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CURCULIO GLANDUM, A PEST WHICH REDUCES THE QUALITY OF THE SEED AT *QERCUS PETRAEA* IN HILLY TREE FROM O.S. ALMAŞ, D.S. ZALĂU

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Abstract: Phytopatologic pests, besides the vegetative organs of the forestry species they can also attack their generative organs: flowering buds, flowers, fruit and seeds. Although these pasts usually don't produce debilitation and tree dryness, it presents, in certain situations, a highly economical importance. They can affect in a smaller or bigger quantity and seed quality, fact which also determines the perturbation of the natural regeneration process of the trees, resinous, and deciduous. When the conditions of development are favorable, these pests can destroy up to 70-90% from the seed production, and sometimes is affected only the quality, meaning the faculty and germinative energy of the seeds.

INTRODUCTION

It is known, that forest regeneration depends by seed production, their capacity to germinate and chances of seed survival. Seed production at the species of trees is a fluctuant phenomenon influenced by clime edafic conditions, pests, diseases, pollution, grazing in the forest and other anthropic influences (Doniță N., 2000, Fodor E., 2001).

Presently, in the world and in Romania, there were noticed decline phenomena in rammel belonging to a large number of species. The causes and the dynamic of the phenomenon are not, in this moment sufficiently explained (Simionescu A. and col., 1971).

In the studied rammels from Almaş, U.P. IX Fildu şi U.P. X Sfăraş, it can be observed the first symptoms of the phenomenon and we can say without doubt, that itis about a decline in cvercinee rammel.

It has also need to be mentioned that in the production units mentioned above there are three species of cvercinee : *Quercus petraea*, *Quercus cerris* si *Quercus frainetto* species which were met in the units in which the observations were taken.

The dynamic of the insect populations, which attack the fructifications of the trees is dependent on a large number of ecological, among which the most important one is the process of differentiation and then the evolution of the generative organs. Even so, there can be seen some pests at which the biological cycle can take place on other organs of the host plant (leaves, stems, roots etc.). For example, in the category of pests which attack the cones and resinous seeds can be seen two: stenoconobionte groups, whose development is strictly dependent on cones existence, and heteroconobionte, which can develop by consuming other organs of the plants, too, especially leaves.

A particularity of the pest which attacks the fructification organs is given by the hidden life style (so by the harming too), which determines that their populations to be affected by a

small number of parasites and natural predators, and the specific useful enthomofauna of this pest group is in general polifagus..
Also because of the specific harming way, the actions of chemical control, have often a low efficacy, and the insecticides which can be used is relatively reduced. In order for the chemical treatments to reach the goals, these ,must be done at optimal times, when the products can directly contact certain developing stages of the pest, that is why it is necessary to know the biological cycle of each species.
The most important pests in this group, which can determine in several years great economical loss, belong to the following botanical ordinals: *Hymenoptera, Lepidoptera, Diptera* şi *Coleoptera* (Simionescu A. and col., 1971)..
Among insects species which attack acorn the most seen are those which belong to *Curculionidae* family and that is *Curculio glandium* (acorn water spout). Another met species is *Carpocapsa (Laspiresia) Amplana* – brick colored moth or acorn red caterpillar. These species attack acorn before dissemination (Rogojanu V., Perju T., 1979).
At oak tree, the germination is strongly affected by *Curculio glandum*. The hibernate adults in order to achieve sexual maturation they chew young leaves, stems and flowers. When the acorn began to develop, the bugs chew several deep channels in the acorn, many times without reaching the embryo, where they lay eggs. The larvae chew irregular galleries in the oak's fructifications, transforming the acorn cotyledons into a shatter unit full of black dejecture. The acorn content is partially consumed by a single larvae, or entirely by two larvae. Usually the larvae don't attack the acorn embryo, that is why sometimes the attacked acorns can spring but have weak plats. In autumn, the attacked acorns fall early on the ground. The attacked acorns can be observed very well after the brown spots on their surface, which indicates the place used by the adults to put the eggs. These chewing are well cicatrized, fact which doesn't allow the parasites fungus to enter in the acorn and destroy the larvae. Depending on the frequency of the attack fruit, the attack is weak if there are attacked under 10% of the fruit, middle attack at a frequency of 11-25%, strong attack at 26-50% of the attacked fruit and very strong when there are affected over 50% of the fruit (Marcu Olimpia, Dieter, S., 1995; Oltean I., 2005, Oltean I., Monica Porca, I. Ghizdavu, 2004).

MATERIAL AND METHOD

The placement and sample surfaces determination were made in u.a. 42 and u.a. 63 of U.P. IX Fildu respectively U.P. X Sfăraş, and there were chosen three probation surfaces for each fitting unit. The surfaces were established from the base of the slope to the top (at the base of the slope, in the middle and in the top). For each probation surface there were chosen three trees, at which there were determined the horizontal projection of the crown. The dimension of the surface varies (from 52,18 up to 206,62 m^2) depending on the trees crown projection on the soil. In the two u.a.- in which the determinations took place the dominant specie is *Quercus petraea*. The dimension of the probation surfaces is according the goal of the observations, evaluation of the fructification and its health stage correlated with the architectonical features and crown dimension.
The acorn was harvested from the probation surfaces, during 27–29 September 2005.
The harvested acorns from, the probation surfaces have been analyzed each and classified as follows:
- attacked acorns
- healthy acorns

The attacked acorns were classified as follows:

- Acorns with opening, which are attacked by *Curculio glandium*, which were classified in :
    - Attacked acorns and germinated ones
    - Attacked acorns and non germinated ones
- Apparently healthy acorns outside were chopped up in order to see if they are healthy or attacked, classified as:
    - Partial attacked acorns; which have the ability to maintain their capacity to germinate, but the plants resulted are not viable.
    - Healthy acorns: germinated and non germinated ones

After falling on the soil, the seeds which are not consumed, remain in bedding and germinate in the following year because they need a period to maturate or they reach in the superior horizon of the soil and that way they are the seeds bank or reserve of the soil. Seed germination depends on a series of intrinsic factors as the genetic and physiological ones and outside factors as the quality of light , air and soil temperature, absorption water capacity, soil nature, the presence of bedding and the grass layer. For example, in order for the acorn to germinate, the optimal bedding thickness is 2-4 cm which confers a sufficient protection against dryness without suffocating the plants.

The method used to collect acorns in the present paper allowed to estimate the quantity of acorn from the crown projection of a tree and after that the establishing of the harming level produced especially by *Curculio glandium*. With the help of this it was possible to establish the number of the acorns viable for germination. The species with large seeds (including the durmast) have greater chances to germinate in the seeds banks, than the smaller seeds. Also the chances to germinate or acorn are lower with the deep in soil.

RESULTS AND DISCUSSIONS

In the table 1 are shown the frequencies of infection in probation surfaces. The high values obtained shows that the insect is in gradation.

Table 1.

Acorn health stage in the autumn of 2005, in durmast rammels in U.P. IX Fildu and U.P. X Sfâraş

Probation surface and U.P.- to which it belongs	Total number	Relative frequency of healthy acorn	Relative frequency of partial attacked acorn %	Relative frequency of attacked acorn %
Surface 1 (base slope) U.P. IX	723	9	5	86
Surface 2 (middle slope) U.P. IX	659	7	5	88
Surface 3 (top of the slope) U.P. IX	160	1	4	95
Surface 1 (base of the slope) U.P. X	884	10	2	88
Surface 2 (middle of the slope\) U.P. X	2236	9	1	90
Suprafața 3 (top of the solpe) U.P. X	497	4	1	95

In all harvesting plots for acorns there was registered a maximum attack due to *Curculio glandium*, the most spread pest of acorn.
The partial attacked acorn maintain its capacity to germinate, theresulted plants are not viable.
In the autumn of 2005 there were harvested 6697 acorns (1540 in U.P. IX and 5157 in U.P. X). from the dates presented, we can conclude that in both of the units, the attack produced by *Curculio glandium*; has a high attack frequency (between 86% - 95% in U.P. IX and between 88% - 95% in U.P. X). In both of the units it can be observed an increasing frequency of the attack from the base of the slope to the top of it. That way, at the base of the slope the frequency of the attack is between 86% and 88%; in the middle of the slope of 88% and 90%, and in the top of the slope the frequency of the attack is 95%.
Depending on the harvest plot, the percent of healthy acorns is between 1 and 10%.These are acorns which assure the natural regeneration of the rammels. The acorns which are partially attacked represents 1-5% from the total of the seeds. Although a part of these acorns may germinate, the plants have little chances to continue their vegetation

CONCLUSIONS

1. After the study made in the two rammels in U.P IX Fildu, and U.P. X Sfăraş O.S. Almaş D.S. Zalău we can conclude that the health level is low.
2. The attacks noticed, especially on acorns, produced by *Curculio glandium* in U.P. IX Fildu and U.P. X Sfăraş, prove the regression of the two rammels. If in the future there will not be taken any measure, for breeding and control the pests this regression stage will get worse, there will be new enemies, which will contribute to the forest extinction.
3. The frerquecy of the attack produced by *Curculio glandum* is between 86% - 95% in U.P. IX and between 88% - 95% in U.P. X.
4. In the infested rammels there has been noticed an increasing attack frequency from the base of the slope to the top.
5. Seed protection already installed (especially by domestic animal grazing).

BIBLIOGRAPHY

1. Doniță N., 2000, Dendrologie. Ed. Universității din Oradea.
2. Fodor E., 2001, Raport parțial la tema ''Biodiversitatea macromicetelor din arboretele de gorun și păduri de amestec cu gorun din Nord Vestul României''
3. Marcu Olimpia, Dieter, S., 1995, Entomologie forestieră. Ed. Ceres București.
4. Oltean I., Monica Porca, I. Ghizdavu, 2004, Entomologie generală, Editura Digital Data, 430 p.
5. Oltean I., 2005, Entomologie specială – Dăunătorii pădurilor, Editura AcademicPres, 266 p.
6. Rogojanu V., Perju T., 1979, Determinator pentru recunoasterea daunatorilor plantelor cultivate. Editura Ceres, Bucuresti.
7. Simionescu A.,(coordonator), 1971, Dăunătorii pădurilor, Editura Ceres București,