ECOLOGYCAL INFLUENCE OF *HETEROBASIDION ANNOSUM* (FR.) BREF. MUSCHROM ATTACK IN SOME REPRESENTATIVE STANDS FROM SUCEAVA DISTRICT

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Abstract

Emphasis of dissemination of the Heterobasidion annosum (Fr.) Bref. spores by air currents is very important and can be outlined by using the method of the small round disks.The outputs obtained from the researches carried out in certain brushes of Suceava district emphasized the large area of spore spreading by air currents and the months of maximum spores deposition on the capturing small round disks
Keywords: *Heterobasidion annosum, spores, infection.*

Introduction

Forest protection against the damaging action of certain biotic factors, that might endanger its capacity of fulfilling the functions of production and protection, imposes it self as a highly important activity of stringent actuality (Delatour, 1972)

In these conditions, we can affirm that the aim of this paper is to bring certain original contributions regarding the fungi attack on beech species, focusing mainly on the attack produced by *Heterobasidion annosum* (Fr.) Bref. because, beyond the large economic damages, this fungus also affects the stability of the forestry ecosystems.

The subjects chosen for this paper are justified by the large spreading of these fungi in the spruce forests of Suceava district, being considered that main factor that affects the quality of the spruce wood, dominant species in the investigated area (Sima, 1982; Ichim 1993; Cenuşă, 1996).

Experimental

In order to determine the interactions on a larger area, there were established a network of research points on a route located between Ilisesti and Iacobeni (Puciosu stream).

The network covers a length of 56 km and a height range of 470 m (figure 1). On this route there is an important variability of vegetation,

making the transition from the deciduous forests by mixtures of beech woods. Consequently, the network covered the demands of certain objectives that aimed mainly the influence of the vegetal carpet over the infecting potential and the influence of the air current intensity over the same process.

The method consists in drawing the small round disks by chopping the trunk of a health tree, especially spruce tree, whose diameter should be of about 20 cm, so as the small round disks should be handled easily; the thickness of the small round disks should not exceed 3-4 cm; after drawing, the small round disks are cleaned with a brush and put immediately under protection by packing; there can be used fresh small round disks or these can be frozen and used afterwards (Grudncki, 2002).

The presentation of the small round disks in the research area is done directly on the ground or on various supports; it is registered the superior face of the small round disk, its number and the point location where the presentation took place; the presentation time is of 24 hours; at the end of the presentation time, each small round disk is taken off from the field and packed in blotting paper; the incubation is achieved in the laboratory after moistening the small round disks with distilled water, without unwrapping them. Afterwards, they are put in plastic bags for moisture preservation; the incubation period lasts 8-10 days at a temperature of 15-18°C.

The observations are done by examining the superior face of each small round disk with a binocular magnifying lens; the "colonies" of the *Heterobasidion annosum* fungi occurred after the germination of the basidiospores can be easily noted due to their cone shape *Spiniger meineckellus* (Olson)

Stalpers, that presents this fungus, although it belong to the subclass Basidiomycotina; for the safety of determination, there can be make drawings on the small round disk that can be examined at the microscope.

There are written down the number of "colonies" on the surface of each small round disk, and the outputs are expresses in spores/dm^2/24 hours.

The limits of the fields of the potential of infection have been established in terms of the variation domain of its value: 0 - 3 colonies/dm^2/24 hours – very low infecting potential; 3,1 – 6 colonies/dm^2/24 hours – low infecting potential; 6,1 – 9 colonies/dm^2/24 hours – average infecting potential; 9,1 – 12 colonies/dm^2/24 hours – high infecting potential; over 12 colonies/dm^2/24 hours – very high infecting potential:

Results and discussions

The primary outputs are organized in table 1.

Table 1: Monthly variability of the number of colonies/dm^2 / 24 hours according to the location of the site of investigation

	May	June	July	August	September	October	November
Ilişeşti	1,1	0,9	1,1	1,7	3,1	2,6	1,4
Frasin	1,7	1,4	2,0	2,9	6,0	6,6	4,9
Vama	5,1	4,0	4,9	6,6	10,6	10,0	7,4
Câmpulung	8,3	6,3	5,7	10,3	13,7	12,6	9,1
Pojorâta	10,9	8,6	10,3	11,7	16,0	15,1	13,7
Valea Putnei	13,4	10,9	12,0	12,9	16,9	16,3	12,9
Mestecăniş	11,1	10,0	9,7	12,0	13,4	8,9	6,6
Mestecăniş (chalet)	5,7	4,9	5,4	3,1	4,3	3,4	2,6
Iacobeni	10,6	8,0	8,9	10.0	12,0	7,7	7,1

There are noticed important differences between various zones where the research took place. A simple analysis of variation shows that these differences are very significant from the statistic point of view (F_{real} = 24,56***; $F_{crit.}$= 2,115).

These differences are given directly mainly by the percent of beech in the forest spaces located around the observation points.

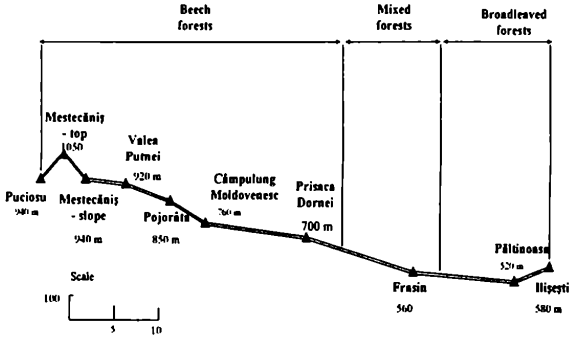

Fig.1: Vertical profile of the research network of the infecting potential at sub regional level (original)

In figure 2 it is described the chart of seasonal variation of the infecting potential proportional to the forestry formation:

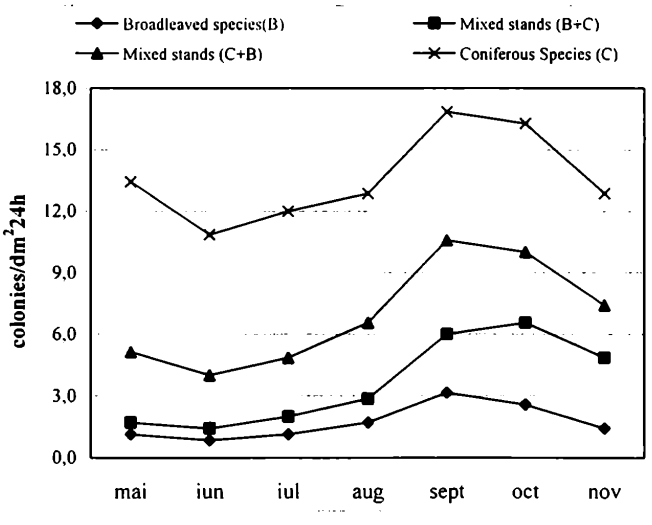

Fig. 2: Monthly dynamics of the infection potential in the year 2000 proportional to the vegetation zone

It is found out that in the beech zone the average of depositions is of 1,7 colonies/dm^2 with a variation coefficient of 49,06%; in the mixed forests where deciduous trees prevail the average of depositions is of 3,63 colonies/dm^2 with a variation coefficient of 58,98%; in the mixed forests where the beech trees prevail the average of depositions is of 6,93 colonies/dm^2 with a variation coefficient of 36,8% and in the zone of beech forests the average of depositions is of 13,59 colonies/dm^2 with a variation coefficient of 16,18%.

Another element considered in our analysis was the wind regime, because from the research made in Codrul Secular Slătioara we haven't obtained its precise influence over the infecting potential.

Thus, for the three points situated on Obcina Mestecăniş it was made a separate analysis, from which came out very significant differentiation. In figure 3 it is shown the variation of the monthly amounts for the infecting

potential in three different situations: Iacobeni – slope with wind, Mestecăniş (chalet) – windswept peak, Mestecăniş – slope under wind.

Although between the slope with wind (average: 9,18 colonies/dm^2; variation coefficient 19,4%) and the slope under wind (average: 10,2 colonies/dm^2; variation coefficient 21,7%) there were not noticed significant differences (F_{real} = 0,98; $F_{crit.}$= 4,74), between them and the peak there are very significant differences (F_{real} = 23,097***; $F_{crit.}$ = 3,55). (average: 4,2 colonies/dm^2; variation coefficient 28,4%).

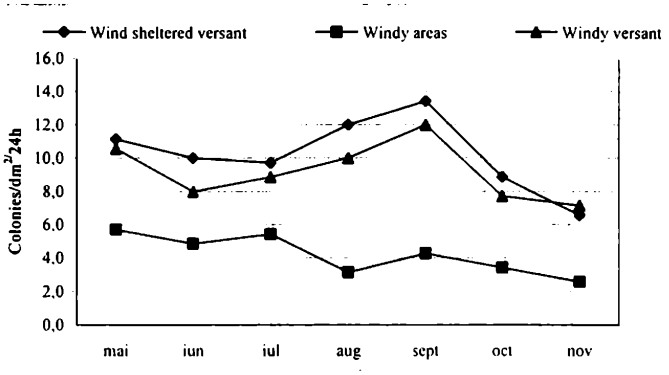

Fig. 3: Monthly dynamics of the infection potential in the year 2000 proportional to the propensity to wind sweeping

Conclusions

In the above-mentioned frame there can be explained why we haven't made correlation with altitude because this influences the researched phenomenon in an indirect way, through the distribution of vegetation and the correlation, although it is obvious, would have been an auto-correlation if we didn't take into consideration the wind sweeping.

The results obtained by expressivity and by flexibility proportional to the main factors of influence are pleading for the use of the small round disks method in monitoring the infecting potential of *Heterobasidion annosum* fungus and on large areas;

Determination of the intensity of infection with the spores of *Heterobasidion annosum* fungus, of its space and time variability and of the

influence of the ecologic factors over these phenomena achieved by the method of small round disks emphasized the infecting potential at a yearly regime.

The application of the small round disks method in various field conditions at the level of plot, forest and sub regional shows that:

- This method is very reliable and provides very good outputs, is easy to be applied in research aims as well as in practical aims;
- The infecting potential has a specific annual regime with minimum values in the winter months and with maximum values in the month of September. Its rhythm of growing is quite slow until July and accelerates until September;
- At macro space level – on the itinerary, there are noticed important differences regarding the infecting potential between various zones. These differences are mainly given by the proportion of participation of the beech trees at the brushes around the observation points;;
- It is noticed a progressive growth of the average of spores depositions starting from the zone of the deciduous trees up to the brushes zone of pure spruce trees;
- Another element shown by the macro space analysis is the influence of the wind regime in spores deposition. .

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