



Characterization of nutrient deficiency symptoms in annual ryegrass

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Newly germinated seedlings of annual ryegrass (*Lolium multiflorum* Lam.) cv. BRS Ponteio were transferred to complete or nutrient-lacking aerated Hoagland's nutrient solution so that plants were either kept under adequate nutrition or exposed to deprivation of one of the following essential macro elements: N, P, K, Ca, Mg, P or S. During a 42-day growing period under controlled conditions, solutions were replaced every other day, and deficiency symptoms and alterations in the pH of the substrates were monitored. Plants were then harvested for subsequent evaluations. Results were positive on Ca, Mg, and N deficiencies, with the incidence of leaf chlorosis and necrosis, plant etiolation, early flowering induction, and severely depressed root growth. Plant symptoms obtained by the lack of K or P were less pronounced, but still characteristic. No symptoms were detected in response to the lack of S. It is concluded that both the utilized procedure for inducing nutritional deficiency and the visual approach for detecting the corresponding symptoms are feasible for studying annual ryegrass. However, trials with longer duration are needed in order to resolve the undetected case. Further progress towards understanding the nutritional requirements of the species are likely to be achieved by also studying deficiencies of minor elements.

Key words: annual ryegrass, nutrient deficiency symptoms, plant nutrition