

EVALUATION AND CHARACTERIZATION OF SOME COMMONLY  
CULTIVATED DIOSCOREA ACCESSIONS IN SRI LANKA

By

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Thesis

Submitted in partial fulfilment of the requirements

for the degree of

MASTER OF PHILOSOPHY

in the

POSTGRADUATE INSTITUTE OF AGRICULTURE

of the

UNIVERSITY OF PERADENIYA

SRI LANKA

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## ABSTRACT

In all 356 accessions of mainly cultivated species and forms of the genus *Dioscorea* were examined. Of these 342 accessions were collected from 9 administrative districts of Sri Lanka, 13 accessions of *D. alata* were from Puerto Rico, and one accession of *D. rotundata* was from Nigeria. These were grown at the University Experimental Farm, Dodangolla.

The accessions were grouped under appropriate local names and planted in April 1984 and harvested after 9 months. Comparative morphological studies of the above ground parts such as stems, leaves and flowers and below ground parts, namely; tubers and roots were carried out. Samples obtained from 42 selected accessions were used for studies of leaf anatomy and epidermal features such as epidermal cell size and guard cell size, stomal distribution, arrangement and frequency. The same accessions were used to study ecophysiological parameters such as 'Density Thickness', 'Degree of Succulence', and 'Potential Tissue Hydration'. Fresh and dried leaf samples of 15 accessions were used to study inter and intraspecific variation of phenolic constituents of 4 cultivated species of *Dioscorea*.

The salient findings were that the 356 accessions represent 5 different species of *Dioscorea*, namely: *D. alata*, *D. bulbifera*, *D. esculenta*, *D. pentaphylla* and *D. rotundata*. *D. rotundata* has not hitherto been cultivated in Sri Lanka and *D. pentaphylla* is a wild-species in Sri Lanka and other tropical countries. The 3 commonly cultivated species in

Sri Lanka are D. alata, D. bulbifera and D. esculenta.

Of these D. alata is the commonly cultivated species and shows wide variations. This study recognizes 12 different forms of this species. D. bulbifera has 2 distinct forms; one with edible aerial tubers called Mothaka-valli which is mainly cultivated in the Jaffna District and the other is found growing wild in the wetter parts of the low and mid country. D. esculenta is represented by 4 distinct forms. They can be referred to as D. esculenta forma Java-ala, D. esculenta forma Siru-valli, D. esculenta forma Kukulala and D. esculenta forma Katu-ala. Of these D. esculenta forma Java-ala represents D. esculenta var. faciculata while the other 3 forma belong to D. esculenta var. spinosa.

Keys for the identification of these species and separate supplementary keys for the identification of different cultivars or forms of the 3 species have been prepared, using morphological characters such as tuber shape, colour of flesh, size of leaves and degree of lobing.

Anatomical characters especially lamina thickness, number and size of epidermal cells, stomatal index and thickness of the palisade layer were found to be useful in distinguishing the 3 major cultivated species of Dioscorea. D. esculenta has a high stomatal index of 26.03 while D. alata has value of 22.23 and D. bulbifera has a low value of 16.7. The epidermal cells were large in D. alata while they were relatively small in D. bulbifera. The lamina is relatively thick in D. esculenta and somewhat thin in D. bulbifera.

Ecophysiological and anatomical features suggest that D. esculenta can withstand moderate water stress as compared to D. alata and D. bulbifera.

Of the phenolic constituents, compound No.1 was found in all the samples examined and may be regarded as a generic marker. Pattern of distribution of the phenolic constituents was not of much use in distinguishing the ~~cultivated~~ yams available in Sri Lanka, either at the cultivar level or species level.