




5 years of field investigations of an effect of biostimulants and microbiological insecticides on onion thrips (*Thrips tabaci* Lindeman, Thysanoptera, Thripidae)

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Abstract: The results of field experiments of environmentally friendly control of onion thrips on onion, leek and cabbage in the period 2016-2020 are presented. The number of registered synthetic insecticides for the control of onion thrips has drastically decreased in past years, and products based on spinosad, spirotetramate, entomopathogenic fungus *Beauveria bassiana* and orange oil are currently registered in Slovenia for this purpose. Due to the increasingly mild winters, higher spring and summer temperatures, which are pleasing to the onion thrips, there is a great need for new insecticidal substances to limit the economic importance of the pest. Since synthetic plant protection products are being replaced by biostimulants increasingly, and their impact on harmful organisms is insufficiently studied, the poster presents the results of several such experiments and give opinions on their suitability for replacing once much more widespread synthetic insecticides.

1 AIM

Testing the insecticidal efficacy of biostimulants and microbiological insecticides against onion thrips on onion, leek and cabbage, the most important hosts of the pest in Slovenia.

2 MATERIAL AND METHODS

The field experiments were performed at the Laboratory Field of Biotechnical Faculty in Ljubljana (46°04' N, 14°31' E, 299 m). In the field a variety of vegetables have been growing for more than 30 years, including onion, leek and cabbage, therefore onion thrips permanently occur in the area. Standard agricultural measures (black PE mulch, drip irrigation system etc.) were performed in the experiments, and evaluation the extent of injuries caused by onion thrips on the leaves was performed by standard (EPPO, Richter et al., 1999) or slightly modified evaluation scales (Stoner and Shelton, 1988). All statistical analyses (ANOVA, Student-Newman-Keuls multiple range test) were performed with Statgraphics XVI program (Statgraphics Centurion, 2009).

3 RESULTS AND DISCUSSION

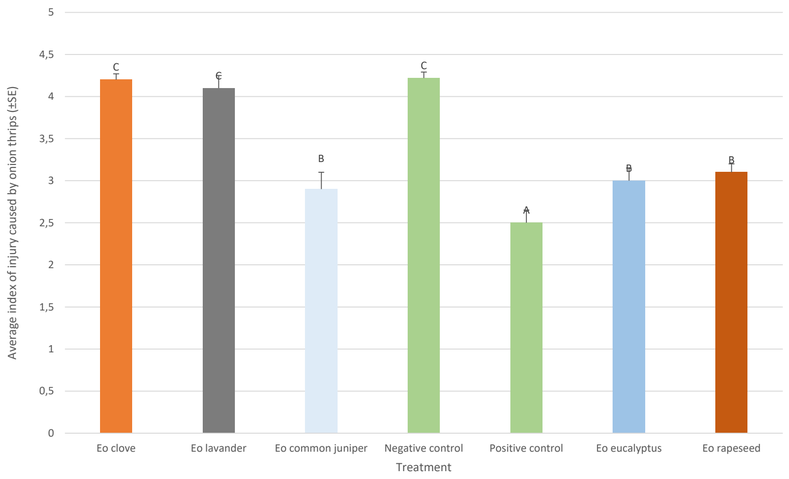

Figure 1: Average indices of injuries caused by onion thrips on leek in 2016. Products Mineral with selected essential oils have been tested against the pest.

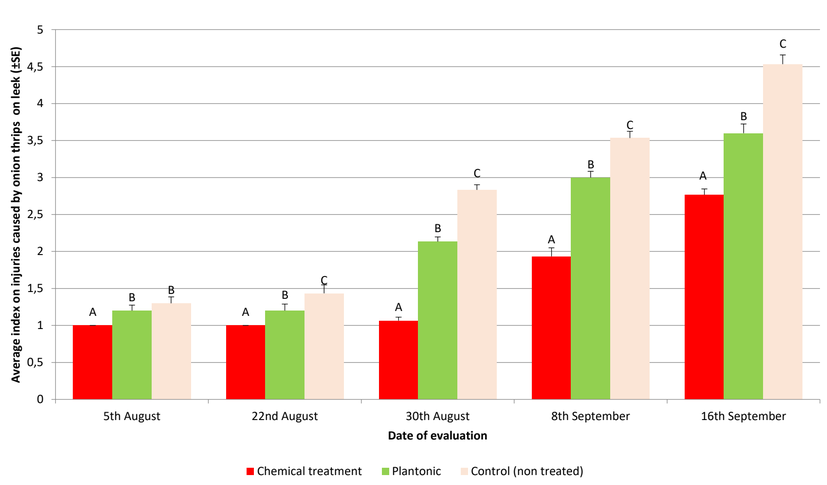

Figure 2: Average indices of injuries caused by onion thrips on leek in 2016. Product Plantonic has been used in comparison to lambda-cihalothrin.

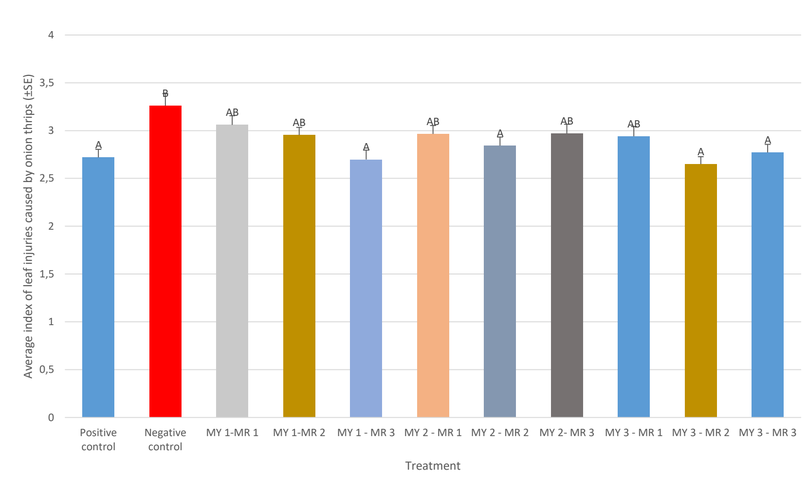

Figure 3: Average indices of injuries caused by onion thrips on onion in 2017. Mixtures of different products Mineral have been tested against the pest.

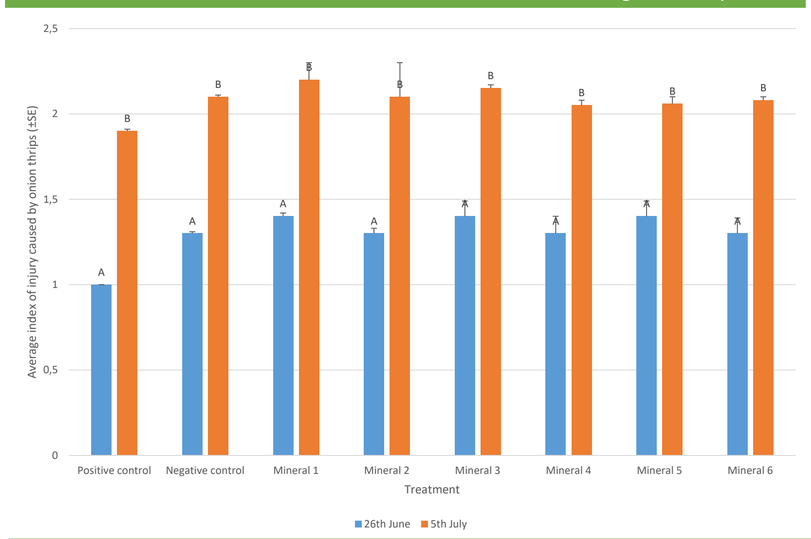

Figure 4: Average indices of injuries caused by onion thrips on onion in 2018. Different spraying programmes with products Mineral have been tested against the pest.

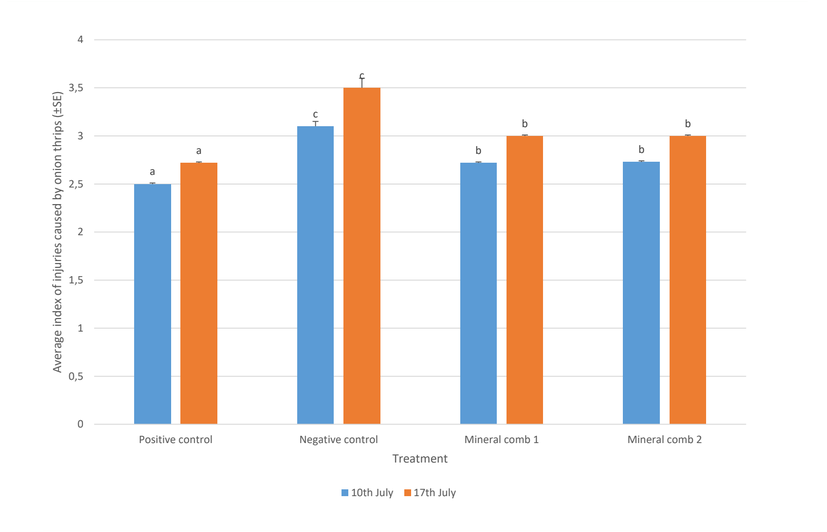

Figure 5: Average indices of injuries caused by onion thrips on onion in 2019. Two spraying programmes with products Mineral have been tested against the pest.

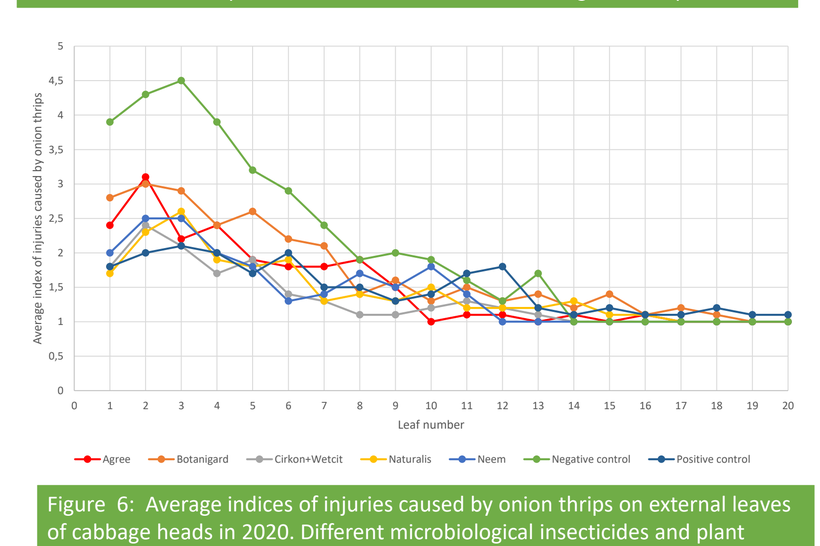

Figure 6: Average indices of injuries caused by onion thrips on external leaves of cabbage heads in 2020. Different microbiological insecticides and plant extracts have been tested against the pest.

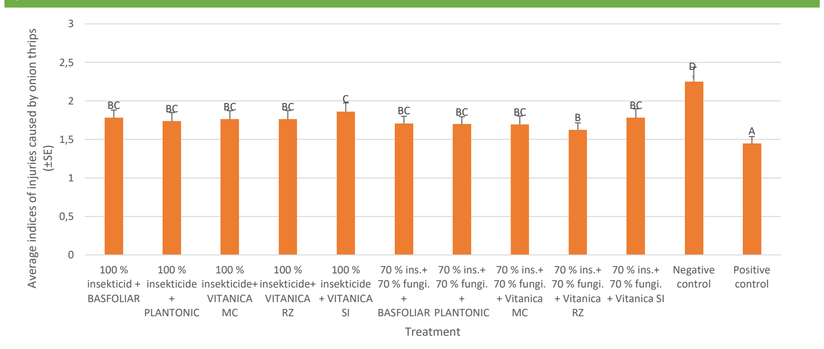

Figure 7: Average indices of injuries caused by onion thrips on onion in 2019. Different spraying programmes with biostimulants and synthetical phytopharmacautical products have been tested against the pest.

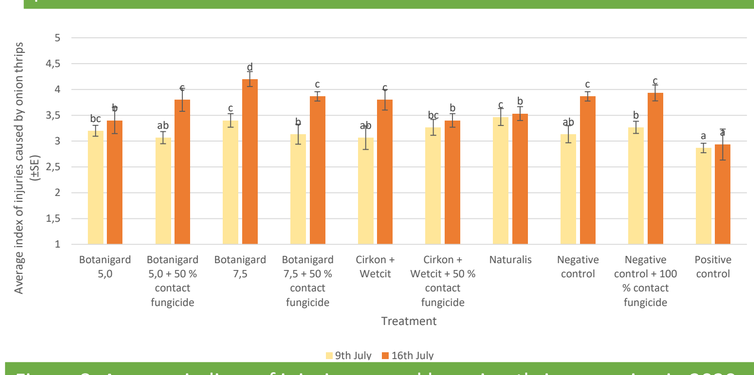

Figure 8: Average indices of injuries caused by onion thrips on onion in 2020. Different spraying programmes (insecticides x fungicides) have been tested against the pest.

Table 1: Tested environmentally friendly products for controlling onion thrips in our investigations in the period 2016-2020 with corresponding yield indices as comparison between treatments with tested substances and both controls.

Year	Plant species	Testing non chemical products	Positive control	Yield index (non chemical products / positive control)	Yield index (non chemical products / negative control)
2016	leek	Minerals (leaf fertilizer with expected action as plant strengthener and/or inducer of plant resistance*) & essential oils	Lambda-cihalothrin (2x)	0,99-1,14	1-1,17
	onion	Minerals* & essential oils	Lambda-cihalothrin (3x)	0,87-1,08	-
	leek	Plantonic (product for strengthening and raising the resistance of plants)	Lambda-cihalothrin (2x)	0,96	1,10
2017	onion	Minerals*	Lambda-cihalothrin (2x) + spinosad (2x)	0,89-1,10	1,00-1,23
2018	onion	Minerals*	Lambda-cihalothrin	1,03-1,20	1,03-1,20
2019	onion	Minerals*	Lambda-cihalothrin (2x)	1,16-1,25	1,28-1,38
	onion	Biostimulants	Lambda-cihalothrin	-	-
2020	onion	Entomopathogenic fungi & bacteria, plant insecticides	Spinosad	0,79-1,22	0,88-1,35
	cabbage	Entomopathogenic fungi and bacteria, plant insecticides	Spinosad	0,50-1,18	0,42-1,07

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4 CONCLUSIONS Products Mineral, biostimulants and products for strengthening plants and increasing their resistance have in most cases not proved to be suitable substitutes for PPPs, however in most cases they have shown a satisfactory effect on higher yield. All microbiological control agents and plant insecticides, with a large number of sprays on cabbage, resulted in a lower extent of damage due to onion thrips.