PD-AAX-202

Dean's Office
Faculty of Agriculture
University of Peradeniya
Peradeniya.

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Progress Report - January - June, 1986

Tittle of Project : Collection, Classification and Evaluation of Dioscoreas, Aroids and Plectranthus spp.

1. Collection of Yam spp :

The collection of Dioscoreas have been completed and no further attempts have been made to explore except in a few instances to re-check the sites of collection. The collection of Aroids is yet in progress. The collection of Plectranthus spp too have been completed.

2. Details of Research :

The entire collection of all yam spp have been replanted since March/April at the University Experimental Station, Dodangolla and covers an area of about six (6) acres. Some have been planted in block to obtain information on their yield performance, while the rest are devoted to experiments. The field and laboratory research undertaken during the period under review are as follows:

(a) Field Research :

1. Evaluation of Rapid Multiplication Techniques for the yams of Sri Lanka.

Rapid multiplication techniques are being tested for ten selected cultivars of yams from the germplasm collection.

1. Ini ala
2. Introduced Peuto Rican Spp
3. Raja ala
4. Thambala
5. Kahata ala
6. Rata ala
7. Lay-danta
8. Angili ala
9. Hingurala
10. Kombuwalli

Three techniques have been employed for rapid multiplication.

(a) Mini Sett Techniques

The ten cultivars are tested in five groups of sett weights (125g, 100g, 75g, 50g, 25g). This experiment is carried out in a randomized complete block design with three replicates.

Main objective of this study is to find out the suitable sett weights for the production of seed tubers. This will help to produce seed tubers at a higher rate of multiplication for research purposes as well as for the distribution of better cultivars among farmers.

(b) Micro Sett Techniques

Very small tuber pieces weighing 5 - 10g from the same ten cultivars have been laid in nursery beds for sprouting. This techniques produces small seed tubers at a very high rate of multiplication. Suitability of using the

micro sett technique for Sri Lankan cultivars of yam is to be evaluated in this experiment.

(c) Rooted Vine Cuttings

This method of multiplication helps to produce nematode-free seed tubers at a higher rate of multiplication.

Sixty strands from each of the ten cultivars have been established in the field to obtain vine cuttings for the experiment to be started in August 1986.

2. Yield Evaluation Trial

Ten cultivars selected are being evaluated for their yield performances in a field experiment laid out in randomized complete block design with three replicates.

1. Raja ala
2. Thambala
3. Rasawalli
4. Kanata ala
5. Nigerian
6. Hingurala
7. Ini ala
8. Rata ala
9. Kukulala
10. Angili ala

3. Studying the effect of weight of planting tuber on the yield of elephant foot yam/kidaran.

This is being carried out as an observational trial.

(b) Laboratory Research

A STUDY OF STRACH GRANULES AND SAPOGENINGS

(a) Starch analysis

Starch granules from 33 selected cultivars of yams belonging to species Dioscorea alata, D.esculenta, D.bulbifera, D.obouneta, D.rotundata and introduced cultivar from Peuto Rico were examined for their size, shape and striations.

Cultivars belonging to D.alata ("Angili-ala", "Raja-ala", "Sudu Raja-ala", "Kahata-ala", "Hingurala", "Kahata angala", "Kiri kondol", "Kiri-ala", "Ini-ala", "Ley-danta", "King yam", "Dandila", "Rata-ala", "Ratu-ala", "Wal-ala", "Rata Hingurala" and "Raja Hingurala") except "Kiri Kondol" and "Raja-ala" were characterized by large ovoid starch granules of size (8-64) μ. D.esculenta cultivars ("Kukulala", "Jawala" and "Siriwalli" had clusters of small (2-8 μ) hexagonal granules. D.bulbifera (Udala) had sickle shaped or triangular granules with sharp corners. White flesh variety of "Combuwalli" showed similar granules but the purple flesh variety contained granules similar to D.alata. D.obouneta ("Hirithala" and "Jamburala") contained oval granules whereas D.rotundata ("Urumpirei", "Thambala" and "Kotakewalli") were characterized by triangular granules with distinct striations.

Other shapes of granules were observed in the aerial yams "Kiri-udala" (oval with sharp pointed end), "Kiri-kondol" (polygonal to circular) and Peuto Rico yam (triangular with blunt apices).

b. Sapogenin analysis

Fifteen cultivars of locally available yams of the species Dioscorea alata ("Hingurala", "Ini-ala", "Katuwala", "Khatangal", "Kiri-ala", "Kirikondol", "Leydanta", "Rajala" and "Rasawalli") D.esculenta ("Jawala and "Kukulala"), D.bulbifera ("Udala), Coleus rotundifolius ("Innala") and Amorphophallus campanulatus ("Kidaran") were examined for the presence of sapogenins by thin layer chromatography .

All the cultivars examined contained a compound giving the same Rf in two solvent systems and colour reaction with antimony chloride spray as diosgenin. There at least unidentified sapogenins observed in some cultivars. "Jawala", "Kiriala", and "Kukulal" showed a purple spot and "Ini-ala", "Khatangal", "Kiri-ala", "Kukulala" and "Udala" showed a pink spot on spraying with antimony chloride reagent.

The cultivars examined for minerals by atomic absorptiometry (1) contained the following mean concentrations. (mg/100g) Calcium = 33.3, Copper = 4.4, Iron = 7.0, Potassium = 1136.9, Manganese = 21.1, Magnesium = 66.2, Sodium = 80.5 and Zinc = 2.9.

The levels of Iron and Calcium available are much higher than what is available in staples such as rice (Iron = 0.5, Calcium = 4) and potatoes (Iron = 0.5, Calcium = 9). Consumption of 100g of the yams could supply 50% Iron, 22% Zinc and the total daily requirements of Copper and Manganese. The yams therefore, from a very important source of minerals, specially Iron, in addition to their value as carbohydrate and proteins (6-12%) sources.

The laboratory research has been undertaken with the assistance of Dr. U. Samarajeewa, of the Department of Food Science and Technology.

Involvement of Postgraduate Students

Mrs. N. Harischandra, a Research Officer of the Department of Agriculture has completed her field research, and the data has been statistically analysed. She will be presenting her thesis for examination in the second half of this year.

Mr. D.A.P. Dissanayake, a M.Phil student funded by this project has made good progress in his research.

4. Plan of Work - July - December, 1986

1. Field planting of the Dioscoreas Aroids and Plectranthus spp. will be continued. This has been delayed due to the prevailing drought.

2. Chemical analysis of Dioscoreas will be continued.

3. Field experiments on rapid multiplication techniques and yield etc, will be monitored and continued.

4. Laboratory studies on starch and sapogenins will be continued.

Prof. H.P.M. Gunasena
Dean/Agriculture.