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MANIFESTATIONS OF THE PEST *CEUTORHYNCHUS NAPI* (LARGE RAPESEED BEETLE) IN THE AGROCLIMATE OF NORTH-WESTERN ROMANIA

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Abstract

The expansion year by year of the areas occupied with autumn rape (Brassica napus oleifera) has favored, together with global warming, the increase of the attack produced by Ceutorhynchus napi (Rapeseed stem weevil) from a level below the economic damage threshold, at a level synonymous in some conditions with the loss of crop profitability.

The prevention and control of this pest is carried out with maximum efficiency by chemical methods aimed only at adults at the time of appearance and manifestation in the rapeseed crops, subsequent treatments after laying eggs are ineffective on eggs and larvae found in the rape stalks.

Scheduling the migration and spawning period, in some temperature conditions, associated with the similar manifestation of another pest (but higher at the lower threshold of the biological zone) Ceutorhynchus pollidactylus determines the number of treatments required.

Key words: rapeseed crop, pest, damage mode, control.

INTRODUCTION

The increase of the cultivated areas with autumn rapeseed (*Brassica napus oleifera*) determined the proliferation of pests and consequently, the integration in the crop technology of new methods of plant protection.

If a few years before, almost entirely, the protection procedures were aimed to control pests of inflorescence and siliceous (Glossy beetle - *Meligethes aeneus*; Seed beetle - *Ceutorhynchus assimilis*; Hairy beetle - *Epicometis hirta*, Mosquitoes in bristles, *Dasineura brassicae*) in present days also are required protection measures against pests of the stem (Stem Beetle - *Ceutorhynchus napi*) and leaves (Rapeseed wasp - *Athalia rosae*; Gray cruciferous lice - *Brevicoryne brassicae*).

Favoring factors for food and climate have ensured an increasing dynamic of the pest *Ceutorhynchus napi*, registering in 2020, an attack frequency of 30-40%, manifesting in hearths.

In the first years of introduction of rapeseed into the crop, the pest *Ceutorhynchus napi* was little known, the attack being below the economical threshold, now the lack of treatment against this pest can be synonymous under certain conditions with the loss of crop profitability.

MATERIAL AND METHOD

Pest description

Ceutorhynchus napi is the most important pest from the genus *Ceuntorhynchus* that causes damage in the rapeseed crop. The adults are gray with a body length between 3 and 4 mm, the legs are black and the face is 1-3 mm long. The larvae are white-yellow, without legs with a brown chitinzed head (Figure 1).

Fig. 1. Aspects from S.C.D.A. Livada field

RESULTS AND DISCUSSION

Insect biology

This pest winters as an adult in the layer surface of the soil, around the plant where it was in nymph stage. Thus, the high level of infestation is registered in the lands cultivated in previous years with rapeseed.

The climatic factors necessary for the development of the biological processes of the insect are corresponding to the vegetation factors of rapeseed. Thus, at a soil temperature (3-4 cm) of 2 °C, which corresponds to a temperature of 7-9°C in the atmosphere, the first adults of *Ceutorhynchus* begin to appear. During this period, the rapeseed resumes its vegetation, at 2 ° C, but the beginning of spring is considered when the daily temperatures average are above 5-6 ° C, when the elongation of the stem begins. This moment occurs early enough in the first decade of March (Figure 2).

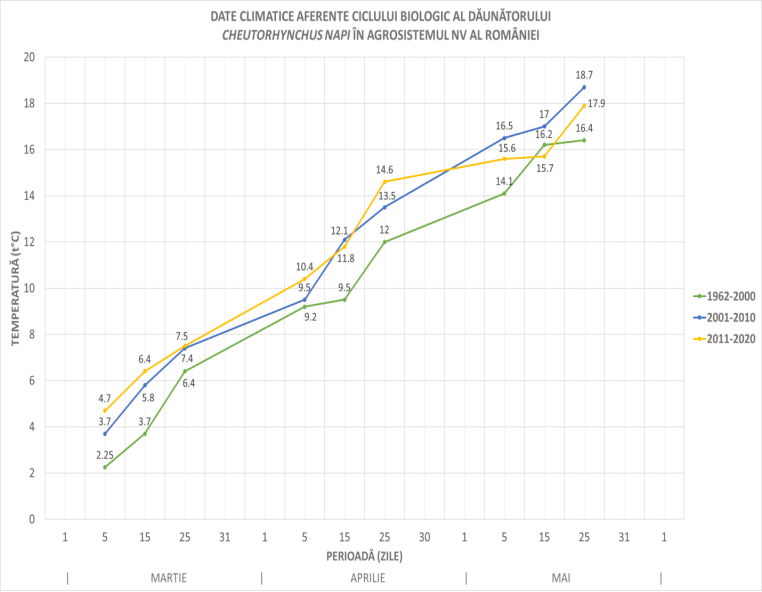

Fig.2. Climatic data related to the biological cycle

Under the conditions from Livada, the daily temperature average of 8°C, considered the temperatures threshold of biologically active appearance of adults, reached during the years 1962-2000, on April 1 and in the decades 2000-2010; 2010-2020, the moment was advanced by three days being reached on March 27-28.

Intense flight and migration in rapeseed crops occurs when air temperatures exceed 10-11 ° C. In our conditions, this aspect takes place earlier starting with April 3 for the decade 2010-2020, April 7 for the decade 2000-2010, respectively April 15 for the period 1962-2000.

First, the adults feed by causing small bites on the leaves, petiole and even on the flowering stem, but without causing significant damage. Usually cultivators do not even notice the attack. The period of migration, feeding, and fertilization, until the laying of eggs lasts about 10-20 days.

Pre-fertilized females will lay eggs in the holes produced by the rostrum inside the stem. The incubation of the eggs lasts about 8-18 days, and the larval stage 21-35 days. The two stages of egg and larva are closely related with temperature. The sum of the useful thermal degrees (higher than 10°C) required for the egg-larval stages is approximately 160 ° C (Table 1).

Table 1.

Development of egg-larval stages in the conditions of Livada, Satu Mare

Period (years)	The period of biological stages		
	Migration + feeding + spawning	Useful thermal degrees at 160°C	Number of days
1962-2000	25.IV.-5.V.	5.V.-10.VI.	36
2001-2010	13.IV.-23. IV.	23.IV.-20.V.	28
2011-2020	14.IV.-23. IV.	23.IV.-23.V.	30

Mode of attack

Adults, even if they feed on rapeseed leaves or cause bites on the stem, do not cause damage that could endanger the rapeseed culture. Significant damage of this pest is made by larvae. They migrate inside the stems consuming the marrow.

The symptom of larval attack is quite easy to notice. The attack manifests more strongly in hot and rainy springs. The rapeseed plant responds to the attack of larvae by tissue changes (histological).The parts above the spawning site turn in a spiral and after a period of rain or low temperatures, due to the disproportionate growth of the tissues, the stalk cracks (Figure 3).

Fig.3. Aspects from the S.C.D.A. Livada field

Sometimes the attack is not obvious by cracking and bending the stem, but the branches above the sting begin to bend, seem withered. The flowers on the branches begin to fall and the remaining siliceous is empty or contains a small number of seeds. The obstruction of the development of the plant tissues above the attack determines the start of the dormant buds under the sting, the creation of new shoots with branches, siliceous and grains of different ages. The damage caused by the weakening of the plant, due to the destruction of the tissues, is amplified by the establishment of some pathogens due to the cracks of the stem and also a higher vulnerability to breaking after storms.

Pest control

The economic threshold is 2 adults per plant. In chemical treatment, the premise is that only adults of *Ceutorhynchus* are combated. There is no approved insecticide to control eggs and larvae inside the stem. Thus, all attention should be paid to the period of migration, feeding and spawning. Spraying is done at noon when the temperature is above 10 ° C and adults come out to the ground. As the occurrence and migration performed in stages depending on climate factors, one or two treatments are applied at an interval of 12-14 days.

CONCLUSIONS

In the agrosystem from Northwestern part of Romania, the rapeseed crop proved to be profitable, obtaining high and constant yields in the conditions of respecting the technological elements and crop protection.

The biological zone and the thermal constant of the pest *Ceutorhynchus napi* is in correlation with the climatic preferences in the development of the phenophases of the crop plant.

The attack of the pest occurs in the phenophase of stem raising that corresponds to a climatic environment with successive temperatures over 8-10 ºC.

The maximum efficiency in the pest control is achieved by insecticide treatments during the manifestation of the adult stage.

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