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Relationships among *Calophyllum* L. species in Sri Lanka: Insights from vegetative morphology

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The genus *Calophyllum* L. (Family: Clusiaceae) encompasses about two hundred species and is represented by thirteen taxa in Sri Lanka, where twelve are endemic. Species identification of *Calophyllum* is usually based on floral morphology even though this can be challenging due to seasonal flowering, except for *C. inophyllum* ('Domba'). A detailed morphological investigation was carried out to construct the relationships among *Calophyllum* species in Sri Lanka and to construct a field identification key based on vegetative morphological characters. Field sampling for nine taxa was carried out, while voucher specimens deposited at the National Herbarium were used for the others. A total of forty vegetative morphological characters were selected and scored. Unweighted Pair Group Method with Arithmetic means (UPGMA) and Principal Component Analysis were performed using software PC-ORD (version 4.0) to construct relationships within the genus. Most distinct morphological characters were used to develop a dichotomous key.

Results were analogous to the previous studies, with few exceptions. The farthest relationship was shown by *C. inophyllum*, the only non endemic taxa, which may be the ancestor of the Sri Lankan *Calophyllum*. Principal Component Analysis illustrated the variations among species, dividing the genus into three major groups characterized by vegetative morphology. Taxa sampled from montane zone (*C. walkeri, C. cuneifolium* and *C. lankaensis*) formed one distinct group characterized by their leaf shape and leaf size. *Calophyllum cordato- oblongum* and *C. thwaitesii* formed a separate group showing close affinity between the two, which was confirmed by the cordate leaf base. The submontane taxa; *C. trapezifolium* and *C. tomentosum* formed another subgroup of a major group, by forming unique clusters. *Calophyllum bracteatum* showed an isolated placement with its distinctive dimorphic leaves. The distinct placement of *C. calaba* and *C. acidus* resolved the taxonomic controversy of the two, giving evidence to separate them as different species. *Calophyllum calaba* was placed in an intermediate position, from which montane group may have evolved. The results of this study added further evidence for evolutionary relationships and radiation of the genus. The dichotomous key, developed by distinctive vegetative morphological characters will be more useful for field identification of *Calophyllum* species in Sri Lanka.

Keywords: *Calophyllum*, UPGMA, PC-ORD, dichotomous key, evolution