Changes of aerodynamic characteristics of maize during a growing season

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A b s t r a c t : In this contribution variations in the zero plane displacement (d), dynamic roughness length (z_0), drag coefficient (C_D), and the aerodynamic resistance (r_a) for maize canopy during one growing season were investigated. With this aim the vertical wind speed profiles measured above surface covered by maize canopy during the whole vegetation season were analysed. The needed experimental data were obtained at the experimental station in Žabčice, Czech Republic (lat. 49°01′ N, long. 16°37′ E, and alt. 179 m a.s.l.), from May to October 2000. Zero plane displacement values increased linearly throughout the season as the canopy increased in height (h) and leaf area index. We accepted the fact, that the relation $d = (2/3)h$ is well representative for agricultural crop covered surfaces. Throughout the season, roughness length z_0 started at 0.04 m (monthly average in May) and increased to a maximum of 0.24 m (monthly average in August) for closed maize canopy surface. The mean z_0 value of closed maize canopy surface was found to be 0.22 m and the mean value of ratio $z_0/(h-d)$ was 0.30 of mean canopy height of 2.20 m (August – October 2000).

Key words: maize, wind speed profile, zero plane displacement, roughness length, drag coefficient, aerodynamic resistance

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