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EFFICACY OF EGG-PARASITIC WASPS (TRICHOPLUS CAPSELS) IN THE INSECT PEST CONTROL OF SWEET CORN

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Abstract: *Pest management is one of the biggest challenges in the plant protection of sweet corn cultivation. Chemical insecticides control is the most widespread, but the demand for the use of the biological method is increasing. The aim of the present work is to compare the effectiveness of the conventional chemical method and the biological control by egg-parasitic wasps, Trichogramma pintoi, T. evascens (Trichoplus capsules) under operating conditions. The research was carried out in the growing season of 2019 and 2020 in the area of Csárdaszállás-Gyomaendrőd settlements (SE Hungary).*

• Introduction

A number of control options are known for the two main pests and damage of sweet corn. The simplest and cheapest one is the agrotechnical protection. In this case, the removal of corn stalk residues from the field and clean plowing means perfect underrotation. Agrotechnical control includes appropriate stocking density, optimal sowing time, and NPK supply (Keszthelyi, et al., 2003). We can reduce the number of pests in an environmentally friendly way with biological control. It can be achieved by using insect parasites (Trichogramma egg-eating species can be used), episites, entomopathogenic bacteria and fungi (Keszthelyi, et al., 2003). The majority of large agricultural farms use synthetic (chemical protection) pesticides (insecticides) during production. The introduction of organic farming and the avoidance of the use of synthetic plant protection products in the environment are crucial to mitigating the harmful effects. Organic farming is the least yield-oriented of the farming methods. The focus of its approach is the use of natural materials (Diver, et al., 2008).

• Material and method

The study areas are located in the south-eastern part of Hungary in Békés county, near to settlements Csárdaszállás and Gyomaendrőd.

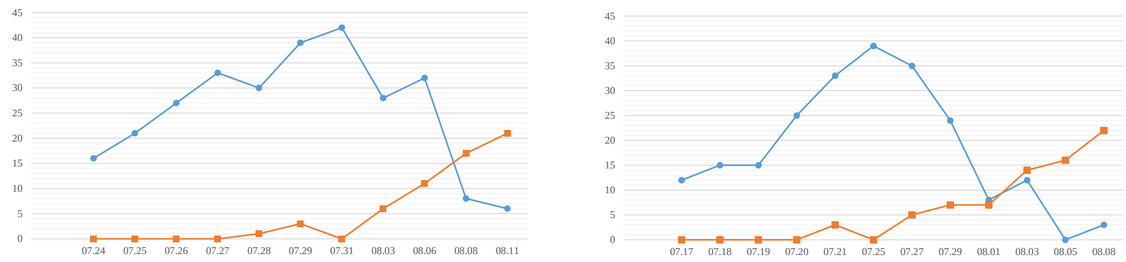
Figure 1. Geographical location of the experiment sites

In order to ensure the homogeneity of the sampling, 1-1 board was randomly selected from the entire area. In the following year, other boards were selected for the purpose of investigation. The boards were selected while excluding the edge effect. The signs were located at least 50 meters from the edge of the production area. Sampling was done from 5 plots within a field, for both treatments. The size of a parcel consisted of 5 rows, the length of which was 13.3 meters, which corresponded to 5 m2. We determined the rate of damage from the number of damaged cobs and all cobs. The data were analyzed using SPSS generalized linear model (GLM) one-factor random block design ANOVA.

• Results and discussions

On 17 July, 2019, we placed the sex pheromone trap and the bisex traps near the ecologically treated field (FIGURE, 2). The trap caught a large number of corn earworm *(Helicoverpa*) already on the day of placement. The catch data increased significantly in the following days.

Figure 2. The number of Helicoverpa males and Ostrinia in 2019 and 2020, Csárdaszállás



The statistical evaluation of our test results shows that the treatment has a significant effect on the degree of damage $F(1,93)=5,11$; $p<0.05$, years and plots have no significant effect. Looking at the breakdown of the years, we also find that the effect of the treatments is significant. In the examined years, however, we can experience different degrees of damage, in 2019 the damage is smaller than in 2020 ($p<0,001$).

Table 2. Average and standard deviation of the degree of damage in the breakdown of the examined years (from SPSS)

Rate of damage				
Year	Production	Average	Standard deviation	Plot number
2019	Conventional	0,0717	0,04200	25
	Ecological	0,0951	0,03108	25
2020	Conventional	0,2231	0,06866	25
	Ecological	0,1470	0,05720	25

• Conclusions

The results of the two-year tests found conventional plant protection intervention to be the most effective treatment in 2019. At that time, the technology intervention was carried out properly. When the interventions were not regular (in 2020, the second spraying was missed), the highest damage rate was obtained. In 2019, the organic treatment was more effective than the conventional treatment. In this year, the organic treatment produced similar results to the most effective conventional treatment. In a two-year comparison of the ecological treatment, they showed almost the same effectiveness with each other and with the most effective conventional treatment. The minimal difference between the organic treatment of the two years can be explained by the one-week delay in sowing the second year.