

Effects of Phosphorus and Zinc Application on Growth of Rice (*Oryza Sativa*) in Soils with Contrasting Phosphorus Levels in Sri Lanka

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Phosphorus (P) application can interfere with Zinc (Zn) availability for rice plant affecting their growth and yield. A pot experiment was conducted to investigate the effect of P and Zn application on growth of the rice plants in an Alfisol (S1) and Entisol (S2), with contrasting P levels. Rice (*var* Bg 360) were grown for 10 weeks under flooded conditions in pots (5.5 kg of soil per pot) with all possible combinations of four levels of P (0, 11, 33, and 99 kg ha⁻¹) and three levels of Zn (0, 2 and 4 kg ha⁻¹). Plant growth parameters were measured at the end of the experimental period. Mehlich-3 extractable P concentrations were 8.53 and 22.65 mg kg⁻¹ while Zn contents were 1.99 and 1.02 mg kg⁻¹, in S1 and S2 soils, respectively. Interaction effects of P × Zn rates were not significant on any of the plant growth parameters. Total dry matter content was significantly higher ($p < 0.05$) in S1 than that in S2 at all P levels, but the differences of dry matter contents among the two soils were low at high P levels. The low total dry matter content in S1 could be due in part to differences in P and Zn availabilities in these soils. Irrespective of soil type and P application, total dry matter yield increased with Zn application, by 12% at 2 kg ha⁻¹ but only by 8% at 4 kg ha⁻¹ compared to that in 0 Zn level. These observations suggested that the application of Zn has beneficial effects in rice cultivation irrespective of the available P content in these two soils. However, to better understand the root causes for the observed effects, changes in P and Zn availabilities in these soils upon their application needs to be investigated in future studies.

Key words: Dry matter, Phosphorus, Plant growth, Zinc