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Distribution analysis and improved propagation of selected *Eriocaulon* species used for medicinal purposes

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Eriocaulon quinquangulare L. (Heen-Kokmota) and *Eriocaulon sexangulare* L. (Kokmota) are widely used in Ayurveda and other traditional treatments in Asian region. Various ecological pressures and intrinsic characteristics of plants such as poor seed germination, slow growth and explicit environmental requirements have caused a drastic decline in the wild populations of these plant species. The main objective of this study was to analyze the distribution and develop an efficient propagation method for the selected *Eriocaulon* species. Species occurrence data and environmental data were collected and species distribution models (SDMs) were developed using Maxent software (v3.4.4). In current SDMs, highly suitable habitats for *E. quinquangulare* and *E. sexangulare* were severely restricted, comprising only 0.17% and 1.65% of the suitable habitats, respectively. Investigations on current conservation status revealed that there were no initiatives for *ex situ* conservation, and *in situ* conservation was restricted to a few protected areas. The identification of *Eriocaulon* species poses considerable challenges due to low interspecific variation. Therefore, a comprehensive pictorial guide including vegetative and reproductive characteristics of the selected species was compiled to facilitate accurate identification. Studies on propagation were conducted according to CRD and data were analyzed using one-way ANOVA in R Studio (v1.4.1106). In investigation of the impact of different potting media on seed germination and subsequent plant growth, *E. sexangulare* exhibited significantly higher ($p \leq 0.05$) seed germination in parent soil (41.7%) and in a potting mixture of sand and coir (2:1) (39.7%) compared to all other media tested. However, *E. quinquangulare* showed no seed germination. Furthermore, the investigation was extended for seed priming treatments with Gibberellic acid (GA), kinetin, and KNO_3 . In *E. sexangulare*, 200 ppm KNO_3 priming resulted in 100% germination. Moreover, seeds soaked in 10 ppm GA exhibited significantly higher ($p \leq 0.05$) germination (95.5%) and seedling growth (20.05 mm) compared to other GA treatments. Although seed priming did not improve seed germination in *E. quinquangulare*, pre-chilling the seeds for 20 days resulted in significantly higher ($p \leq 0.05$) seed germination (31.4%) compared to the control (11.7%). This study revealed the potential of selected seed treatments for overcoming inherent hindrance associated with germination and growth in *E. sexangulare* and *E. quinquangulare*, further providing insights for their conservation and sustainable utilization.

Keywords: *E. quinquangulare*, *E. sexangulare*, species distribution modelling, seed priming, pre-chilling.