









Variability of qualitative morpho-anatomical characteristics of needles in *Abies alba* Mill., *A. cephalonica* Loud., and *A. borisii-regis* Mattf

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ABSTRACT

Eighteen native fir populations from the Balkan Peninsula were analyzed based on five qualitative morpho-anatomical characteristics of the lower- and upper-rank needles. The study aimed to assess the utility of these characteristics in distinguishing Balkan *Abies* taxa and to examine potential variations between needle ranks. The multivariate statistical analysis revealed that *A. alba* and *A. cephalonica* can be clearly differentiated based on the four studied characteristics of both needle types. *Abies borisii-regis* populations appeared to be heterogeneous, exhibiting similar qualitative morpho-anatomical characteristics of both needle types to those of geographically closer populations of the parent species. Additionally, some qualitative morphological differences between lower- and upper-rank needles were also observed in all three species.

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