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Short communication

FIELD EVALUATION OF YAM GERMPLASM

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Yams are one of the delicious group among the tropical tuber crops - cassava, sweet potato, aroids, elephant footyam, chinese potato and yambean. They are rich in energy (high starch) and also supply certain vitamins (B-complex) and minerals. These are dietary staples of low income group people in hills and plains of tropical and sub-tropical climates. They also ensure food supply in times of food scarcity. Tribal populations of N-E states consume yams in large amounts and also feed the hard fibre portions to the pigs. The rich yam diversity (Sharma and Hore, 1993) had little or no information on various traits useful for systematic classification and genetic improvement work. The present work is an attempt in the same direction.

A set of 240 accessions belonging to 10 different taxa (Table 1) in tuberous

Table 1. *Dioscorea* taxa studied for characterisation

Species Studied	Accessions No.
**Dioscorea alata* L.	45
**Dioscorea bulbifera* L.	40
Dioscorea pentaphylla L.	18
**Dioscorea esculenta* (Lour.) Burkill	32
**Dioscorea pubra* Bl.	35
**Dioscorea hamiltonii* Hook.f.	29
Dioscorea culindrica Burm.	15
Dioscorea oppositifolia L.	08
Dioscorea glabra Roxb.	16
Dioscorea prazeri Prain & Burkill	02

*Widely cultivated for human food and as pig feed.

form were planted for evaluation at Barapani (900m msl) farm in Meghalaya. These collections were planted in 30 cm deep pits filled with well rotten compost @ 1.2 kg/pit spaces at 1m × 1m between rows and plants. Usually 3 plants per accession were planted during the month of April/May i.e. onset of monsoon. Seed tubers weighed about 200-250 gm and were planted 15 cm deep in the pit. Weeding and earthing up was done in July. Harvesting was done in December.

The accessions (collected from Garo Hills and Assam (Sharma and Hore, 1993) were characterised for fourteen descriptor and descriptor states over two years (1992-93) and the results are presented and discussed under following heads.

Vine growth and vigour : This character was scored using 1 to 9 scale where 1 represented very poor and 9 very good vine growth and vigour. Majority (179) accessions had poor rating whereas twenty four accessions possessed good vigour and growth. During 1992, many (199) accessions suffered severe attack of *Helminthosporium* leaf spots. The number of prominent vines and their growth vigour has been found to be the most important yield component (Rishi *et. al.*, 1988).

Stem twining : This is important character and helps in identification of species of *Dioscorea.* The large number (164) of accessions had right side stem twinning while only 76 showed left stem twinning.

Spines in stem base : This is one of the characteristic feature of the species. Terete vs. prickly stem base is a criteria for identifying the edible types and local people give much importance on it. Among the characterised materials, 69 accessions possessed the spines at stem base while rest 171 accessions had non-spinous stem base.

Winged stem : Winged stem is also an aid for identification and distinction of species or to determine the variability within the taxa. Out of total 240 accessions studied, only 183 accessions were having winged stem.

Pigmentation of petiole base : Light purple, purple and light green, these three kinds of colour were observed in the matured petiole base. Such distinctions were noticed in 10 accessions which were light purple, while pure purple comprised of 32 accessions. Green or light green were observed in rest 198 accessions.

Lamina characteristics :

a) *Lamina lobation* : Lobation in lamina though is a variable character within the species but it helps as identifying tool for intraspecific distinction. Practically, it helps in separation of supraspecific categories of plant within the family. Such distinction were recorded as follows - Single lobed - 222 accessions; Trifoliate - 14 accessions; pentafoliate

4 accessions. Leaf area has also been found to be closely correlated (r = 0.90) with tuber weight per plant (Rishi *et al.*, 1988).

b) *Young leaf pigmentation* : Colour of young leaves is also variable and 5 major types of colour were recorded among the 240 accessions studied. These were - Green (3); Light green (165); Dark green (64); Light purple (5) and Purple (3).

c) *Variation between distance of basal leaf lobes* : The variation is remarkable in this character which ranged from 1.3 cm to 9.4 cm. The maximum distance was observed in NIC-12341 while minimum was recorded in NIC 12339. Similarly, the variation in leaf-size character was also noticed. In respect of leaf length and breadth it varied from 5.3 cm (NIC-12496) to 27.7 cm (NIC-12562) length and 1.7 cm (NIC-12541) to 17.5 (NIC-12367) breadth respectively.

Among the reproductive characters of the accessions, emphasis mas laid on the following criteria which helps to distinguish the promising accessions. Tuber shape, root hairs on tubers, flesh colour of tuber, fresh tuber yield per plant and yield potentialities among the accessions were taken into consideration. These characters helped to identify the edibility preferences and serve for selection of accessions for large-scale cultivation.

a) *Tuber shape* : Morphologically, though there is no regular shape sized for particular species detection yet 6 types were identified. They are digitate (4); spherical (64); cylindric (92); oval (30); oblong (47) and flattened (3). The shape of tuber also indicate the space and soil depth requirement for future regeneration of particular accessions.

b) *Root hairs on tuber* : It is a general observation that edibility criteria, stress tolerance and propagation potentialities can be determined visually through the tubers possessing degree of hair density in its surface. Scoring criteria indicated that there were low (1-3) density of hairs in 109 accessions, medium (4-6) in 97 accessions, high (7-8) in 28 accessions and very high (9) in 06 accessions.

c) *Flesh colour of tubers* : Examination of sliced tubers among 240 accessions indicated light purpled colour in 82 accessions, cream colour was seen in 51 accessions while rest 107 accessions were white colour completely.

d) *Fresh tuber yield per plant* : The maximum yield of fresh tuber was received from NIC-12572 which was 4100 gms. The minimum yield was given by NIC-12559 which was only 20 gms.

Some more promising accessions which gave more than 3 kg/plant of fresh tuber yield were - NIC-12528; NIC-12555; NIC-12366; NIC- 12284; NIC-12387; NIC-12417; NIC-12572; NIC-12349 and NIC-12420.

Fresh tuber yield per plant appeared to be highly correlated in positive direction with characters such as tuber number per plant, length and circumference (Ebong, 1987), with number of prominent vines per plant and leaf area (Rishi *et al.*, 1988).

Further work on evaluation of acridity (due to presence of calcium oxalate crystals), diosgenin or botogenin contents (precursor of cortisone used in treatment of rheumatoidal troubles) etc. would be rewarding since in a study by Bindroo and Bhatt (1988) diosgenin content varied from 2.9% to more than 6%. Further work for identification of morphotypes, varietal and specific status of the material is under investigation.

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REFERENCES

Bindroo, B.B. and B.K. Bhatt. 1988. Natural variation, heritabilty and genotypes × year interaction in *Dioscorea deltoidea* Wall. *Herba Hungarica.* **27** : 19-26.

Ebong, U.U. 1987. Effect of different seedbeds and weights of seed sets on the heritabilities of tuber yield per plant and the yield components of white yam (*Dioscorea rotundata*). *In* : Tropical root crops : root crops and the African food crisis (eds. Terry, E.R.; Akoroda, M.O.; Arene, O.B.; Ottawa, Canada.

Rishi, A.K.; P.L. Dhar; M.K. Bhan and Ali Nasir. 1988. Factor analysis in *Dioscorea deltoidea* Hook. *Genetica Agraria* **42** (3) : 317-322.

Sharma, B.D. and D.K. Hore, 1993. Genetic Resources of Yams in N-E India with special reference to Garo Hills, Meghalaya. *India J. Hill Farming* (in press).