

Influence of iron toxicity on root characteristics of selected *Oryza sativa* L. varieties under field conditions

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Iron toxicity is one of the most severe abiotic limitations for paddy cultivation in low-country wet zone (LCWZ) of Sri Lanka, because of its negative impact on rice yield. The present study examined root characteristics of two rice varieties, i.e. Fe tolerant Bw 267-3 and Fe susceptible Bw 272-6b grown in naturally iron-rich soils at Regional Rice Research and Development Center (RRRDC), Bombuwala, in 2017/2018 'Maha' season. Plants were grown in field in a Complete Randomized Block Design, with three replicates. Selected morphological characters and physiological parameters of roots were examined at two growth stages; the maximum tillering and flowering. The results showed that, soil Fe content and soil pH in selected rice field at time of planting was 605.74 ± 160.51 mg/kg and 4.84 ± 0.20 respectively, which could induce toxic effects in rice plants. The root length, root volume, number of adventitious roots and root dry matter in Bw267-3 were significantly higher than in Bw272-6b at both growth stages, confirming their previously demonstrated tolerant and susceptible traits (one-way ANOVA: $F=134.97$, $p<0.05$). The total iron content in root plaque was greater in susceptible Bw272-6b than in tolerant Bw267-3 at both growth stages, while the iron content inside the root showed a reverse pattern. As toxicity symptoms are linked to the ability of iron to pass into roots and thereby to other parts of paddy plant, the disparity in root growth and iron accumulation demonstrated between the two varieties in the present study would most likely be linked to their inherent traits of iron toxicity tolerance.

Keywords: Field screening, Iron toxicity, LCWZ Sri Lanka, rice-root characteristics

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