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Seed Biology of Ten Common Roadside Sri Lankan Weed Species**Kumari L.R.L.S.¹, Gunadasa D.M.N.H.^{1,2}, Merritt D.J.^{3,4}, Turner S.R.^{3,4},
Gama Arachchige N.S.^{1,2*}**¹*Department of Botany, University of Peradeniya, Peradeniya, Sri Lanka*²*Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka*³*Kings Park Science, Department of Biodiversity, Conservation and Attractions, Kings Park, Australia*⁴*School of Biological Sciences, University of Western Australia, Perth, Australia***suranjithgan@gmail.com***Abstract**

Weeds are undesirable in habitats where they grow and cause negative economic and environmental impacts. Understanding in weed seed germination is important to deploy control measures. This study was conducted to evaluate the effect of seed dormancy, smoke, KAR₁, salinity and pH on germination of ten common roadside weed species in Sri Lanka. Freshly collected seeds of ten weed species were subjected to five treatments vis, (1) 0 and 500 ppm GA₃; (2) Smoke solutions of 0%, 5%, 25%, 50%, 75%, and 100% strength; (3) 0 nM, 10 nM, 100 nM and 1 μM KAR₁ solutions; (4) 0 nM, 25 mM, 50 mM, 75 mM, 100 mM, and 200 mM NaCl solutions; and (5) 4,5,6,7,8,9 and 10 pH buffer solutions. All the treatments were applied on 100 seeds (five replicates, 20 seeds each) and incubated at 25° C under 12/12 hrs light/dark for 4 weeks. Final germination percentages were calculated. Seeds of *Bidens pilosa*, *Mikania micrantha*, *Rivina humilis*, *Tridax procumbens*, and *Vernonia cinerea* were identified as non-dormant (germination>90%) and seeds of *Ageratum conyzoides*, *Hyptis capitata*, *Oldenlandia herbacea*, *Ocimum tenuiflorum* and *Spilanthes iabadicensis* were identified as dormant (germination<65%). GA₃ improved germination of *S. iabadicensis* and KAR₁ improved germination of *A. conyzoides*, *H. capitata*, *O. herbacea*, and *S. iabadicensis*. Smoke water did not improve seed germination of any of the species. Seven species (*B. pilosa*, *M. micrantha*, *O. herbacea*, *O. tenuiflorum*, *R. humilis*, and *T. procumbens*) exhibited a wide range of salinity tolerance (0-75 mM NaCl) with>50% germination. *R. humilis* exhibited a wide range of pH tolerance (pH 5-8) with >50% germination. Seed dormancy of four species were broken by GA₃ and KAR₁ treatments indicating physiological seed dormancy (PD). Due to unresponsiveness to dormancy breaking treatments, it can be assumed that seed of *O. tenuiflorum* possess deep-PD. The study confirmed that responsiveness to KAR₁, smoke, salinity and pH is species specific and seed dormancy may lead to the formation of persistent soil weed seed banks. These traits may facilitate the weed seeds to compete with other species and dominate the vegetation.

Keywords: KARRIKINOLIDE (KAR₁), pH, Smoke water, Salinity, Weed species