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CONTROL OF PATHOGENS AND PESTS FROM STANDS LOCATED IN DEGRADED LANDS IN NORTH WEST OF ROMANIA

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Abstract
Degraded land is a problem at both national and global level. The need for their reconstruction is imperative in order to prevent large scale ecological imbalances. So different integration methods are being attempted to reintroduce in the agricultural and forestry circuits of these lands. With the placement of stands, pests and pathogens are introduced that can affect them differentiated. In deciduous stands, mainly Quercus sp, it is necessary to control the pathogens present systematically - Microsphera abreviata (F.C.Oidium alphitoides) and other genera of Erysiphe. Regarding the resinous stands, they are invariably infested with pathogens of the genus Lophodermium sp., Chrysomyxa abietina, etc. The present paper proposes to present the main pests in these stands and their control technologies. From the studies, analyzes and statistical processing, it has been shown that the milling at Quercus sp. or rust to resinous are present at different intensities and frequencies, and the use of FSC and EEC approved fungicides can be maintained at optimal pest degradation.

Keywords: control, pathogens, pests.

1. INTRODUCTION

Being in a certain decline and still subject to particularly strong pressures and stress factors, which seriously affect their integrity and continuity, the forests of the country are currently claiming rigorous actions of restoration and ecological reconstruction on the part of foresters. In this context, it is necessary, among other measures of management and conservation and afforestation and reforestation works, both in normal forest sites, but especially in extreme forest sites. Their perfection involves the production of the afforestation material, the assortment, the quantity and the quality, necessary for these works.

This goal can only be achieved by applying modern methods and technologies to prevent and combat pathogens present in solariums and nurseries. The spectrum of pathogens, being subjected, like all the living creatures of evolution, as a result of adaptations to natural environmental conditions or obviously anthropogenic influences, although largely known, can never be limited to a certain point, and knowledge requires a careful permanent pursuit. However, parallel to this spectrum of diseases, there is a permanent development of the diversity of technical solutions, on the one hand, based on new, non-polluting and non-toxic products, and on the other hand by the use

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of simple, economically advantageous methods and efficient. Environmental conditions may directly or indirectly influence the occurrence and evolution of the disease in a given situation, as well as the transition from saprophytism to parasitism of components of microbial flora in the soil. Investigations carried out in many countries come to clarify the context in which maladies occur more frequently and factors that can influence the activity of microorganisms developing in resinous resinous rhizosphere.

2. MATERIALS AND METHODS

Within these works were used the methods of general phytopathology with the adaptations of the forestry. Thus the material from the seed samples was washed and placed in wet rooms for incubation. At the onset of micelles, harvests and inoculations were performed on culture media usually made of malt agar. The same operation was also performed on saplings harvested from the field that were kept for one hour under the tap to remove saprophytic agents and prevent infestation of culture with unwanted infections.

Binocular and microscope determinations were made using determination keys from the literature and for mandatory parasitic cryptogamic agents the determinations were made by correlating the observed symptoms with the fruiting bodies and spores formed. All of this implied observations throughout the development of pathogens.

In order to achieve the proposed objectives, experiments were located where we considered them to be more representative. All experiments were placed so that they could be statistically processed.

Biological harvested material, with both obvious and unsafe symptoms, has been a basis for obtaining mycelium for isolation, incubation, for subsequent determinations.

The products used were administered as solutions depending on the condition of the product or recommendations for use in other areas (most often in agriculture) when bathing seeds before seeding or spraying in post-emergence phases, respectively sprinkles of the nutritional bed, this in the solarium experiments. In the nurseries, both sprays and dusts were applied depending on the product used, taking 2-3 treatments, depending on the evolution of the pathogen that is closely related to the local climatic factors.

3. RESULTS AND DISCUSSIONS

The works were located in the Tonciu area, Bistrita-Nasaud, where the substances Difenoconazole, Famoxadone and Cymoxanil were used in the control of the pathogens identified on the examined samples were *Sclerotinia sclerotiorum* (Phosphocinae) and *Phoma piceae* (Ascomycotina / Dothideomycetes / Pleoporales) - present only on part of the analyzed samples.

In order to capture the phenomenon as accurately as possible and to establish the effectiveness of fungicides, it was necessary to establish a degree of attack as the location of the experiments as follows:

NA - healthy seedlings; SA - poorly attacked seedlings, where necroses cover up to 25% of needles;

MA - Medium attacked seedlings, where necroses cover between 25-50% of needles;

PA - strongly attacked seedlings, where necroses cover over 50% of needles.

Fungicides used for testing have been so chosen as to combat pathogens from different orders and families encountered in affected pine seedlings. In general, fungicides have been considered to combat a wide spectrum of micas and are effective both in preventing and controlling pathogens and economically. The treatment options were as follows:

V1 - treatment with Difenoconazole 23.2%, 3 ml/10 l water;

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V2 - treatment with Difenoconazole 23.2%, 2 ml/10 l water;
V3 - treatment with Famoxadone 225 g/kg + Cymoxanil 300 g/kg, 6 g / 10 l water;
V4 - treatment with Famoxadone 225 g/kg + Cymoxanil 300 g/kg, 4 g / 10 l water;
V5 - untreated witness;
The data obtained are shown in Figure 1.

We note that in the treated versions, the healthy seedlings remained about the same percentages, their migration occurred to the SA and less to MA and PA. Instead, the witness behaved inversely, over 90% of the seedlings met in the MA and PA groups.

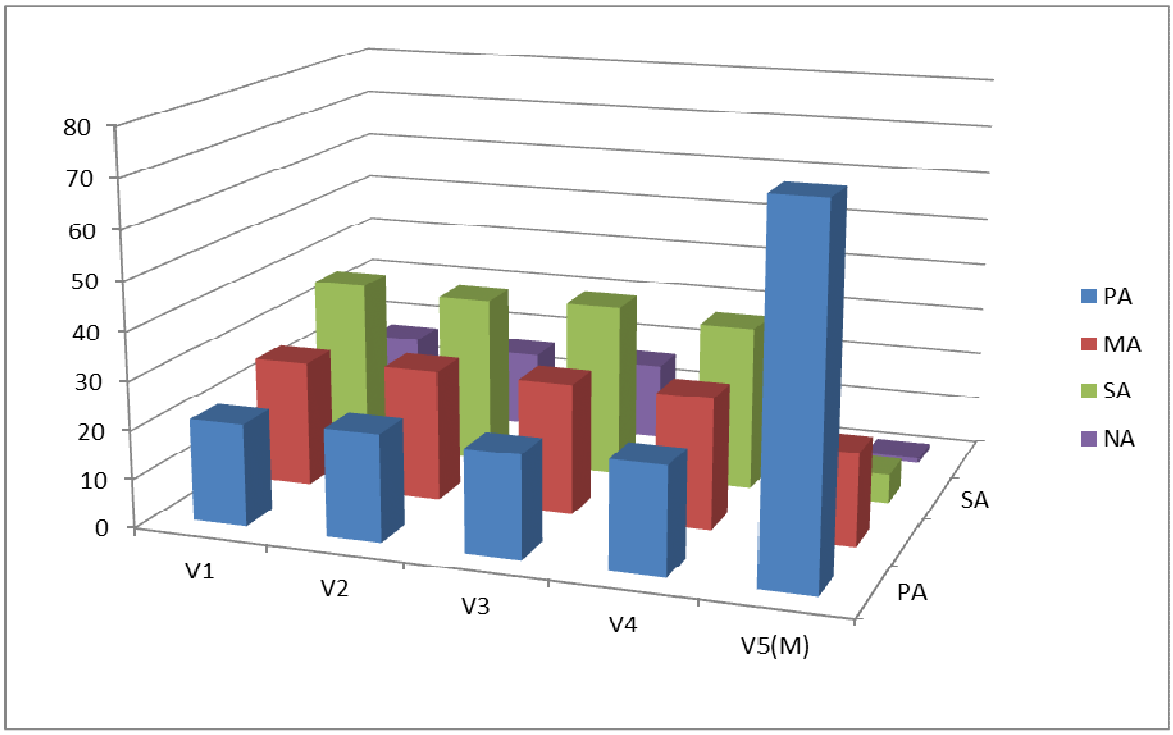

Figure 1. Situated status by degrees of attack after application of treatments, Tonciu perimeter, Bistrita-Nasaud

Given that there are currently restrictions on the use of certain fungicides approved for the control of pathogens in forest cultures, both from C.E.E. (European Economic Community - Directive 91/414 / EEC) and the Forest Stewardship Council (FSC), it was considered useful and appropriate to test new fungicides that meet the requirements of both bodies.

The field demonstrations aimed at combating the *Microsphaera abbreviatta* pathogen (*Oidium alphitoides*) - the mildew of the oaks, by using new fungicides agreed by CEE and FSC, with increased efficiency in terms of both pathogenic and economical control. The methodology required for their approval for the territory of Romania, namely at least two areas located at least 60 km apart, was respected.

In the experiments, the control of the *Microsphaera abbreviatta* pathogen (*Oidium alphitoides*) - the mildew of the oaks, located in the Budești improvement area, Bistrita-Nasaud, using the fungicides Score (Dipenoconazole 250 g/l), Impact (flutriafol 250 g/l and Antracol (propineb 70%), the initial situation being favorable, the first treatments being applied the infection did not occur.

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The inventory carried out before the first treatment shows us that the percentage of untreated saplings is 100% in all variants.

The percentage of severely attacked (82%), medium attacked (10%), poorly attacked (6%), unpainted seedlings of 2% increased after untreated control treatments. In the treated species the percentage of the unattached seedlings ranged from 88-92%, the poorly attacked seedlings had between 6-8%, the middle attack between 2-5%, and the strongly attacked seedlings did not exist.

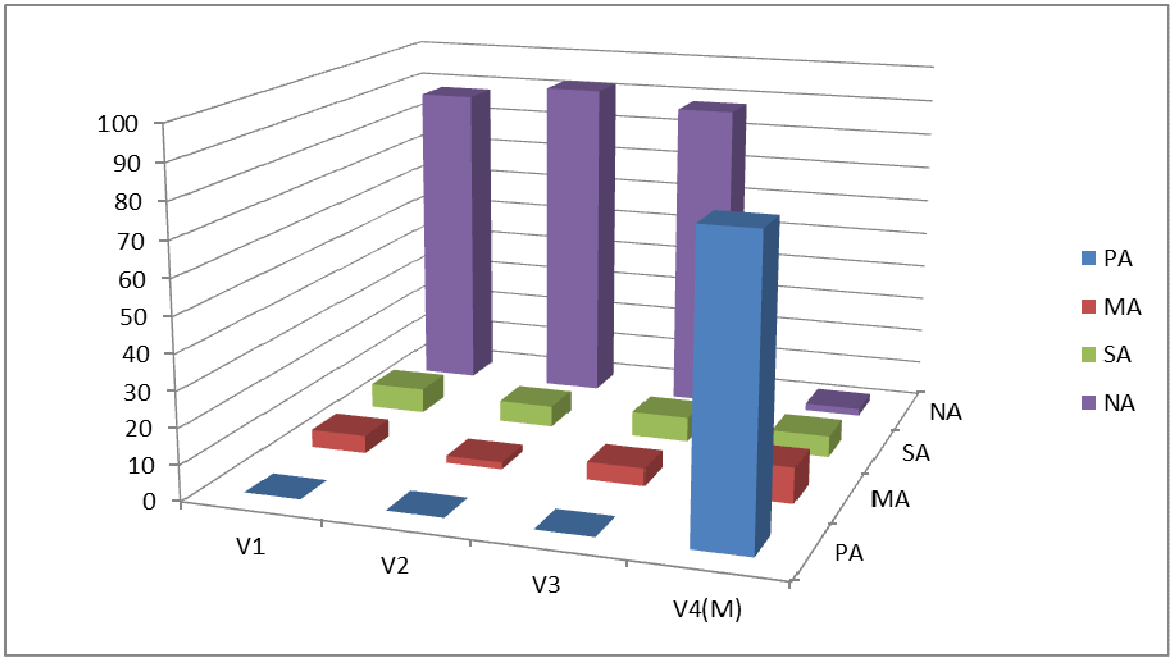

Figure 2. Saplings distribution by degrees of attack, after application of treatments, the Budeşti breeding perimeter, Bistriţa-Năsăud, the sessile oak, 2017

V1 - treatment with Score, 2.0 ml to 2 l water
V2 - treatment with Impact, 2.0 ml to 2 l water
V3 - treatment with Antracol 2.0 ml to 2 l water
V4 - untreated witness

In the improvement area of Ţagu, Bistrita-Nasaud, the treatment variants were shown in figure 3, using the fungicides Score (Diphenoconazole 250 g/l), Impact (Flutriafol 250 g/l) and Antracol (propineb 70%), a similar one, there being no variants with attacked seedlings.

After application of the treatments, in the untreated control, the percentage of attacked saplings was 50%, medium attack 30%, poorly attacked 17%, and untreated saplings 3%. In treated species the percentage of strongly attacked saplings ranged between 1 and 5%, medium seedlings attacked 4-11%, poorly attacked 18-29%, and unattached seedlings had percentages between 58-74%.

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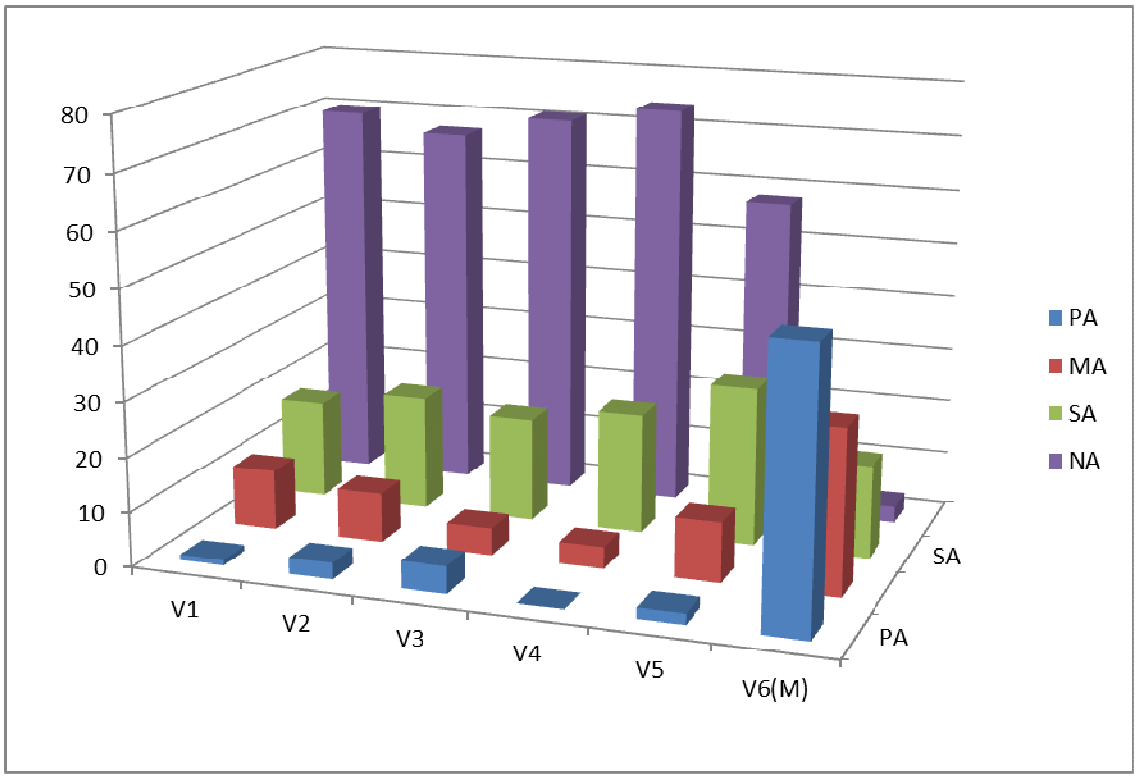

Figure 3. Saplings distribution by degrees of attack, after application of treatments, Țagu, Bistrita-Nasaud, the Oak species, 2017

V1 - treatment with Antracol, 2.0 ml to 2 l water
V2 - treatment with Score, 3.0 ml to 2 l water
V3 - treatment with Score, 2.0 ml to 2 l water
V4 - treatment with Impact, 0.2 ml to 2 l water
V5 - treatment with Impact, 0.3 ml to 2 l water
V6 - untreated witness

4. CONCLUSIONS

Following the studies, the researches and the experiments carried out, we note the following:
a. The most dangerous pathogens remain for spruce seeds *Fusarium*, *Rhizoctonia*, *Pythium*, *Alternaria*, *Botrytis*, respectively for the saplings of *Sclerotinia sclerotiorum* and *Phoma piceae*;
b. Following consultation and study of the prospects, testing for the control of the following fungicides: Difenoconazole, Famoxadone and Cymoxanil in the control of pathogens affecting the pine crops has been agreed;
c. The results were promising, drawing up experimental biological records;
d. Extremely important for the prevention of infections with pathogens is the time of applying the treatments, which is variable depending on the climatic factors, and preventive treatments are recommended;
e. The results obtained can be applied to all Directions or to the Forest Hills, which have as activity the production of spruce seedlings, in solaria and / or in nurseries.

5. RECOMMENDATIONS

To control pathogens agents, it is recommended in the future to:

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- monitoring the evolution of the stands according to the pathogenesis of the identified agents;
- developing methodologies for monitoring the emergence risk and the dynamics of destabilizing factors for forest ecosystems;

6. REFERENCES

Alexe. A. (1986). Analiza sistemică a fenomenului de uscare a cvercineelor şi cauzele acestuia [Systemic analysis of the drying phenomenon of cvercines and its causes]. *Revista Pădurilor*, 3, 129-133.

Badea, O., Tănase, M. (2003). Analiza dinamicii stării de sănătate a arboretelor şi determinarea pierderilor de creştere cauzate de vătămarea acestora. Silvologie [Analysis of the health state dynamics in the stands and determination of the growth losses caused by their injuries. Silvobiology]. (vol IIIA). Editura Academiei Române, Bucureşti.

Badea, O., Neagu, S., Roibu, D. (2006). Starea de sănătate a pădurilor din România în perioada anilor 1990-2005. evaluată prin sistemul de monitoring forestier [The health status of forests in Romania during the period 1990-2005. assessed through the forest monitoring system]. *Revista Pădurilor*, 1, 8-14.

Führer, E. (1990). Forest decline in Central Europe: additional aspects of ist cause. *Forest Ecol. Manage*, 37, 249-257.

Moldovan, M. C., Boca, L. C., Lungu, T. I., Simonca, V., Blaga, T., Tăut, I., Dîrja, M. (2018). The state of vegetation in the stands established on degradated lands in the hilly area of Transilvania, *Current Trends in Natural Sciences*, 7(13), 211-220

Şimonca, V., Tăut I. (2010). Oaks Decline in the North and West of Transylvania, *Promediu/Proenvironment*, 3, 17-22.

Şimonca, V., Oroian, Gh., Tăut, I. (2011). The Research of some elements from climate regime with the influence of the forests from River Somes upon vegetation condition. *Revista Promediu / Proenvironment*, 7, 20-26.

Tăut, I. (1995). Cercetări privind prevenirea şi combaterea ciupercii *Microsphaera abbreviata* [Research on the prevention and control of *Microsphaera abbreviated* mushroom], *Revista pădurilor*, 2, 26-32.

Tăut, I., Şimonca, V., Holonec, L. (2011). Detection and Prognosis Defoliators *Tortrix viridana* and *Pristiphora abietina* in the Northwestern Transylvania Forests, *Bulletin UASVM Horticulture*, 68(1), 469-473.

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