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54382

Progress Report - January - June 1985

Title of Project - Collection, Classification and evaluation of Dioscoreas, aroids and Plectranthus Spp.

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1. The Collection of Yam Spp.

The collection of yam Spp. was continued in most of the districts except in some of the Nothern areas. It appears impossible to travel to some districts of the North, but attempts are being made to collect them through indirect sources by using students and research officers of government institutions who are residing in the Nothern region. It is likely that most of the germplasm locally available has been already collected.

2. Details of Research undertaken in the Period Under Review

The collection which has been kept under storage until March was replanted in the field at the University Experimental Station, Dodangolla. The extent covers an area of about 3 acres. The accessions which are similar according to the preliminary morphological classification were planted in blocks to further study the dissimilarities if any, of these accessions. The planting was at a spacing of 1m x 1m, in holes filled with light soil mixed with organic matter. Inorganic fertilizers were not used. The individual hills were provided with stakes, 8 feet tall, two weeks after planting.

The study included the following characteristics,

3. Morphological Characteristics :-

Detailed studies of both qualitative and quantitative characters were made.

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(a) For qualitative characters, the description of the plant morphology such as dormancy (early or late sprouting), colour of the sprout, direction of turning, cross section of stem, presence of wings, auricles, hairs and spines, colour of tender vine and mature vine were studied. Leaf characters such as arrangement, shape, venation, colour of lamina, base of lamina, veins, and petioles were also studied.

Tuber characters studied included their shape, colour of flesh, and area just below the cork layer and their change in colour on exposure to air and the amount of adventitious roots present on the tuber.

The flower structures, and aerial tuber shape and their colours were also studied.

(b) Quantitative characters studied were lamina length & breadth, petiole length, number of veins & spines on stem, weight of underground tuber & aerial tuber, maximum length & breadth of underground tuber and number of tubers per plant, inflorescence number per axil of leaf, inflorescence length, & number of flowers per inflorescence.

4. Study of foliar anatomical and epidermal features :-

Permanent microtome sections were prepared from leaf lamina. Sections were taken from the mature leaf including the mid rib. Drawing were made on the outline of the mid rib region and transverse section of the leaf lamina under a camera lucida.

Lamina thickness, heights of upper epiderms, upper palisade & lower palisade cells, spongy cells & lower epidermis were also measured. Epidermal features were drawn using a camera lucida. Number of epidermal cells, guard cells, length & breadth of epidermal cells & guard cells were measured.

5. Eco-physiological features :-

Leaf discs from each variety were cut with a cutter of known area. 3 sets of each containing 30 discs were made from each variety. These leaf discs were immediately put in distilled water for 3 hours to attain full turgid condition and then blotted & weighed to obtain the turgid fresh weight. These leaf discs were then dried in an oven to get the dry weight. Using the above data leaf indexes namely 'Density Thickness', 'Degree of Succulence', and 'Potential leaf tissue hydration' were calculated for each veriety.

6. Phyto Chemical Contituents :-

Two directional paper chromatography was done with some dried and fresh leaf varieties to detect the flavanoid spots.

On the basis of morphological characters the 356 yam accessions were identified as belonging to five different species of which 3 are most commonly cultivated in Sri Lanka, namely D. alata, D. esculenta and D. bulbifera.

D. alata is the commonly cultivated one and had the highest number of accessions. However the plants were highly variable in form, size & pigmentation. D. esculenta had smaller, but a larger number of tubers. In D. bulbifera a large number of aerial tubers or bulbils were present.

The accessions were grouped under the same local name and it came to 42 varieties. Within each variety some forms looked similar in morphology and they will be grouped again.

7. Aroids and Innala :-

Different aroids and innala accessions were collected and maintained at the University Experimental Station.

8. Involvement of Postgraduate Students

Mr. D.A.P. Dissanayake who is registered as a postgraduate student (M. Phil.) continued to show progress in his course work. He was following only two courses per term due to the preparation of planting materials and field planting of yams. He is presently in-charge of all the field collections of Dioscoreas, Aroids and Plectranthus Spp. His major area for research for the M. Phil. Degree will be the continuation of the classification of all yam Spp., their chemical analysis and rapid micro propagation techniques. His performance over the period under review has been very satisfactory.

Mrs. N. Harischandra, a Research Officer of the Department of Agriculture too has been associated with the project. She has been sponsored by a joint program of the Department of Agriculture and the International Development of Research Center (IDRC), Canada. Mrs. Harischandra is continuing her research on classification of Dioscoreas and has been studying the anatomical and biochemical features of those yams. She too has made very good progress in research during the period under review.

9. Procurement of Equipment and Chemicals

The IBM electric typewriter and the camera has been received. However, some accessories for the camera have not yet been procured due to their non-availability with the Agents. Orders have been placed by the Authority. The chemicals required for analysis too have been received.

10. Plan of work - July - December, 1985

1. Collection of germplasm from certain districts in the Nothern Provinces have to be completed. This is unlikely to happen by direct procedure due to the prevailing unsettled situation in those areas. However as indicated earlier attempts will be made to collect them through indirect sources.

2. Chemical analyses of the Dioscoreas will be continued. This work commenced in March, 1985.

3. Rapid Multiplication Methods will be investigated.

4. The field plantings of all yams will be maintained. Since the extents grown are large maintenance itself has become a considerable task.

11. Future Concerns

1. There are a large number of valuable accessions of all yams in this collection. At harvest time in March/April massive quantities of yams have to be stored. This will create problems, and it is suggested that an announcement be directed to both national and international institutes involved root crop research about the availability of germplasm for distribution.

2. After the research is completed an arrangement should be made for the conservation, preservation and utilization of this valuable germplasm either by continued support to the Faculty or they should be handed over to a relavant institution. There should be advanced planning for this, and holding duplicate collections at another center outside Sri Lanka will be also very desirable. I shall appreciate if enquiries could be made in this regard.