

## **OBSERVATION OF THE ATTACK CAUSED BY THE LARVAE OF *DIABROTICA VIRGIFERA VIRGIFERA*, UNDER THE DIFFERENT TILLAGE IN CORN CROPS OF NEAMȚ COUNTY, UNDER CONDITIONS OF 2020**

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### **ABSTRACT**

In the current context, of banning neonicotinoids treatments, tillage systems and crop rotation are very important rings in controlling larval attack. The samples were collected in the corn crop from Ghigoiesti stationary, Neamț County.

The period of observation, harvest samples was carried out between May and August 2020, by taking over biological material represented by corn roots, that have been brought into the laboratory for examination and processing the data obtained. From the collected biological material, the *Diabrotica virgifera virgifera* specimens that have been determined and centralized have been retained.

The material was harvested on the three variants represented by no tillage (V1), minimum tillage (V2) and conventional tillage (V3). All three variants are planting in soil treatment with Force G 1.5.

Following the collection of samples and after analyses, during the period of observation, were had collected a number of 1239 specimens of larvae of *Diabrotica virgifera virgifera*. And after centralization at variant 1 we totaled 457 specimens, at variant 2 we totaled 418 specimens and at variant 3 we totaled 364 specimens.

### **INTRODUCTION**

The Western Corn Rootworm (*Diabrotica virgifera virgifera*, La Conte) became, in the last period, one of the most important pest in Romania, with very large economic losses.

Throughout the territory, economically referred damages are produced by both larvae and adult attack, especially under maize monoculture are registered. Assessing potential of different prevention and control methods reveals the importance of certain crop management measures, as crop rotation, chemical control and genetically modified cultivars (MON).

Since the signaling of its appearance, in Romania as in Europe, numerous works have been published have highlighted the great harmful danger of the species, signaling to the farmers the production losses caused in the corn crops, especially in monoculture.

From the information collected more than a third are cultivated in monoculture for one, two or even three years. A common practice in most farms due to the profitability of corn cultivation. The stationary Ghigoiesti, located in Neamț County, the N-East of Romania, had this year about 40 thousand hectares, according to Neamț Agricultural Division. Because of all this reason *Diabrotica virgifera virgifera*, has a very rapid spread in almost counties from Moldova.

In the Neamț County, first alert of the adult was in 2010 in hybridization fields, and intervention during the vegetation whit foliar insecticide, kept below the economic threshold of harm. After his move made the corn scales, commercial crops, and at this moment it is most important pest in the region.

## MATERIAL AND METHOD

The observations were made between May and August, 2020, in a corn crop situated in Ghigoiesti, Neamt County, and the stationary experience consisted of three variants with six repetitions. The presented data in the work have been collected, processed and analyzed.

For establishment the experience we used two hybrids of Dekalb, by Bayer, DKC3969 and DKC4670, of different maturity, early and mid-early.

The precursor plant are corn in the monocultura for three years. Planting time are 19.04.2019.

Variant 1: no tillage work system and soil treatment with granulated insecticide FORCE G 1.5

Hybrid DKC 3969, 89 RM and hybrid DKC 4670, 96 RM.

Monoculture 3 years; The used seed is untreated with insecticide in the conventional soil work system.

The sowing was done directly, without tillage, in the corn stubble, and insecticide was distributed by microgranulator from seed drill.

We applied 2 treatments during the vegetation period with CALYPSO 480 SC, the active ingredient, Thiacloprid 480g/L (Bayer) at a dose of 150 ml/ha, every application.

Variant 2: minim tillage work system and ground treatment with granulated insecticide FORCE G 1.5

Hybrid DKC 3969, 89 RM and hybrid DKC 4670, 96 RM.

We performed at planting time, after minimum tillage, at 15 cm, and ground treatment, with granulated insecticide FORCE G 1.5, active ingredient, Tefluthrin 1.5%, at a dose of 15 kg ha, with Microgranulator, by seed drill.

## RESULTS AND DISCUSSIONS

During the experience we collected a total of 1239 larvae of the *Diabrotica virgifera virgifera* pest, on the three experimental variants.

We applied 2 treatments during the vegetation period with CALYPSO 480 SC, the active ingredient, Thiacloprid 480g/L (Bayer) at a dose of 150 ml/ha, every application.

Variant 3: conventional tillage and soil treatment with granulated insecticide FORCE G 1.5

The hybrid DKC 3969, 89 RM and hybrid DKC 4670, 96 RM.

During the vegetation period, we applied 2 treatment with CALYPSO 480 SC, the active ingredient Thiacloprid 480g/L (Bayer) in Dose of 150 ml/ha, every application.

The spring was very cold, and the corn emerge occurred on

The dawn of plants occurred on 14-15 May. For harvesting of the material was examined the root system in order to determine the frequency and intensity of the attack produced by the larvae, and for adults we used the yellow pheromonal traps (Wita Trap.).

At each rehearsal a number of 10 roots were extracted, with a volume of soil up to a depth of 15 cm. Subsequently, the earth was carefully removed, collecting on gauze, and the process continued by examining with the binocular magnifier and counting the larvae present on the roots. Every rehearsal has accumulated the number of larvae identified on each root.

Observations and collections were made periodically at intervals ranging between 10 and 25 days .

With each observation noting the:

-the date when the determination was made;

-Number of identified larvae; The result obtained on the 10 roots resulted in a repetition (from R1 to R6)

-experimental variant.

The situation of collection by variants is the following: Variant 1, a number of 457 (table1) variant 2, a number of 418 (table 2) variant 3, a number of 364 (table 3).

The highest number of larvae was collected from variant 1, where are the no tillage work system, namely 457. Variant 2, where we used superficial soil preparation, named minimum tillage, the total number of larvae was 418 larvae, and in variant number 3, where we used conventional tillage, we registered a number of 364 larvae, during all vegetation period.

After analyses, even if the insecticide was present in the ground, all

### CONCLUSIONS

1. After this observations made on the *Diabrotica virgifera virgifera* species the most critical period with the large damage produced by larvae in in June, in all variants. the period coincides with the

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three variants have had a number consistent presents of larvae. Compared to the no tillage system from variant 1 and last one, with conventional tillage, the number of larvae decreases. And comparing with last year, when spring was had warm and wet, the larvae mortality increase in drought and dry soil.

Monoculture favored the development of a large number of larvae.

pre-flowering period, when the corn needs the most water. reducing the volume of roots leads to very high production losses.

2. The high density of larvae has been registered to first variant represented by no tillage.

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*Table 1*

**Situation and frequency of attack larvae of *Diabrotica virgifera virgifera* in the variant of no tillage**

VARIANT 1 - NO TILLAGE – GRANULAR INSECTICIDE							TOTAL	No. of larvae /PL
MONTH	R1	R2	R3	R4	R5	R6		
MAY	1	3	4	3	1	3	15	0.25
JUNE	45	35	34	43	38	36	231	3.85
JULY	34	23	33	37	38	28	193	3.22
AUGUST	11	1	1	0	2	3	18	0.30
TOTAL	91	62	72	83	79	70	457	7.62

*Table 2*

**Situation and frequency of attack larvae of *Diabrotica virgifera virgifera* in the variant of minimum tillage**

VARIANT 2 – MINIMUM TILLAGE – GRANULAR INSECTICIDE							TOTAL	No. of larvae /PL
MONTH	R1	R2	R3	R4	R5	R6		
MAY	2	2	1	2	0	2	9	0.15
JUNE	40	34	36	37	32	36	215	3.58
JULY	16	22	29	36	27	35	165	2.75
AUGUST	9	7	3	0	4	6	29	0.48
TOTAL	67	65	69	75	63	79	418	6.97

*Table 3*

**Situation and frequency of attack larvae of *Diabrotica virgifera virgifera* in the variant of conventional tillage**

VARIANT 3 - CONVENTIONAL TILAGE							TOTAL	No. of larvae /PL
MONTH	R1	R2	R3	R4	R5	R6		
MAY	0	0	1	2	2	1	6	0.10
JUNE	26	24	22	30	32	31	165	2.75
JULY	15	13	29	36	38	35	166	2.77
AUGUST	4	3	0	8	4	8	27	0.45
TOTAL	45	40	52	76	76	75	364	6.07

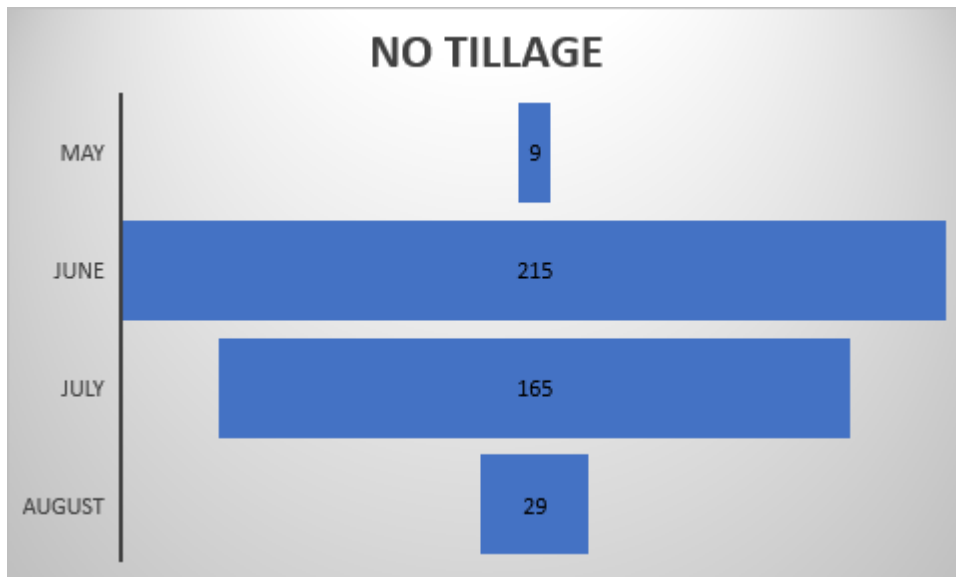


Fig. 1. Situation of collections in variant no.1 – No tillage work system

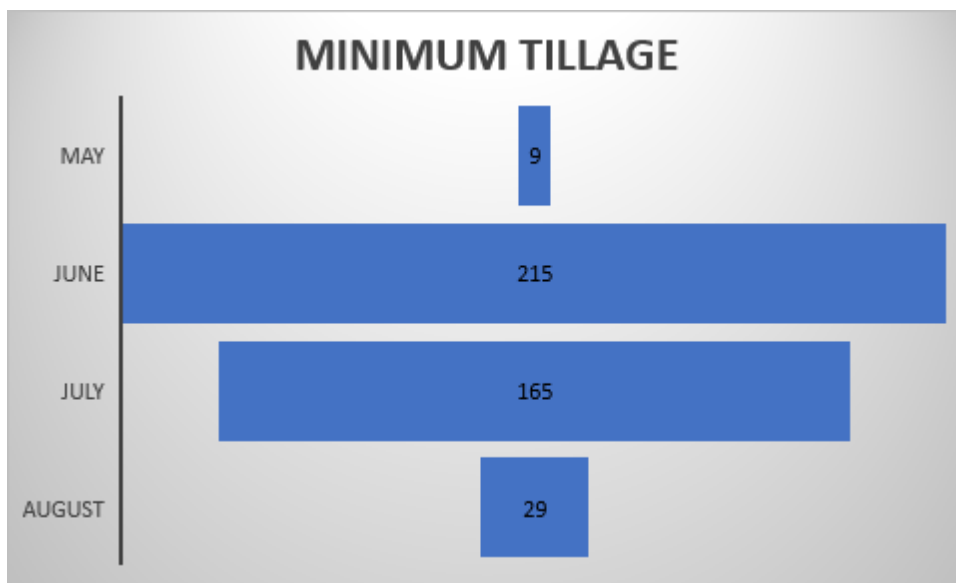


Fig. 2. Situation of collections in variant 2 – Minimum tillage work system

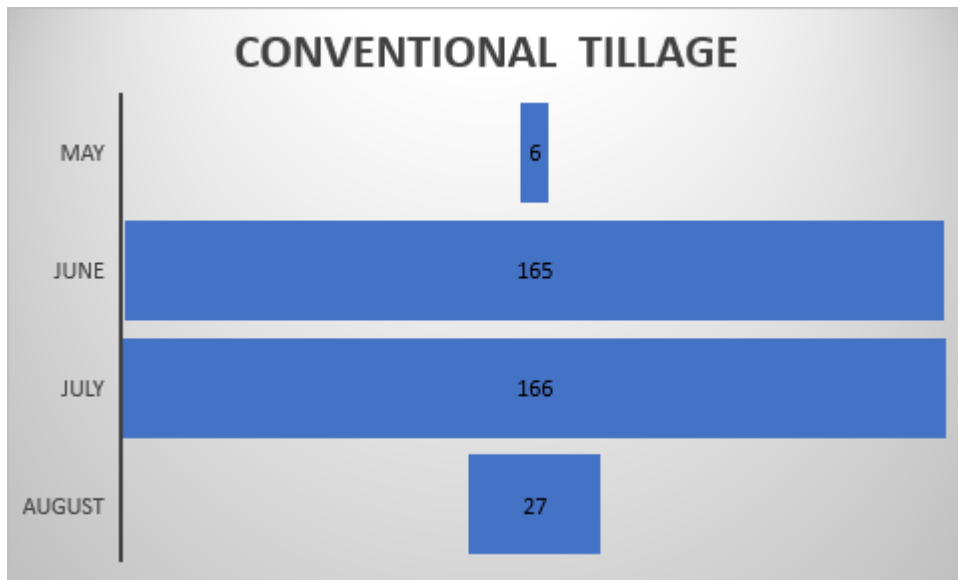


Fig. 3. Situation of collections in variant 3 – Conventional tillage work system

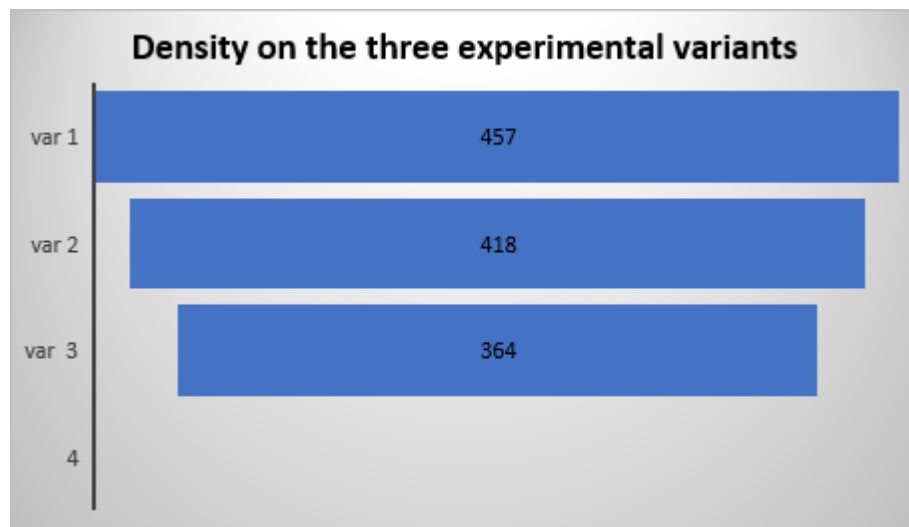


Fig.4. The situation of larvae density on the three experimental variants



Fig. 5. Attack of larvae about the roots