

THE EFFECTS OF DEFOLIATION CAUSED BY *STEREONYCHUS FRAXINI* L. BEETLES ON THE RADIAL GROWTHS IN FOREST ASH STANDS IN EASTERN ROMANIA

EFECTELE DEFOLIERILOR PRODUSE DE GANDACII DE *STEREONYCHUS FRAXINI* L. ASUPRA CREȘTERILOR RADIALE ÎN ARBORETELE DE FRASIN DIN ESTUL ROMANIEI

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Abstract

*The research aimed at understanding the influence of defoliation caused by the *Stereonychus fraxini* L. beetles on the growth and vitality of forest stands with ash trees in their composition or ash forest stands. Complete, unrepeatabe defoliation has important consequences on tree vitality, especially in the case of early defoliation, causing a 50-70% reduction in the vegetative mass compared to the witness trees unaffected by defoliation; the effect of defoliation manifests differently, depending on the age of the stands, being more pronounced in young stands than in older ones; repeated defoliation within the same year causes partial or total drying of the trees towards the end of the vegetation season. Prevention of defoliation is possible through pest control methods. Pest control treatments manage to prevent defoliation and to put an end to mass multiplication of insects.*

Keywords: ash plantations, defoliation insects, radial growth.

Rezumat

*Cercetările au avut ca scop cunoașterea influenței defolierii provocate de insecta *Stereonychus fraxini* asupra creșterii și viabilității arboretelor de foioase cu frasin în compoziție sau de frasin. Defolierea totală, nerepetată, are urmări importante asupra vitalității arborilor, mai ales dacă este timpurie, provocând o reducere a masei vegetale de 50-70% în comparație cu martorii nedefoliați; efectul defolierii se manifestă diferit, în funcție de vârsta arboretelor, fiind mai accentuat la arboretele tinere decât la cele în vârstă; defolierea repetată în același an provoacă uscarea parțială sau totală arborilor spre sfârșitul sezonului de vegetație. Prevenirea defolierilor este posibilă prin lucrări de combatere a insectei. Tratamentele de combatere reușesc să prevină defolierea și să stingă înmulțirea în masă a insectei.*

Cuvinte cheie: plantații frasin, insecte defoliatoare, creștere radială

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INTRODUCTION

In the last decade, the ash forests were affected by the pest attacks *Stereonychus fraxini* (De Geer, 1775) (Coleoptera: Curculionidae). The biological and ecological characteristics of insect (the presence of two generations of development during the year, very early appearance and the extended flight of adults) low frequency of natural enemies shows more the management of *Stereonychus* population.

Stereonychus fraxini is one of the newest species in our country in the last time.

Climate data show that on the Romanian territory, the values mean annual temperature increased in XXth century with 0.6 - 0.8 Celsius degrees, the increase being more pronounced in the eastern and southern regions of the country, where it and finds an expansion of pest attacks [Simionescu *et. al.*, 2012].

MATERIAL AND METHOD

To follow the biology, mortality biotics factors and established frequency and intensity of *Stereonychus fraxini* attack, were made observations, in 5 permanent control areas.

The established of density populations were made for both generations, in adult and larvae stages.

To follow the flight dynamics of the second generation *Stereonychus fraxini* beetles, were installed glue panels in five permanent control areas to capture the adults by accident. Capture reading was done with a periodicity of 7 days from April to July, the values being registered in number of beetles/dm².

In the field, growth samples were collected from defoliated trees (ash, elm, field maple) of several different diameters by means of a Pressler borer. A growth sample was extracted from each tree at a height of 1,30 m, using the Pressler borer. The width of the annual rings was determined with a precision of 0,001 mm, using the Lintab measuring device.

In order to determine the effect of defoliation on forest stand vitality, the same stands –defoliated and witness- were used and annual observations on the occurrence of dry trees were carried out. The measurements were limited to certain permanent sample surfaces (sample lots), and the observations and experiments were performed in several stands of different diameter classes.

RESULTS AND DISCUSSIONS

The impact of defoliation on radial growth in the studied ash trees is presented in figure 1. When applying the statistical calculation, an indirect correlation is observed between defoliation degree and radial growth reduction.

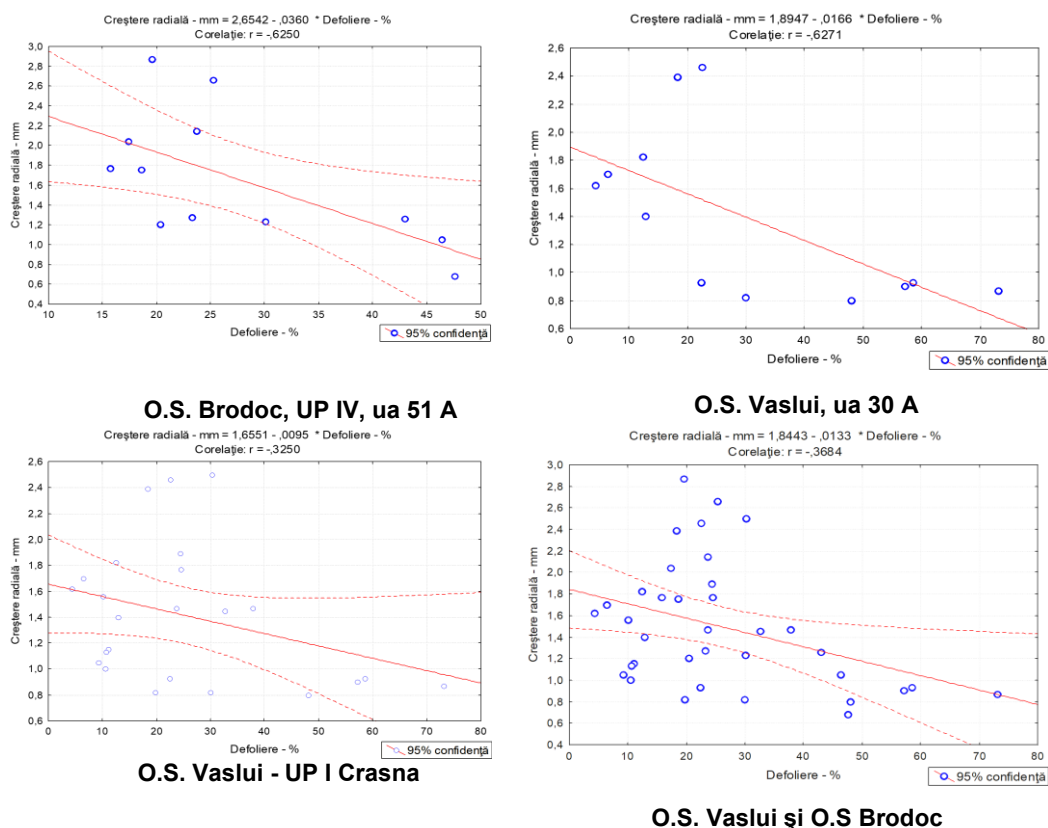


Fig. 1. Correlations between the defoliation degree and the radial average growth on experimental areas, in Vaslui Forest District and Brodoc Forest District

Defoliation causes a sensible reduction in growth of trees in forest stands. Complete, unrepeatable defoliation has important consequences on tree vitality, especially in the case of early defoliation, causing a 50-70% reduction in the vegetative mass compared to the witness trees unaffected by defoliation; the effect of defoliation manifests differently, depending on the age of the stands, being more pronounced in young stands than in older ones; repeated defoliation within the same year causes partial or total drying (figure 2) of the trees towards the end of the vegetation season [Blaga, 2010].



Fig. 2. The monitor of populations of *Stereonychus fraxini* (a,b - drying surfaces after repeated attacks)

The damage caused by defoliation also has a socio-economic dimension which involves the following:

- reduction in volume growth of defoliated trees left standing;
- loss produced by extraction of prematurely dried trees, taking into account the inferior varieties thus obtained;
- costs of artificial regeneration, mandatory under such conditions (thinned stands with trees not bearing fruits, grassy ground, etc.) or costs of ecological restoration of these stands;
- additional costs of pest detection, prognosis and control methods;
- costs of creating and implementing new management and care technologies for this kind of stands.

CONCLUSIONS

Stereonychus fraxini is one of the newest species in our country in the past time.

Stereonychus fraxini is a dangerous pest for forests and ash tree plantations, especially through early defoliation when the adults and the larvae attack in the same time the buds and the young leaves.

The appearance of mass multiplication in the last years of a primary defoliator like *Stereonychus fraxini*, which caused injuries of economic importance, imposed measures of knowledge of pest biology in order to supervise and even combat it.

The research aimed at understanding the influence of defoliation caused by the *Stereonychus fraxini* beetles on the growth and vitality of forest stands with ash trees in their composition or ash forest stands.

The defoliation caused by *Stereonychus fraxini* in ash stands or broad-leaved stands with ash trees in their composition generates the reduction in growth of wood mass (when the defoliation exceeds 25% of the foliage surface);

The age of the stands influences the reduction in growth due to defoliation, in the sense that young stands are more sensitive than old (mature) stands;

In severely and very severely defoliated stands, a small percentage of dry trees is observed. Drying occurs especially among the trees belonging to the last classes in Kraft's classification and in the case of young stands not subjected to specialized treatments/care; it would be equivalent to an accentuation of the self-elimination phenomenon [Blaga, 2010].

Prevention of defoliation is possible through pest control methods. Pest control treatments manage to prevent defoliation and to put an end to mass multiplication of insects.

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