

STUDIES ON THE GENUS CINNAMOMUM

BY

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ABSTRACT

Based on morphological and organoleptic characters of the bark and leaf, a germplasm survey of the genus Cinnamomum was carried out in different parts of the island. A total of 60 cultivated cinnamon (C. verum) accessions and 30 accessions of wild species viz. C. capparudcoronde, C. citriodorum, C. dubium, C. litseaefolium, C. ovalifolium, C. rivulorum and C. sinharajanse were located. All the selected accessions were air layered. The rooted branches of 32 C. verum accessions and seedlings of most of the wild Cinnamomum species were established at the Research Station of the Department of Minor Export Crops, Matale. Dried herbarium specimens were prepared for the 30 accessions. A detailed study of foliar morphology including lamina anatomy, ecophysiological features, pollen morphology, chromosome number and T.L.C. study of essential oil constituents were made on 34 accessions (30 accessions of wild species were compared with 4 accessions of C. verum)

Observations on various quantitative leaf parameters showed that a combination of these could be used to identify most of the species. The highest variability for the above parameters were found in C. verum. Leaf area showed a significant positive correlation with leaf length and breadth.

Sunken stomates showed hypostomatous distribution and paracytic arrangement in all the species investigated. Abaxial epidermal cells in surface view were polygonal in outline with thick wavy walls in all the species except C. rivulorum and C. sinharajanse, which had somewhat straighter walls. Simple unicellular hairs were a characteristic feature of all the Cinnamomum species examined. Epidermal cell and trichome characteristics could be of considerable value in differentiating the various species of the genus. Lamina anatomy was comparable among the different species with

some exceptions. C. ovalifolium (an upper montane "sun species") had the thickest epidermis and a double layer of palisade cells, C. sinharajanse (wet low land forest "shade species") had a thin epidermis and poorly developed mesophyll.

Ecophysiological parameters of leaves were considerably influenced by environmental factors. Sun species showed highest values for leaf consistency, and succulence and lowest values for potential leaf tissue hydration and specific leaf area. In the shade species the converse of the above trend was found.

All the pollen grains were omni aperturate, spheroidal in shape and possessed faveolate ornamentation. Significant difference in diameter was found among some of the species.

All the species studied had the same diploid chromosome number of 24. The cytological data on wild species are reported for the first time.

From the T.L.C. study, major constituents of volatile oils such as cinnamaldehyde, eugenol, linalool, alpha terpineol, acetyl eugenol and cineole were detected by means of colour reactions and comparisons using vanillin-sulphuric acid spray reagent with authentic samples. Eugenol was detected in stem-bark oils of all the species except C. ovalifolium. Eugenol was the major component of stem-bark oil in species such as C. capparu-coronde, C. sinharahanse and C. rivulorum, while linalool was the most important in the other 4 wild species. Cinnamaldehyde was found only in C. citriodorum, C. verum, C. sinharajanse and unidentified Cinnamomum of Gammaduwa stem-bark oils.

Eugenol was the major component of C. verum and C. sinharajanse leaf oil, while linalool was the principal constituent in C. dubium C. litseaefolium and unidentified Cinnamomum of Gammaduwa.

The major substance in the leaf oil of C. citriodorum was identified as citronellal. The presence of this constituent in the genus Cinnamomum has not been reported elsewhere.

From T.L.C. analysis of the root-bark oil, camphor could not be detected using the vanillin-sulphuric acid reagent, but was shown to be the major constituent using uv light fluorescence studies. The data on major constituents of wild species in Sri Lanka are reported for the first time in this genus.