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Effect of cadmium and lead stress on physiological and biochemical parameters of twelve wheat varieties

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Abstract

Anthropogenic release of heavy metals into the environment has continuously increased soil contamination. Heavy metal toxicity in the environment is of great concern because of its effects on growth and development of plants. Heavy metals may cause deleterious effects on human health due to the ingestion of plants (food grain) grown in contaminated soils. The day by day emerging problems of heavy metal pollution in wheat fields have attracted more and more attention towards wheat to be taken as the experimental plant. Excess concentration of cadmium and lead may exhibit detrimental effect on wheat (*Triticumaestivum* L.). An effective technique for assessing the response of wheat varieties to excess concentration of heavy metals is required to create high yielding tolerant varieties. The study was undertaken to investigate the effect of Cd and Pbon physiological and biochemical parameters on the sample of 12 wheat varieties including germination percentage, length of seedlings, number of lateral roots, total protein content, total carbohydrate content and amount of pigments. The experiment included control and six treatments of cadmium and lead each at different concentrations. On an average, significant differences have been found among the varieties. Increasing Cd and Pb levels lead to several disruptions of wheat varieties, which are reflected by reduction in germination percentage, growth, protein, carbohydrate, chlorophyll content. However, number of lateral roots in treated plants increased with increasing level of heavy metals. Decrease in stomatal frequency was also observed with metal stress in comparison to the control Wheat varieties. The effect of lead toxicity was more pronounced at 200 µM whereas the effect of cadmium toxicity was more pronounced at 100 µM. Cd was observes to be more toxic than Pb.