Influence of seed priming on seed germination and seedling vigour of traditional rice varieties in Sri Lanka

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Abstract

Demand for traditional rice varieties has increased in recent past. However, seeds of traditional varieties have poor germinability and storability. Thus, seed priming for six selected traditional rice varieties (*i.e.* Batapola-el, Suwendal, Kaluheenati, Kuruluthuda, Maawee and Madathawalu) was tested using distilled water and three concentrations (100%, 50% and 25%) of neem seed extract (NSE) for 24, 48, and 72 hours. The Primed seeds were dried under ambient laboratory conditions until initial weight was achieved. Prior to germination, all seeds were soaked in water for 0, 24, 48, and 72 hours. Germination of primed and un-primed seeds was tested at ambient temperature (~27 °C) and light using paper towel method. Seed vigour was evaluated using seedling emergence in uncontrolled glasshouse conditions. Four replicates of 100 seeds were used in each treatment. Arcsine transformed data were analyzed using one-way ANOVA. Germination percentages of un-primed Suwendal, Batapola-el, Kaluheenati, Kuruluthuda, Maawee and Madathawalu seeds were 89%, 91%, 62%, 32%, 24%, and 20%, respectively, while the seedling emergence were 76%, 79%, 65%, 10%, 12% and 40%, respectively. Hydro-priming for 72 hours has significantly improved the seed germination (98%) and the seedling emergence (>94%) of Suwendal and Batapola-el. Fifty percent NSE priming for 24+24 hours pre-soaking has significantly improved seed germination (83%) and seedling emergence (83%) of Kaluheenati while 25% NSE priming for 72+24 hours pre-soaking has improved seed germination (64%) and seedling emergence (25%) of Kuruluthuda. Furthermore, 25% NSE priming for 48+48 hours pre-soaking was effective in improving seed germination (49%) and seedling emergence (30%) of Maawee, whereas 100% neem extract priming for 72+48 hours pre-soaking was needed to improve the seed germination (55%) and seedling emergence (53%) of Madathawalu. Priming with NSE improved the seed germination and vigour of Kaluheenati, Kuruluthuda, Maawee and Madathawalu, while hydro-priming was effective for Suwendal and Batapola-el seeds. These priming treatments could be practiced even in organic rice production as no synthetic chemicals are used. Further, these priming treatments could be used in promoting traditional rice varieties among farmers.

Keywords: *Neem seed extract, Seed germination, Seed priming, Seed vigour, Traditional rice varieties*

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