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MONITORING AND CONTROL OF ADULTS AND LARVAE OF THE WESTERN CORN ROOTWORM

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Abstract: *About 27 years ago, the species with invasive status (at that time) called the western corn rootworm (Diabrotica virgifera virgifera Le Conte) (Insecta: Coleoptera: Chrysomelidae) was reported in the corn crops in western Romania. However, the studies have stopped, but the pest continues to cause damage to corn crops (a plant useful for human food and as a basis for feeding various farmed animals). That is why we proposed to update the situation of monitoring the populations and the damages produced in Timis county by analyzing some crops with corn hybrids from different categories of maturity by installing sticky yellow traps and direct observations*

Introduction

- Both the adults and the larvae of this species are harmful, the adults attack the aerial parts of the plant (leaves, panicle, silk and grains) and the larvae cause damage in the soil environment, more exactly in the roots (Moeser and Hibbard, 2005). With the present ones, we have proposed to update the monitoring data of the Diabrotica species from 2 counties in the west of the country and to see what is the current status of the species and the attractiveness of corn hybrids because many farmers have noticed their diverse presence.

Material and method

- ✓ The study sites were diverse, in 3 localities (Şag, Jimbolia, Sântana) from 2 western counties of Romania (Timis and Arad). Thus, we chose for analysis about 6 hybrids by the same producer KWS (KWS, 2024) from the category: semi-early, semi-late and late, according to the FAO maturity categories.
- ✓ To evaluate the size of the adult populations of Diabrotica virgifera, we chose colored (yellow) sticky trap (panel type), which has a dual role in attracting and capturing both forms (females and males) and pheromone traps (Toth, 2005).
- ✓ Two traps (1 with sexual pheromone and 1 without pheromone) were installed in each crop, between July and October.
- ✓ In order to evaluate the damage produced by the larvae, we pulled out those plants with goose neck symptoms and analyzed them to the roots.

Results and discussions

- ❑ The monitoring results of Diabrotica adults expressed by trap catches in different maize hybrids or showed different values. Thus, the bimonthly observations revealed a maximum of the flight curve with the same trend for all hybrids, i.e. in the first decade of August. The most catches were at KWS Banato (405 adults) and the least at KWS Oltenio (145 adults).
- ❑ The late hybrids had 2 flight curve maxima, by comparison, the early hybrids had 1 single peak in the first decade of August (Fig. 1).

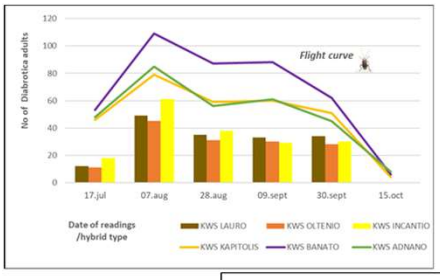


Fig. 1
Flight curve of Diabrotica virgifera adults based on total catches from July to October, 2022, in the 6 plots with different corn hybrids

- ❑ The pheromonal traps attracted and captured almost double the number of Diabrotica adults (241.5) compared to the colored ones (138) (Fig.2).

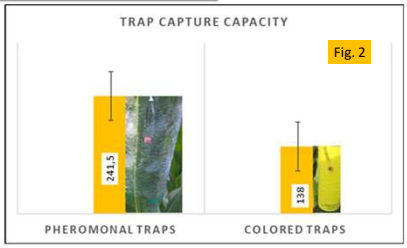


Fig. 2

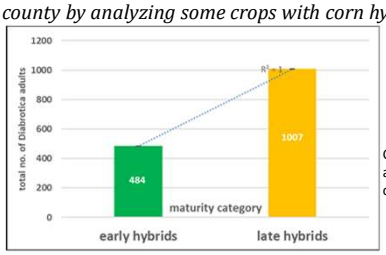


Fig. 3
Catches of Diabrotica adults according to maturity category of hybrids

- ❑ Comparing the catches by maturity category of the hybrids, it was observed that in the 3 early hybrids the values were lower in contrast to the 3 late hybrids with a difference of almost 2.5 times (Fig. 3). Thus, at KWS Lauro there were 163, at KWS Oltenio-145, at KWS Incantio-176, at KWS Kapitolis-299, at KWS Banato-405 and at KWS Adnano-303.

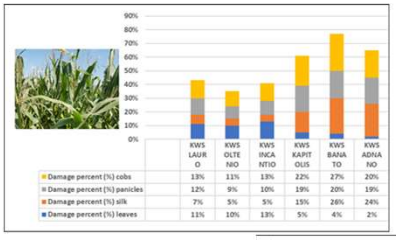
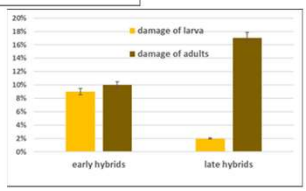


Fig.4
Catches of Diabrotica adults according to maturity category of hybrids

Fig.5
The damage produced by adults in the 6 hybrids depending on the relevant phenophase



- ❑ The damage produced by adults and larvae in differed depending on the maturity category. In early-hybrids, adult damage was lower and concentrated on leaves (10-13%), while in semi-late and late hybrids it was higher and concentrated on silk, panicle and cobs (15-27%) (Fig. 4).
- ❑ Comparing the damage of adults and larvae by maturity categories of corn hybrids, we found that in early hybrids, throughout the study period (2022-2023), damage to larvae was higher than in late hybrids (respectively 9% and 2%) and in adults was the opposite, higher in the late and semi-late than in the semi-early hybrids (respectively 17% compared to 10%) (Fig 5).

Fig. 4

Conclusions

From the results we can conclude that the catches of Diabrotica vary quantitatively depending on the maturity category of the hybrid, the phenophase and the type of trap. Thus, the late hybrids attracted more catches of adults than the early ones. Also, more adults were captured in the first decade of August and especially in the later ones at the appearance of the cob, the silk and the panicle. Pheromonal traps were more attractive and effective than non-pheromonal ones. Regarding the damage, the larvae attack the semi-early hybrids more than the later ones, and the adults did the opposite. Traps used in monitoring can also have the role of controlling adults in an ecological and inexpensive way.

Acknowledgement

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