THE IMPACT OF THE SOWING TIME ON THE EUROPEAN CORN BORER (*OSTRINIA NUBILALIS* HUBNER) ATTACK IN SOME ROMANIAN HYBRIDS

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INTRODUCTION

European corn borer (*Ostrinia nubilalis* Hbn.) is the most representative maize pest for the conditions of the Transylvanian Plateau. It is the most important pest following the tassel emergence (Roşca and Rada, 2011), attacking all the aerial organs of the maize plant (Tărău et al., 2023). The damage is caused by mature larvae which are tunneling in stalks, tassels and ears (Franeta et al., 2019). The attack on stalks affects plant development causing their breakage and, implicitly, the decrease in maize yield (Trotuş et al., 2018). The attack on ears (Figure 1) favors the installation of pathogens (Magagnoli et al., 2021), which depreciates the quality of kernels.

The reaction of maize hybrids to European corn borer (ECB) attack can be influenced by several factors, including the time of sowing. Certain maze hybrids show variable susceptibility to this pest. The aim of this study was to (i) evaluate the influence of sowing time of maize on the incidence of natural attack of ECB larvae on the ear (ii) determine the reaction of hybrids from different FAO maturity groups regarding the natural attack on ear of this pest.

Figure 1. Attack of ECB larvae on ear (original)

MATERIAL AND METHODS

In order to evaluate the influence of sowing time and climatic conditions on some maize hybrids in terms of ECB incidence, an experiment was conducted at Agricultural Research and Development Station (ARDS) Turda. The biological material consisted of 12 maize hybrids created at ARDS Turda (Turda 248, Turda 165, Turda 201, Turda Star, Turda 332, Turda 344, Turda 335, Turda 2020, Turda 380, HST 148, HST 149, Sur 18/399).

Observations and determinations on the natural attack of the ECB larvae on ear were carried out during the period 2021-2023. The incidence of ECB was assessed on 25 randomly sampled ears from each plot, in 3 replications. This parameter was calculated as the percentage of ears per plot with injury and kernel damage or tunnels in the ear due to larvae activity .

The obtained data were presented using the cluster analysis processed in Past4 statistical program.

RESULTS AND DISCUSSIONS

Table 1

The thermal and pluviometric regime, ARDS Turda 2021-2023

Month	Temperature (°C)				Rainfall (mm)			
	Monthly average	Average/ 65 years	Deviation	Characterization	Monthly amount	Average/ 65 years	Deviation	Characterization
2021								
May	14.1	15.0	-0.9	normal	80.8	68.7	12.1	little rainy
June	19.8	17.9	**1.9**	warmly	45.0	84.8	**-39.8**	very dry
July	22.7	19.7	**3.0**	warm	123.1	77.1	46.0	rainy
August	19.7	19.3	0.4	normal	52.9	56.5	-3.6	normal
2022								
May	16.3	15.0	**1.3**	warmly	82.9	69.4	13.5	little rainy
June	21.1	18.0	**3.1**	warm	41.8	84.6	**-42.8**	very dry
July	23.1	19.8	**3.3**	warm	25.2	78.0	**-52.8**	very dry
August	22.3	19.5	**2.8**	warm	94.6	56.1	**38.5**	very rainy
2023								
May	15.4	15.0	0.4	normal	33.2	69.4	**-36.2**	very dry
June	19.0	18.0	**1.0**	warmly	144.5	84.6	**59.9**	very rainy
July	21.8	19.8	**2.0**	warm	85.8	78.0	7.8	normal
August	22.1	19.5	**2.6**	warm	98.5	56.1	**42.4**	very rainy

Source of primary data: Turda meteorological station (longitude: 23 ° 4´; latitude: 46 ° 35´; altitude: 427m)

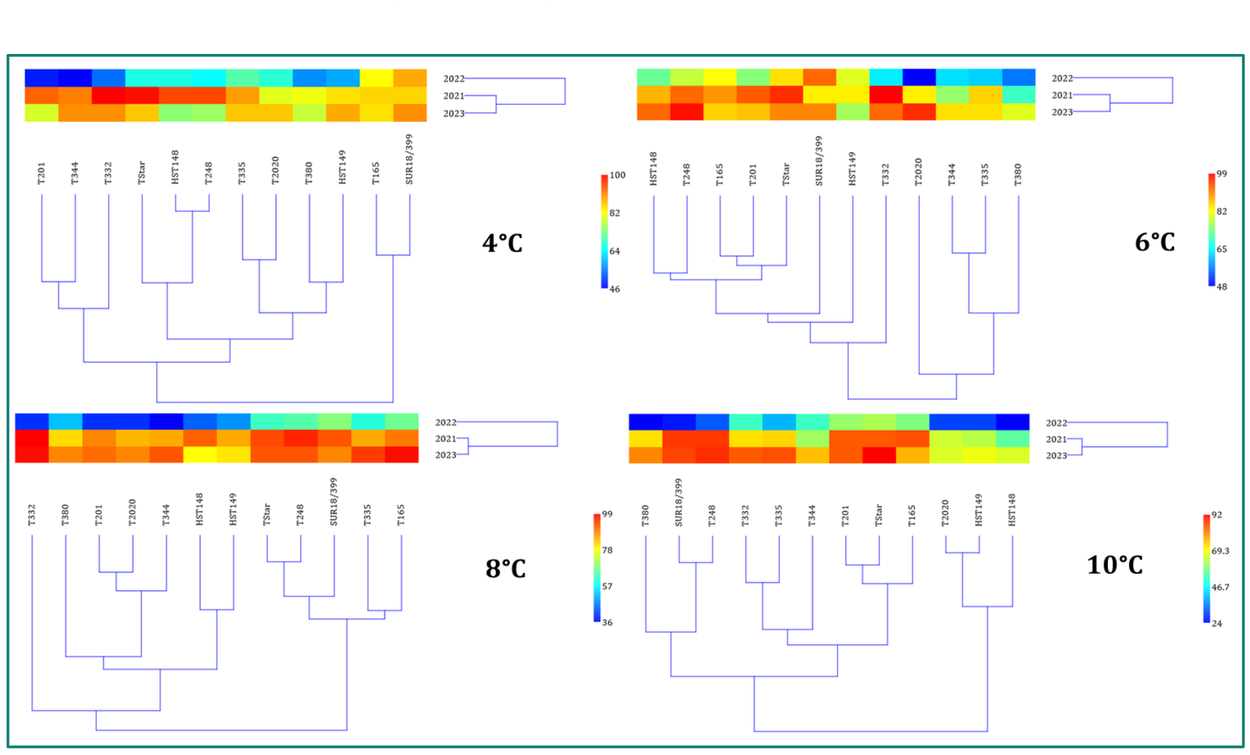

Figure 2. Incidence of ECB larvae on ear depending on climatic conditions, sowing time and hybrid, Turda 2021-2023

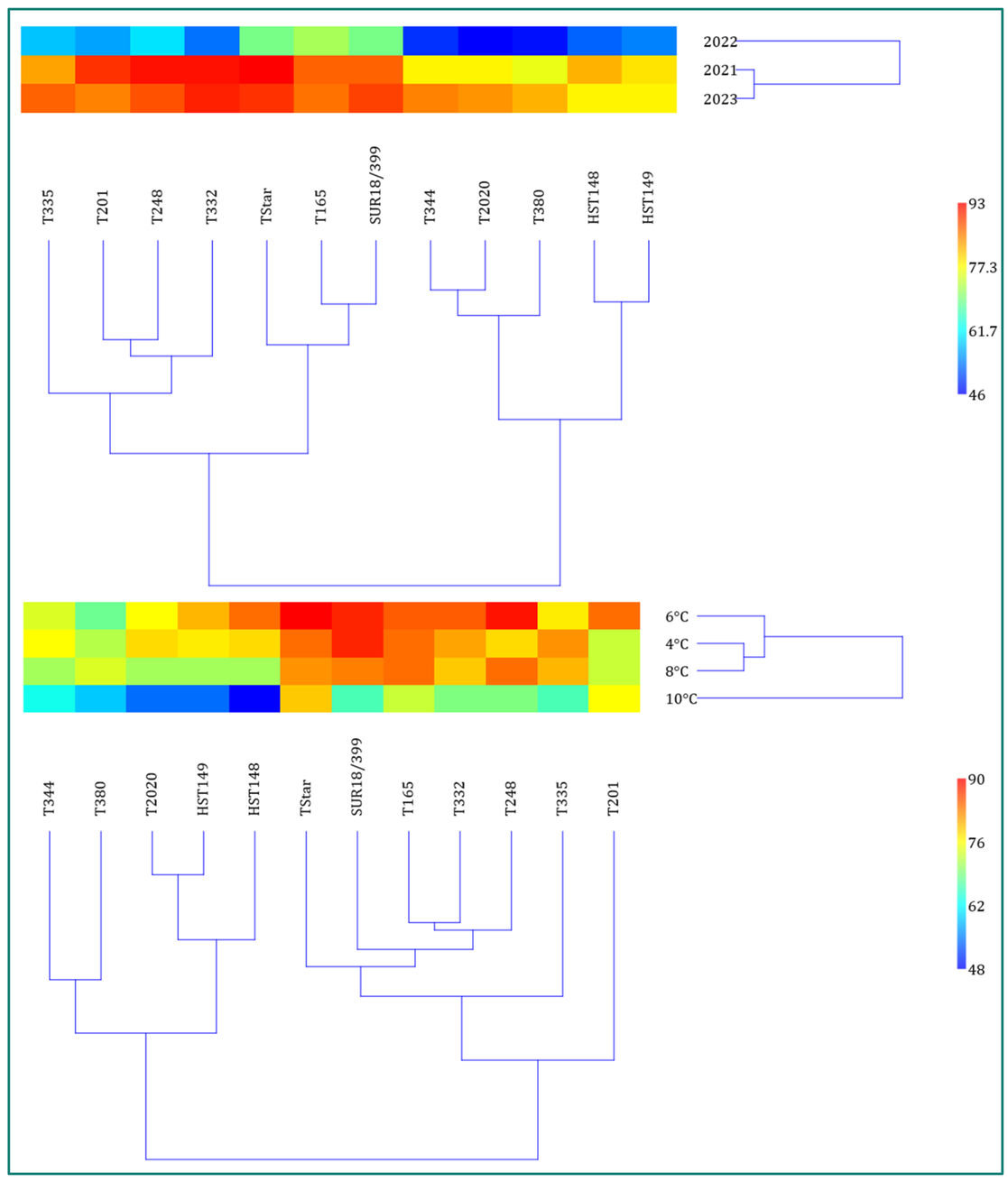

Figure 3. The influence of climatic conditions or sowing time on the incidence of ECB larvae on ear for each hybrid, Turda 2021-2023

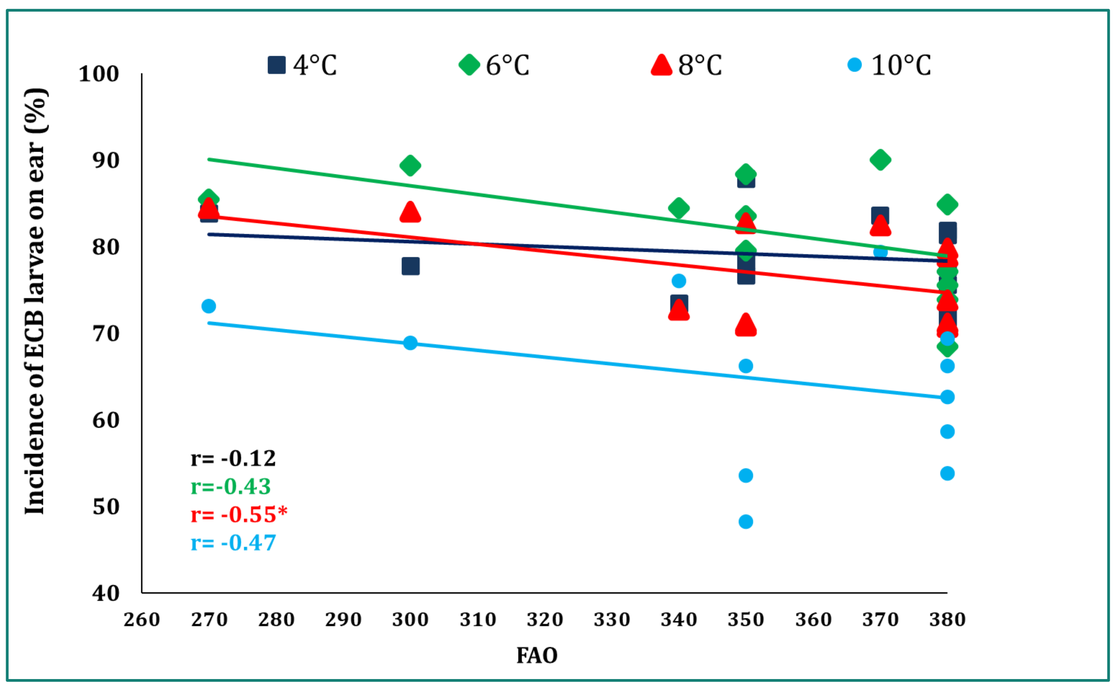

Figure 4. The relationship between the maturity group of the hybrid and the incidence of ECB larvae on ear, Turda 2021-2023

CONCLUSIONS

- ✓ The timing of sowing influences the susceptibility of maize hybrids to the attack of ECB. When maize was sown at 10°C, a decrease in natural attack of ECB larvae on ear was observed.
- ✓ While Turda 248, Turda 165, Turda Star and Sur 18/399 hybrids were the most susceptible to ECB attack on ear, a good tolerance for Turda 380, Turda 2020, HST 149 and HST 148 was observed.
- ✓ There is a negative relationship between the FAO group and the incidence of ECB larvae on ears. The percentage of damaged ears was higher in early hybrids compared to semi-early ones.
- ✓ Even if the use of hybrids tolerant to ECB attack is important, some agricultural practices such as sowing time can be significantly reduce the damage caused by this pest
- ✓ The results of the study provide essential information for the optimization of agricultural practices and effective management of ECB, in order to maximize maize yield.

Selective bibliography

1. FRANETA F., S. MIKIĆ, Ž. MILOVAC, B. MITROVIĆ, D. INĐIĆ, S. VUKOVIĆ, 2019. Maize defence mechanisms against the European corn borer, *Ostrinia nubilalis* Hübner (Lepidoptera: *Crambidae*). International journal of pest management, 65(1), 23-32;
2. MAGAGNOLI S., A. LANZONI, A. MASETTI, L. DEPALO, M. ALBERTINI, R. FERRARI, ..., G. BURGIO, 2021. Sustainability of strategies for *Ostrinia nubilalis* management in Northern Italy: Potential impact on beneficial arthropods and aflatoxin contamination in years with different meteorological conditions. Crop Protection, 142, 105529;
3. ROŞCA I., I. RADA, 2011. Dăunătorii culturilor de porumb şi sorg. Tratat de entomologie generală şi specială, Editura Alpha MDN, ISBN 978-973-139-207-3, 379-388;
4. TĂRĂU A. D., L. ŞOPTEREAN, A. M. VĂLEAN, L. SUCIU, F. RUSSU, A. VARGA, I. CRIŞAN, C. POPA, 2024. Behavior of Some Maize Hybrids to the Attack of the European Corn Borer (*Ostrinia nubilalis* Hbn.) and Fusarium Ear Rot (*Fusarium* sp.). Romanian Agricultural Research, 41, 33-45;
5. TROTUŞ, E., A.A. BUBURUZ, P.L. URSACHE, 2018. New data regarding the appearance, evolution and the attack produced by *Ostrinia nubilalis* Hbn. species, at maize crop, under the Center of Moldavia conditions. Rom. Agri. Res., 35: 229-236. WITZGALL P., P. KIRSCH, A.CORK, 2010, Sex pheromones and their impact on pest management, Journal of Chemical Ecology, 36, 1, 80-100.