

International Agrophysics

Polish Journal of Soil Science

Acta Agrophysica

Instytut Agrofizyki

International Agrophysics

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International Agrophysics

publisher: Institute of Agrophysics
Polish Academy of Sciences
Lublin, Poland

ISSN: 0236-8722

vol. 22, nr. 3 (2008)

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Effect of oxygen deficiency on soil dehydrogenase activity in a pot experiment with triticale cv. Jago vegetation

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vol. 15 (2001), nr. 3, pp. 145-149

abstract Dehydrogenase activity of an Orthic Luvisol developed from loess (Ap horizon) was observed in a greenhouse pot experiment with triticale cv. Jago vegetation under different aeration conditions. Soil aeration conditions were modified through the use of the combination of three degrees of soil compaction (1.20, 1.35 and 1.50 Mg m⁻³) and three levels of water condition (control level of 15-80 kPa; 2-5 kPa and water saturation). Triticale plants were planted into the soil at three density levels and water conditions were maintained at the control level, except at three physiological stages of tillering, shooting, and the beginning of plant flowering when 14-days oxygen stresses (I, II and III, respectively) were applied. During the stresses the water regime of the soil was elevated to the level of 2-5 kPa or flooded, except for the control pots. Four replications of each combination of compaction and water status were prepared. Soil aeration parameters such as oxygen diffusion rate - ODR, redox potential - Eh, concentration of Fe⁺² and soil dehydrogenase activity were measured four times during each stress period. The changes of the dehydrogenase activity at particular water content levels during the stresses are presented. Significant correlations between dehydrogenase activity and soil aeration indicators (Eg, ODR, Eh, Fe⁺²) are reported.

keywords soil aeration status, dehydrogenase activity, triticale, redox potential, oxygen diffusion rate

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