

# **VARIETAL IMPROVEMENT OF SWEET POTATO FOR THE PHILIPPINE HIGHLANDS: SELECTING FOR DROUGHT RESISTANCE**

B. A. Anselmo, Z. Ganga, E. Badol, M. C. Posa, and C. Sagudan

## **Abstract**

Today's sweet potato farmers in the Philippine Highlands are demanding cultivars that are high yielding, acceptable to consumers, and tolerant of major stresses such as shade and low-fertility soils. The Varietal Improvement Project screens germ plasm according to criteria based on farmers' demands. Selected varieties must have good yields and be resistant to drought. This year, about 10,000 segregating seeds were generated through the polycross method for use as a source of variability for drought tolerance. Simultaneously, under glasshouse conditions, local cultivars were screened to identify resistant genotypes. Results showed that only two cultivars (Kalbo-oy and Tocano) produced storage roots under drought conditions. These cultivars will be used as checks in screenings for drought resistance. Screening and evaluation of various genotypes will continue on station and in farmers' fields, where major stresses are encountered.

## **Introduction**

Sweet potato farmers in the Philippine Highlands demand cultivars that are high yielding, resistant to pests and diseases, early maturing, adapted to local conditions, and tolerant of extreme or adverse conditions such as drought, shade, and infertile soils.

The Varietal Improvement Project in the Philippine Highlands undertaken by the Philippine Root Crop Research and Training Center (PRCRTC), is addressing these needs. The Project uses a scheme for location- and use-specific varietal development. Selections from a series of on-farm trials are classified, with farmers' participation, according to their probable use: for processing into starch or for feed, depending on local requirements. The selected materials are advanced to promotional trials for wider farmer adoption.

Drought screening began in 1993. The initial germ plasm evaluated was derived from local cultivars, varieties, and selections from the Project's series of evaluations. Sources of variability for drought tolerance are generated by producing open-pollinated seeds through polycross methods.

The Project's objectives are to select and recommend location- and use-specific cultivars for different agro-ecological zones in the Philippine Highlands; to involve farmers actively in the evaluation and selection of their cultivars; and to identify and document farmers' criteria in cultivar evaluation and selection.

## **Methodology**

Germ plasm used in drought-screening activities were selections from Project trials. About 50 clones of these selections are currently being screened under glasshouse conditions. In 1994, almost 10,000 open-pollinated seeds were generated through the polycross method. These seeds will be used as sources of variability to be evaluated in the field for drought resistance. At the same time, we screened, under glasshouse conditions, local cultivars to identify resistant genotypes.

### **Results**

Using a participatory approach, farmers and researchers were able to select genotypes suited to Highland post-rice and *kaingin* conditions (Tables 1 and 2). Some of these genotypes are now being screened for drought resistance under glasshouse conditions; others will be screened in succeeding trials.

### **Discussion**

The active involvement of farmers during selection meant that the cultivars selected were those that farmers really prefer. Among the most important selection criteria are high yield, early maturity, skin colour (red to purple), flesh colour (yellow to orange), and drought tolerance. Cultivars selected by farmers will be further screened for drought tolerance.

### **Acknowledgements**

The authors are grateful to the International Foundation for Science (IFS), Sweden, and the International Development Research Centre (IDRC), Canada, for providing financial support to the Project.

**Table 1.** Sweet potato clones selected for post-rice conditions in the Philippine Highlands.

Accession no.	Local name	Storage root yield		Root colour	
		(kg/plot)	(t/ha)	Skin	Flesh
NPSP 160	Karumbasa	0.1383	14.77	Red	Orange
NPSP 371	VSP6	0.2020	13.53	Red	Creamy yellow
NPSP 64	Dakol	0.1917	12.78	Violet	Violet
NPSP 98	Ganga 01	0.2250	7.78	Pink	Yellow
NPSP 48	Monglo 04	0.1071	7.14	Pink	White
NPSP 08	Wag-Wag	0.0908	5.80	Pink	White
NPSP 713	Tocano	0.0450	3.00	Red	Creamy

**Table 2.** Sweet potato clones selected for *kaingin* conditions in the Philippine Highlands.

Accession no.	Local name	Storage root yield (t/ha)	Root colour	
			Skin	Flesh
NPSP 192	Kalbo-oy	14.33	White	Creamy
NPSP 160	Karumbasa	5.99	Pink	Orange
NPSP 371	VSP6	5.22	Red	Creamy
NPSP 002	Pakac	4.05	White	Yellowish violet
NPSP 247	Bajorec	3.88	Creamy	Creamy
NPSP 254	Kangaw	3.38	Red	Orange
NPSP 030	Komendal	2.94	Creamy	Creamy
NPSP 576	Kiangang 11	2.64	Red	Creamy
NPSP 075	Dangian	1.33	Pink	Creamy