

ADAPTATIONS OF OVERGROUND VEGETATIVE ORGANS IN SOME SEMPERVIRENT PLANTS

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Abstract

Two plant species from the Pinaceae family (Abies alba, Pinus nigra) with evergreen leaves were analyzed in this paper. The material was collected in autumn and winter, in order to emphasize some changes which could occur depending on the vegetation season.

At the same time, histo-anatomical features correlated with the evergreen phenomenon were highlighted.

Differences were observed in the sizes of different parts of the leaf anatomical structure in the two species considered for the study, reflecting differences in their mode of adaptation to the environmental conditions. Thus, there was a significant increase in the size of most tissues belonging to the structure of Abies alba leaves collected in winter, less the diameter of endoderm; and in the Pinus nigra, there was observed a considerable increase in the epidermis, hypodermis and resin canals in the leaves collected in winter, compared with leaves collected in autumn.

INTRODUCTION

In the existing literature, in the country and worldwide, the issues of ecological anatomy, and the relationship between organ structure and function become increasingly important.

Some authors have noted that the same species, depending on the original habitat, leaf structure may undergo significant adaptive changes, suggesting the possibility of some degree of freedom in the enhancing phenotype, depending on the environmental conditions.

Also, there occur differences in the anatomical structure of some organs, reflecting differences in the plants' mode of adaptation to environmental conditions.

MATERIAL AND METHODS

For the anatomical study, fresh material (leaves) of fir (*Abies alba*) and black pine (*Pinus nigra*) was used.

Cross-sections of fir leaves and black pine were made, which were clarified in chlorine hydrate for 24 hours; color was achieved by using the Geneva reactive, subsequently mounted in Canada balsam [2].

Measurements have been performed using the ocular micrometer, in a microscope ML-4M IOR found in the equipment of the Botanical Laboratory, University of Agronomic Sciences and Veterinary Medicine, Bucharest, specialization Biology.

RESULTS AND DISCUSSION

The study of *Abies alba* adaptations, performed by micrometric measurements in the different leaf tissues collected in autumn and winter, revealed significant and new issues elated to the transformations occurring at that level (Figure 1).

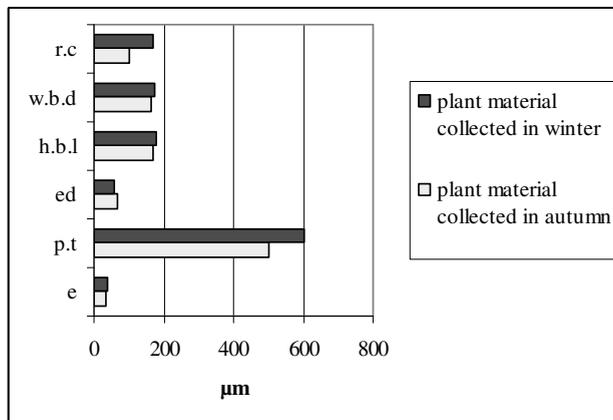


Fig. 1. Anatomical characteristics of *Abies alba* leaf

Most tissues (epidermis - ed, palisade tissue - p.t, beam driver - h.b.l = beam height leader, w.b.d = beam width driver, resin canals - rc) of the sections made in the fir leaves collected in winter, recorded an increase in size (except the endoderm - ed), compared with the tissue sections of the leaves collected in autumn.

Pinus nigra leaves are acicular [3] and the section has a semicircular shape, flat on the upper face and convex on the lower.

The micrometric comparative measurements of different tissues of leaves collected in autumn and winter allowed to highlight the adaptation of the black pine - *Pinus nigra* to the environmental conditions (Figure 2).

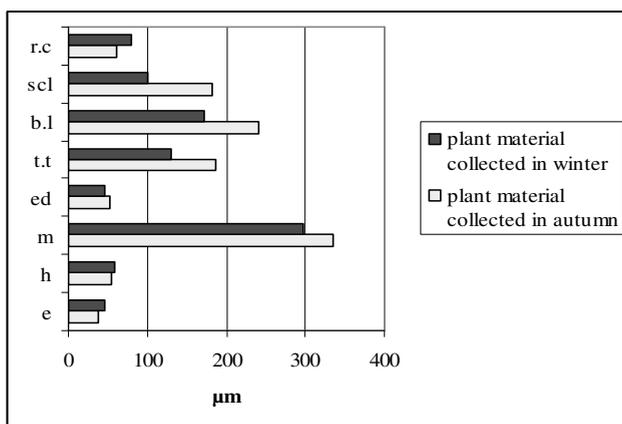


Fig. 2. Anatomical characteristics of *Pinus nigra* leaf

(e = epidermis; h = hypodermis; m = mesophyll; ed = endodermis; t.t = transfusion tissue; b.l = beam leader; scl = sclerenchyma; r.c = resin canal)

Epidermis, hypodermis and resin canal had increased in size, while the other tissues recorded decreases in their diameter.

CONCLUSIONS

1. Several anatomical traits were analyzed by original micrometric measurements in the leaves of *Abies alba* (fir) and *Pinus nigra* (black pine).
2. There were differences in the sizes of different parts of the leaf anatomical structure in the two species considered for the study, based on their harvest in two seasons (autumn and winter), reflecting differences in their mode of adaptation to the environmental conditions.
3. Thus, there was a significant increase in the size of most tissues in the *Abies alba* leaf structure (leaves collected in winter), less in the endodermis diameter.
4. In the leaves of *Pinus nigra*, there was observed a considerable increase in the epidermis, hypodermis and resin canals of the leaves collected in winter, compared with the leaves collected in autumn.

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