

# Wind speed and aerodynamic conductance variation in air layer affected by spruce forest stand

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**Abstract:** The results of the vertical wind speed profile analysis have been evaluated with the aim to determine the aerodynamic conductance in an air layer affected by a young spruce forest stand and to investigate the wind speed and aerodynamic conductance variation in this air layer. The simple method of the aerodynamic conductance calculation on the basis of the vertical wind speed profile analysis is presented. The experimental data were obtained at the Bílý Kříž Experimental Ecological Study Site in Moravian-Silesian Beskydy Mts, the Czech Republic (49°30'17"N, 18°32'28"E, 908 m a.s.l.). The analysed wind speed profiles were measured in and above the investigated spruce forest stand during growing season of 2004 (from July to October) on the plot with area of 2500 m<sup>2</sup> and with density 1880 trees/ha. This site represents the Norway spruce monoculture of a mean height ( $h$ ) of about 10.4 m and with age of 23 years. The mean displacement height ( $d$ ) during the investigated period was found to be 7.0 m and the roughness length ( $z_0$ ) 0.9 m. The  $g_a$  values were determined for the layer from  $(d + z_0)$  to  $z$ , in this case from 7.9 m to 18.0 m. It was shown that aerodynamic conductance values ( $g_a$ ) increase with increasing wind speed exponentially. This dependence is more closed with the wind speed measured at the mean height of the forest stand than the wind speed measured at the level of 26 m.

**Key words:** spruce forest stand, wind speed profiles, aerodynamic conductance, zero-plane displacement, roughness length

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