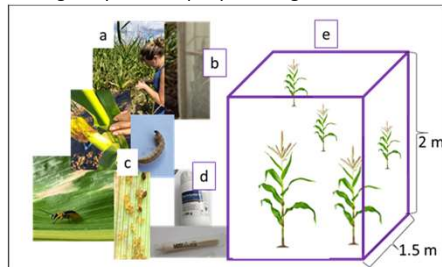


Fig. 1
Materials used in the study: a, the experimental field from which the insects were collected; b, field cage; c, targeted pests (chrysomelids, lepidopteran larvae, aphids); d, microbial biopesticides; e, field cage diagram

We used 3 field cages with 5 corn plants each, constituting 1 different dose (concentrations) for each product and 1 cage for the Control version. Observations on the effectiveness were made at intervals of 3, 5, 7, 9 and 11 days. The results expressed in live individuals (pests) and their mortality rate were interpreted statistically by comparisons between the treated variants and also with the Control variant.

Results and discussions

The efficiency expressed by the number of larvae (*Ostrinia n.*) alive, at different intervals, after the application of the biopesticide Spinosad shows that out of the total of 30 larvae, the most were in the B1D1 variant (at the lowest dose), and the fewest in the variant B1D3 (at the highest dose) (fig 2).

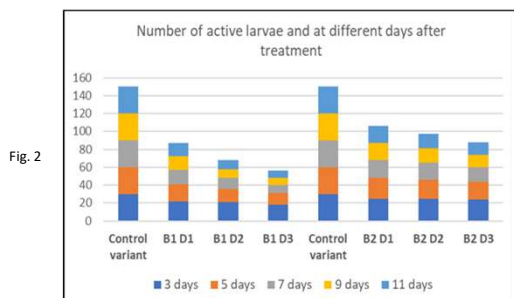


Fig. 2

The same trend was recorded after the application of the biological product B2.

Acknowledgement

We thank the company MDF Agro SRL from Sicula locality, Arad County who managed the corn culture and the person who made the field cages.

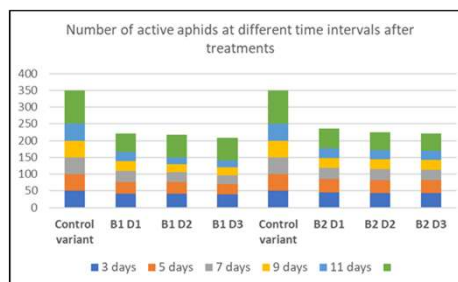


Fig. 3

In variant B1 (Spinosad), regardless of the dose used (D1, D2, D3) and the interval considered (even after 11 days), the number of beetles alive was high, 17-20 ad. Likewise in the version with B2 (Bactospeine), where the chrysomelids were even more (20-22 ad.) (fig. 3).

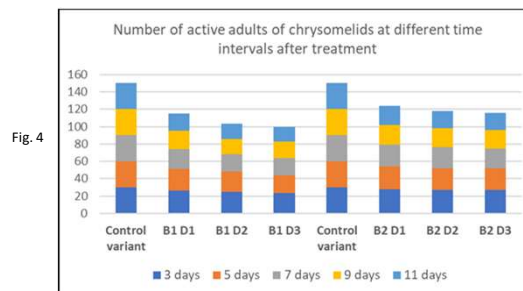


Fig. 4

The fewest active aphids (20-24) out of 50 initially introduced and treated with Spinosad, were observed at 9-11 days in the variants with higher doses (D2, D3) (fig. 4). In the variants with Bactospeine, at all doses, the situation was a little different, even after 11 days from the application, the number of active larvae did not drop below 50%, they being still at high values (26-27 aphids).

Conclusions

The effectiveness results obtained through the present observations show that both the treatment with bioinsecticide B1 (Spinosad) and B2 (Bactospeine) require higher doses to be effective. Biopesticide B1 proved more effective than bioinsecticide B2 because the mortality among pests was higher (approximately between 40-65%) while in B2 it was 31-45%. It is obvious that the ideal option is for bioinsecticide B1 to be included in the complex strategy to combat pests in the corn crop through 1-2 treatments using the highest dose.

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