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RESEARCH ON THE INFLUENCE OF THE APPLICATION OF ECO-SCHEMES IN CHERRY ORCHARDS IN NORTH-EAST ROMANIA

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Abstract
The general objective of the research aims to achieve a sustainable fruit-growing ecosystem, by identifying and introducing into fruit-growing plantations some beneficial plant species (floral strips, ground cover plants, sanitary and companion plants), as well as the technological elements that allow the creation of this ecosystem to limit the attack of pathogens and pests that cause damage in cherry orchards. The introduction of repellent plants in the crop gives us confidence that we can limit the number of treatments with their help, even if phytosanitary treatments were also used in the experience, a limitation of the attack produced by pests in the analyzed crop is observed, also the area in which the plantation is located greatly influences the evolution of pathogens and pests, these aspects must be taken into account when we want to establish a plantation regardless of the crop system.

Keywords: cherry, pests, repellent plants.

1. INTRODUCTION

Cherry orchards, as an integral part of the fruit sector, are constantly affected by various pathogens and pests that can significantly compromise the production and quality of the fruit. Thus, the general objective of the present research is to achieve a sustainable fruit ecosystem, by integrating repellent plant species (floral strips, cover, sanitary and companion plants), together with adapted technological elements, in order to reduce the use of phytosanitary treatments and limit the negative impact they have on the environment.

Recent studies highlight the practical potential of these alternative methods in integrated pest management (IPM), highlighting the synergistic role of biodiversity and sustainable technologies (Wyss, 1995; Landis et al., 2000). Therefore, the proposed research aims not only to make a theoretical contribution to the knowledge of the interactions between species in a fruit system, but also to develop solutions that can be applied in commercial cherry orchards in order to reduce the number of chemical treatments.

2. MATERIALS AND METHODS

As part of the experience in 2024, an integrated pathogen and pest control program was applied to limit the attack produced by them and maintain cultural hygiene.

Phytosanitary treatments were 5 in number (table 1) in correlation with the phenology of the trees (BBCH) and based on the catches recorded on the phytosanitary traps in order to carry out as few phytosanitary treatments as possible, in order to protect the useful entomofauna.

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Table 1. CHERRY TREATMENT PROGRAM –RSFG IASI, 2024

NO TRATMENT/ PHENOPHASE	***APPLIED PRODUCTS***	***DOSAGE HA/1000 L***
T1 –BBCH 07-10 White button	*B. Bordelaise*	*5 KG*
	Mospilan 20 SG	*0.45 KG*
	Ovipron top	*10 L*
	Polyactiv B	*2 L*
T2- BBCH 65	*Signum*	*0.5 KG*
	Decis Expert	*0.01 L*
	Polyactiv B	*2 L*
T3 BBCH 74-78	*Folicur solo*	*0.75 L*
	Rezistevo	*4 KG*
	Kerafol	*2 L*
	Karate zeon	*0.25 L*
T4- BBCH 80	*Signum*	*0.5 KG*
	Exirel	*0.8 L*
	Rezistevo	*4 KG*
T5 –7 days before harvest	*Folicur Solo*	*0.75 L*
	Decis 25 wg	*0.045 kg*

Within the experience we have four experimental variants of soil maintenance.
In order to limit excessive mechanization, other types of tree row maintenance were practiced at the expense of black field, this type of maintenance strongly accentuating erosion processes, thus reducing the number of mechanized works, up to a level appreciated as optimal, reducing the negative effects of excessive mechanization.
V1-palaptor used between trees;
V2-use of herbicide on the row of trees;
V3 –plant repellents (garlic, *Tagetes* Spp, *Lavandula officinalis*, basil, thyme, marigold);
V4 – mulching with biodegradable material
All these variants during the study are in 4 repetitions.
In the experimental group in addition to the applied phytosanitary treatments (tab.1) were installed Decis Trap traps to limit the attack of the pest *Rhagoletis cerasi L.*, traps were placed in zig zag within the experience , they limited the attack of this pest given that they were located in a fairly large number. Decis Trap acts as a manually hanging trap in the tree, which attracts and combats the cherry fly (*Rhagoletis cerasi L.*) to the cherry tree. It is recommended to manually place the traps at the top of the trees (about 1.4-1.8 m of soil), southern exposure, once a year. Placement was made after flowering, at the beginning of the period of flight of the pest, and at the latest until the color of the cherries from green to yellow changes. Application rate: 100 traps/ha, one application per crop/season. Protection time: 150 days.
Pause time before harvest: does not apply, which helps us in limiting the attack without risk of residues in fruit, representing a safety for the consumer.

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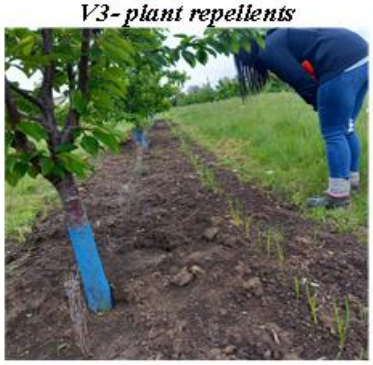
FIGURE 1
V1-palaptor used between trees

FIGURE 2
Tagetes spp.

FIGURE 3
V4 – mulching with biodegradable material

FIGURE 4
V3- plant repellents



The biological material on which the studies related to the achievement of the objectives were carried out is in the cherry demonstration group from RSFG Iasi in total area of 0.63 ha; the trees are in year 4 from planting, are grafted on mahaleb, planted at a distance of 6 x 5 m and led in the form of improved vase, without support system.
On the row of trees, the soil is kept clean with the help of the palpator plough, and between the rows of trees the soil is maintained as a grassed ground floor.
At RSFG Iasi, the following factors were used for setting up the experimental variants (table 2):

Table 2. EXPERIMENTAL VARIANTS 2024

SPECIA		***ROOTSTOCK***	***VARIANTS***	***REPETITION***
CHERRY		***4 x 1 x 4 x 4***		
	R1	*Mahaleb cherry*	*V1-palaptor used between trees*	*4 repetition*
			V2-use of herbicide on the row of trees	*4 repetition*
			V3 –plant repellents (garlic, Tagetes Spp, Lavandula officinalis, basil, thyme)	*4 repetition*
			V4 – mulching with biodegradable material	*4 repetition*
	R2	*Mahaleb cherry*	*V1-palaptor used between trees*	*4 repetition*
			V2-use of herbicide on the row of trees	*4 repetition*
			V3 –plant repellents (garlic, Tagetes Spp, Lavandula officinalis, basil, thyme)	*4 repetition*
			V4 – mulching with biodegradable material	*4 repetition*

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	R3	*Mahaleb cherry*	*V1-palaptor used between trees*	*4 repetition*
			V2-use of herbicide on the row of trees	*4 repetition*
			V3 –plant repellents (garlic, Tagetes Spp, Lavandula officinalis, basil, thyme)	*4 repetition*
			V4 – mulching with biodegradable material	*4 repetition*
	R4	*Mahaleb cherry*	*V1-palaptor used between trees*	*4 repetition*
			V2-use of herbicide on the row of trees	*4 repetition*
			V3 –plant repellents (garlic, Tagetes Spp, Lavandula officinalis, basil, thyme)	*4 repetition*
			V4 – mulching with biodegradable material	*4 repetition*

3. RESULTS AND DISCUSSIONS

In the experience, three determinations were made on the attack of pathogens (*Stigmina carpophilla* m.b. ellis*., Coccomyces hiemalis* HIGG.) and pests (*Sciaphobus squalidus*, *Myzus cerasi*).
Thus, on May 17, June 27 and July 30, leaves were taken from each variant with the 4 repetitions in order to determine the degree of attack of pathogens and pest attack, these determinations are presented in table 3.
In the case of the first variant V1- the degree of attack (G.A.) of the pests recorded values ranging from 0 – 0.35%, and the degree of attack (G.A.) of the pathogens recorded values ranging from 0 – 1.95%.
The second variant V2- the degree of attack (G.A.) of the pests recorded values ranging from 0 – to 0.3%, and the degree of attack (G.A.) of the pathogens recorded values ranging from 0 – to 3.0%.
In the case of the third variant V3, the degree of attack (G.A.) of the pests recorded values ranging from 0 – 0.5%, and the degree of attack (G.A.) of the pathogens recorded values ranging from 0.3 – 3.0%.
In the fourth variant V4 - the degree of attack (G.A.) of pests recorded values ranging from 0 – 0.2%, and the degree of attack (G.A.) of pathogens recorded values ranging from 0.7 – 2.7%.

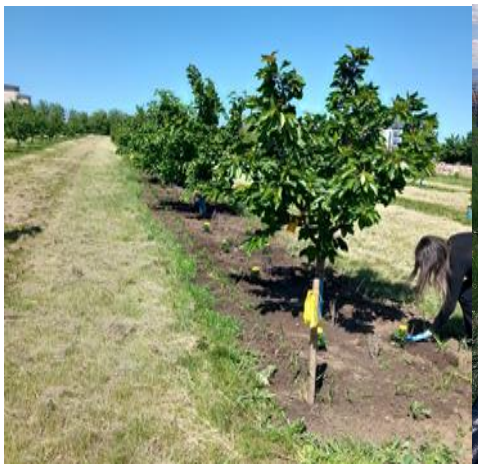

FIGURE 5

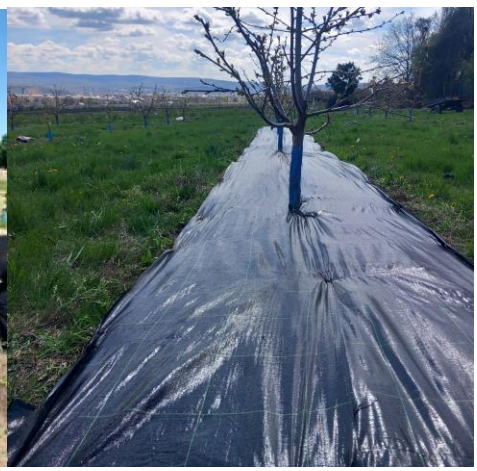

FIGURE 6

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Table 3. The degree of attack of pests and pathogens in the experience

Species	***Type of treatment by variant***	***G.A.% Sciaphobus squalidus and Myzus cerasi***			***G.A. % Stigmina carpophilla m.b. ellis., Coccomyces hiemalis HIGG.***		
		Date of sampling of leaves			***Date of sampling of leaves***		
		17.05	***27.06***	***30.07***	***17.05***	***27.06***	***30.07***
Cherry	*V1 palaptor used between trees*	*0.35*	*0*	*0.3*	*0*	*1.5*	*1.95*
	V2-use of herbicide on the row of trees	*0.3*	*0*	*0.2*	*0*	*0*	*3.0*
	V3 - repellent plants (garlic, Tagetes Spp, Lavandula officinalis, basil, thyme)	*0.5*	*0*	*0*	*0.3*	*1.3*	*3.0*
	V4 – mulching with biodegradable material	*0*	*0.1*	*0.2*	*0.7*	*1.1*	*2.7*

In the case of the three determinations carried out, the degree of pest attack recorded the highest values in the case of variant 3 in the determination of May 17, even if this variant had repellent plants in the following determinations did not register a significant degree of attack which shows that the repellent plants within the variant had the desired effect, the to remove insects by means of the repellent effect of plant species within the variant.
Variant 3 had the lowest degree of attack recorded in the determination of 27.06 and 30.07 which gives us confidence to use these plants together with plant protection products to combat pests in cherry plantations.
Variant 4 registered a 0.2% attack rate at the 30.07 determination.
Regarding the pathogens *Stigmina carpophilla* m.b. ellis., *Coccomyces hiemalis* HIGG., the highest attack rate was recorded in the determinations of 30.07 in all 4 variants.
The prevention and control of diseases and pests in fruit crops is an extremely important branch, in order to achieve the main purpose of obtaining healthy crops and to ensure a phytosanitary state corresponding to fruit trees.
We can add that the application of phytosanitary treatments has an extremely important role without which we cannot have a qualitative and quantitative production specific to culture, but these measures must be applied together with those of cultural hygiene, representing the basis in combating harmful agents in a culture.

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4. CONCLUSIONS

During the experimentation period, the newest plant protection products were used.
The climatic conditions of this period were favorable to the evolution of the attack of pathogens (*Stigmina carpophilla* m.b. ellis., *Coccomyces hiemalis* HIGG.) as well as of the pests (*Sciaphobus squalidus, Myzus cerasi*).
In the control of pathogens (*Stigmina carpophilla* m.b. ellis., *Coccomyces hiemalis* HIGG.) the best results were obtained with the help of fungicides SIGNUM and FOLICUR SOLO.
Also insecticides DECIS 25, EXIREL, KARATE ZEON have been shown high effectiveness in fighting pests.
As a general conclusion on the application of plant protection products accompanied by repellent plants - we can say that they have an important role and can be recommended in the culture technologies of the cherry species and encourage farmers to focus on low toxicity products for humans and the environment.
The introduction of repellent plants into the culture gives us confidence that we can limit the number of treatments with their help, even if in the experience were used and phytosanitary treatments there is a limitation of the attack of pests in the analyzed culture, also the area where the plantation is located greatly influences the evolution of pathogens and pests, and these aspects must be taken into account when we want to establish a plantation regardless of the culture system.

5. ACKNOWLEDGEMENTS

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