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EFFECT OF Cd^{2+} STRESS ON SEED GERMINATION CHARACTERISTICS OF RYEGRASS, INDIAN MUSTARD AND GRAIN AMARANTH

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Abstract

In order to select a better plant to extract cadmium in heavy metal contaminated soils, a hydroponic germination experiment was designed to evaluate the effects of cadmium on seed germination characteristics of Grain amaranth (*Amaranthus hypochondriacus L.*), Indian mustard (*Brassica juncea*) and Ryegrass (*Lolium perenne L.*). The results showed that fresh weight, dry weight and germination index of Ryegrass were promoted at the low cadmium concentrations (≤ 25 mg/L), while that of 3 plants were inhibited at the high cadmium concentration (≥ 50 mg/L). The inhibition rates of root and bud length of three plants were correlated significantly with cadmium concentrations ($P < 0.05$). The bud sensitivity of three plants to cadmium was in order of Grain amaranth, Ryegrass and Indian mustard, and the sensitivity of root length of three plants to cadmium was in order of Grain amaranth, Indian mustard and Ryegrass, based on the half inhibitory concentration (IC_{50}). The tolerance of three plants to cadmium was in order of Ryegrass, Indian mustard and Grain amaranth based on the value of membership function. Our findings suggest that the root length inhibition rate can probably be used as an important indicator to assess ability of heavy metal (Cd^{2+}) stress. Ryegrass is speculated to have better resistance to Cd^{2+} stress and may be further applied to heavy metal Cd^{2+} ecological restoration.

Key words: cadmium, seed, hyperaccumulator, germination

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