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## Seed dormancy, germination and soil seed bank composition of 12 common rice weeds of Sri Lanka

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Weeds are a major problem that affects rice production causing heavy economic losses. This study was conducted to investigate seed dormancy and germination of common paddy weeds in Sri Lanka and their soil seed bank status. Dormancy and germination of seeds of 12 rice weeds collected from Dambulla area were studied. To test initial seed germination, seeds of each species (five replicates of 20 seeds each) were incubated at 25°C in an incubator under 12 hr/12 hr light/dark and 24 hr dark in distilled water and 500 ppm gibberellic acid in Petri dishes containing tissue paper. Final germination percentages were calculated after 28 days. Seeds of species suspected to possess physical dormancy were mechanically scarified prior to germination tests. To study emergence from the soil seed bank, nine soil samples (30×25×10 cm<sup>3</sup>) from each locality were randomly collected from rice fields representing wet (Peradeniya), intermediate (Kurunegala) and dry (Dambulla and Kekirawa) zones of the country at the beginning of *Maha* season 2017-2018. Soil samples were spread in plastic trays in a greenhouse and kept continuously moist for three months. Species emerged were identified and the number of individuals from each species were recorded. Data were analyzed using one-way ANOVA. *Cyperus difformis* and *Ludwigia peruviana* showed high germination (>80%) in distilled water and can be considered as non-dormant. Seed germination of *L. perennis*, *C. iria*, *Ischaemum rugosum* and *Dactyloctenium aegyptium* significantly increased in the presence of gibberellic acid indicating the presence of non-deep physiological dormancy (P<0.05). Seeds of *Aeschynomene indica* germinated only when scarified, confirming the presence of physical dormancy. *Isachne globosa*, *I. rugosum*, *D. aegyptium* and *Echinochloa glabrescens* showed low germination (<20%) and *C. rotundus* and *Limnocharis flava* did not germinate under tested conditions. Germination of six tested species was decreased under 24 hr dark condition. *Cyperus iria*, *C. difformis*, *I. globosa*, *L. perennis*, *L. peruviana* and *E. glabrescens* were recorded in soil samples from all four localities. *Cyperus* spp. were the most abundant and was significantly higher (P<0.05) in samples collected from the dry zone (>4000 seedlings/m<sup>2</sup>) than wet and intermediate zones (<1500 seedlings/m<sup>2</sup>). *I. globosa* was also higher in samples from the dry zone while *Ludwigia* spp. were lower compared to the samples from wet and intermediate zones. Information on the seed dormancy type, germination requirements and composition of weed seed banks, will be useful in implementation of species specific, effective weed control measures.

**Keywords:** Germination, rice, seed dormancy, soil seed bank, weeds