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FUNCTIONAL PLASTICITY OF SEEDS OF THE INVASIVE SPECIES *Miconia crenata*: IMPLICATION FOR EFFECTIVE MANAGEMENT

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Invasive plant species *Miconia crenata* poses a significant threat to biodiversity and ecosystem stability in Sri Lanka. Its rapid spread necessitates the development of effective management strategies, which require a deeper understanding of its biology, particularly the plasticity of seed functional traits. This study investigated seed dormancy variations through monthly dry storage treatments, germination patterns under different light conditions [Light/dark condition (12 h/12 h) and complete dark conditions (24 h)], environmental adaptability via the hydrotime model across three populations from Riverston (7°31'23.6"N 80°44'11.7"E), Hanthana (7°15'31.5"N 80°36'01.9"E) and Galle (6°03'31.0"N 80°18'47.9"E), and the impact of bioclimatic factors on seed functional traits, specifically moisture content (oven drying method), dry weight, germination timing, dormancy, and osmotic stress tolerance [0, –0.1, –0.2, –0.5, and –1 MPa poly(ethylene glycol) solutions], each tested with four replicates. Germination trials under different light conditions revealed the variability in the portion of non-dormant seeds among populations. Dry storage treatments revealed significant differences in dormancy patterns ($p < 0.001$) with distinct dormancy cycles. However, there was no significant difference in seed moisture content ($w = 2.867$, $p = 0.236$), dry weight ($F = 3.777$, $p = 0.087$), and the hydro-time constant (H_Θ; $z = 2.997$, $p = 0.22$) among populations. Riverston seeds exhibited the lowest base water potential (-2.54 MPa), indicating greater drought tolerance ability, while Galle seeds showed higher moisture content (14.41%), higher base water potential (–3.34 MPa), and lower dormancy, reflecting adaptation to wetter environments. Canonical Correspondence Analysis (CCA) demonstrated a strong correlation between temperature (BIO1), and diurnal range (BIO2), with seed functional traits, highlighting the environmental influences on germination behavior. The study confirms high plasticity in seed traits of *M. crenata*, enabling its successful establishment in diverse climates. Future research should focus on analysing genetic variation and assessing seed trait responses under simulated natural conditions to refine management approaches.

Keywords: Ecosystem management, Germination plasticity, Invasive species, *Miconia crenata*, Seed dormancy