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Multivariate statistical approach to comparison of the nutrient status of Norway spruce (*Picea abies* [L.] Karst.) and top-soil properties in differently managed forest stands

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The soil is an irreplaceable component of forest ecosystems. Soil-forming processes directly influence element cycling (EC). Plant-soil interaction is a specific part of EC. Plant-soil interactions were observed on an example of natural spruce stand (NSS), semi-natural spruce stand (SNSS) and allochthonous spruce stand (ASS) in conditions of the spruce forest altitudinal zone (1,140–1,260 m a.s.l.; +3.0°C; 1,200 mm) of the Hrubý Jeseník Mts. (Czech Republic, Central Europe), where Norway spruce (*Picea abies* [L.] Karst.) is the main edifier and stand-forming tree species. We evaluated the soil properties of H- and E-horizons at selected sites with Haplic and Skeletic Podzols and they were compared with the nutrient status of spruce. A method of the principal component analysis was used for definition of the basic hypotheses: (1) each forest stand is in specific and topically individual interactions with soil and these interactions influence its state, (2) the influence of forest management reflects in humification and in the nutrient status in plant assimilatory tissues. Cluster analysis calculated results comparable with the multivariate analysis of variance. The results show that the continuity of linear and multivariate statistical methods gives the approach to detection of the forest stage based on soil and plant tissue data.

Keywords:

Norway spruce (*Picea abies* [L.] Karst.); humification; nutrition; cation exchange capacity (CEC); principal component analysis

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