Development of Low Input Sweetpotato Varieties and Its Utilization in Sustainable Agriculture Production

Mohd Said Saad

Faculty of Agriculture,
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor
Malaysia

Telephone Number of Corresponding Author: 03-89466999
E-mail of Corresponding Authormsaid@putra.upm.edu.my

Key words: Sweetpotato, Breeding, low input

Introduction

Sweetpotato is a starch base crop. In the last 10 years there was an acute shortage of starch supply in Southeast Asian region for both food and industrial uses. Sweetpotato is well adapted and its planting is well established since it was introduced into the country about 400 years ago. However, commercial planting of sweetpotato was least feasible in Malaysia due to high cost of production which was mostly resulted from high input in term of chemicals and fertilizers as well as labor to apply them. Since naturally sweetpotato is a hardy crop, developing a superior hardy varieties that require less input for optimum production could help commercialization of the crop. This study was undertaken to develop sweetpotato varieties with high vigour, competitive, resistance to P&D and efficient in fertilizer intake with good conversion rate.

Materials and Methods

EXP1: 8 superior_Polycross Progenies isolated from IRPA RM7 projects, 60 Polycross Progenies from Set II (RM 7 IRPA) and 30 accessions of sweetpotato obtained from Thailands were subjected to field trials (RCBD, 3 replications) without weeding, fertilizer and watering. Data were taken on vigour at one week after palanting and at harvest, P&D infestation and Yield.

EXP 2: The best 20 entries from EXP 1 were selected and planted in a polycross nursery using RCBD with 5 replications. They were arranged in such a way that in every replication all parents will have different neighbors to enable each of them to cross with all the other parents. A total 100 progenies from each parent were evaluated in the field without replication (single plant trial without maintenance) and vigour, P&D infestation and Yield were monitored.

EXP 3: Selected entries from EXP 1 and EXP 2 were subjected to a replicated field trial. Low input practice i.e 36 t/ha N, 30 t/h P2O5, 60 K2O were applied (split in to 2) at one week and 8 week after planting. Weeding was done before fertilizer application. No watering was done, however planting was scheduled at the beginning of raniy season. The plant vigour, P&D and Yield performance were monitored.

Results and Discussion

A total of 20 best entries from EXP 1 were selected. However, the yield of the selected entries ranged from 22-31 t/ha, moderate vigour and mostly with low P&D infestation. The selected entries include 6 from the superior clones, 5 from the Polycross progenies and 9 from the accessions from Thailand. These entries were used in the polycross nursery. However, only 16 of the plants produced seeds and a total 1126 polycross progenies were evaluated in the field. From the single plant progenies trials a total of 31 progenies were selected based on vigour, yield and P&D resistance. In the EXP 3, the 31 selected plants from EXP 2 and 7 from the EXP 1 were subjected to a replicated field trial. The results indicated that 11 of them, 2 from the Thailand germplasm, 1 from the EXP 1 clone and 9 from the polycross progenies EXP 2, showed good yield (28-33 t/ha), moderate to high resistance to P&D and good vigour. However, most of the good clones were of the spreading types, only 2 of them of the semi-compact type. *Do not include figures*

Conclusions

Polycross which combines parents from superior clones and the Thailand germplasm was successful in combining useful genes of different sources. However, due to high segregation, the selection rate was very low, 31 out of 1126. This study showed the possibility of producing clones with hardy characters that will require low input with reasonable yield in sweeetpotato. Further trials should be continued to evaluate the selected clone in a larger replicated and regional trials.

Benefits from the study

A pool of hardy sweetpotato clones are now available at the Agrogene Bank, Faculty of Agriculture, UPM. This germplasm is a good source of materials for future genetic improvement program of sweetpotato.

Patent(s), if applicable:

Nil

Stage of Commercialization, if applicable:

Nil

Project Publications in Refereed Journals

1 **Saad, M. S.**, A. S. Ali Sabuddin, A. G. Yunus and Zulkifli H. Shamsuddin. 1999. Effects of Azospirillum inoculation on sweetpotato grown on sandy tin-tailing soil. *Comm. Soil Sc. Plt. Analysis* 30 (11&12):1583-1592

Project Publications in Conference Proceedings

I.M. S. Ramisah, **M. S. Saad**, A. G. Yunus and A. S. Nor Aini. 2000. Genetic Relationship in Sweetpotato (*Ipomoea batatas* L.). In: **M.S. Saad**, Q.Z. Faridah, M.A. Kadir, M.Z.M. Khalid, O. Mohamad, G.B. Saleh and J.M. Panandam (eds.). 2000. Genetic Manipulation: Challenges and Advances. Genetic Society of Malaysia. Pages49-59

2. Sow, H., **M. S. Saad**, A. G. Yubus and A.K. Mihdzar. 2003. Application of molecular markers (RAPD) in sweetpotato (Ipomoea batatas) germplasm rationalization. Fifth National Genetic Congress, 25-27 March 2003, Kuala Lumpur, Malaysia

3. **M. S. Saad**, M. S. Ramisah, A. G. Yunus. Mohd Shukor Nordin. 1999. Detection of Duplicates Within Sweetpotato Germplasm Using RAPD Markers. Symposium on Genetic Resources of Borneo, Kota Kinabalu, Sabah, Malaysia, 26-28 Oct 1999

4. **M. S. Saad**, T. C. Yap, A. G. Yunus, M. A. Kadir and Mohd Shukor Nordin. 1999. Genetic Diversity Within and Between Locally Adapted Sweetpotato Germplasm from Different Sub-regions in Sarawak and Sabah, Malaysia. Symposium on Genetic Resources of Borneo, Kota Kinabalu, Sabah, Malaysia, 26-28 Oct 1999

Graduate Research

Name of Graduate	Research Topic	Field of Expertise	Degree Awarded	Graduation Year
Harouna Sow	**Rationalization of Sweetpotato Germplasm: comparative analysis of core collection based on RAPD and SSR markers**	**Plant Breeding**		

IRPA Project number01-02-04-0551
UPM Research Cluster:AFF