

Molecular phylogeny and species limits of native *Asparagus* in Sri Lanka

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Asparagus L. commonly known as “Hatawariya”, is the type genus of the family *Asparagaceae* and is distributed in moist, dry, intermediate and montane regions of Sri Lanka. Throughout the taxonomic history the circumscription of the genus has been changing. In 1898 Trimen recognized four species of *Asparagus* occurring in Sri Lanka, *A. racemosus* Willd., *A. zeylanicus* (Baker) Hook f., *A. falcatus* L. and *A. gonoclados* Baker. In 2000, Dassanayake recognized only three species, where he merged *A. zeylanicus* with *A. racemosus*. A morphometric analysis carried out recently on Sri Lankan *Asparagus* recognized five phenetic groups within the genus, where *A. racemosus* was divided into three distinct phenetic groups; low country, small cladode bearing group; low country, large cladode bearing group and upcountry, small cladode bearing group. Therefore, the present study was carried out to determine the species limits and phylogenetic relationships of native *Asparagus* species occurring in Sri Lanka, using molecular sequence data and also to study their seed characters. The molecular phylogenetic analyses were carried out using internal transcribed spacer (ITS1-5.8S-ITS2) region of the nr (nuclear ribosomal) DNA and chloroplast DNA *petD-rpoA* intergenic spacer region independently and in combination. This also included a combined molecular and morphological analysis. Seed shape and sculpturing patterns were studied using the Scanning electron microscope and were included in the combined molecular and morphological analysis. Phylogenetic tree based on the combined molecular DNA sequences suggests the monophyly of the native *Asparagus* species. In all the phylogenetic analyses the low country, small cladode bearing *A. racemosus* group was recovered as the basal group, and this phenetic group best matched with the morphological description in taxonomic literature for *A. racemosus*. Combined molecular and morphological analysis revealed the close relationship of upcountry *A. racemosus* group with *A. gonoclados* and the distinctiveness from the other two phenetic groups. This group corroborates with previously described *A. zeylanicus* (Baker) Hook f. in literature. The present study suggests the necessity of the resurrection of the endemic *A. zeylanicus*. Furthermore, the identity of the low country, large cladode bearing *A. racemosus* group needs to be supported by further studies.