Cassava Breeding and Varietal Release in the Philippines

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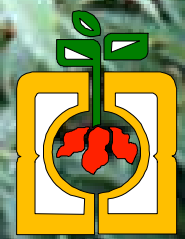
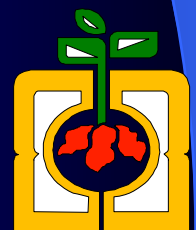


Introduction

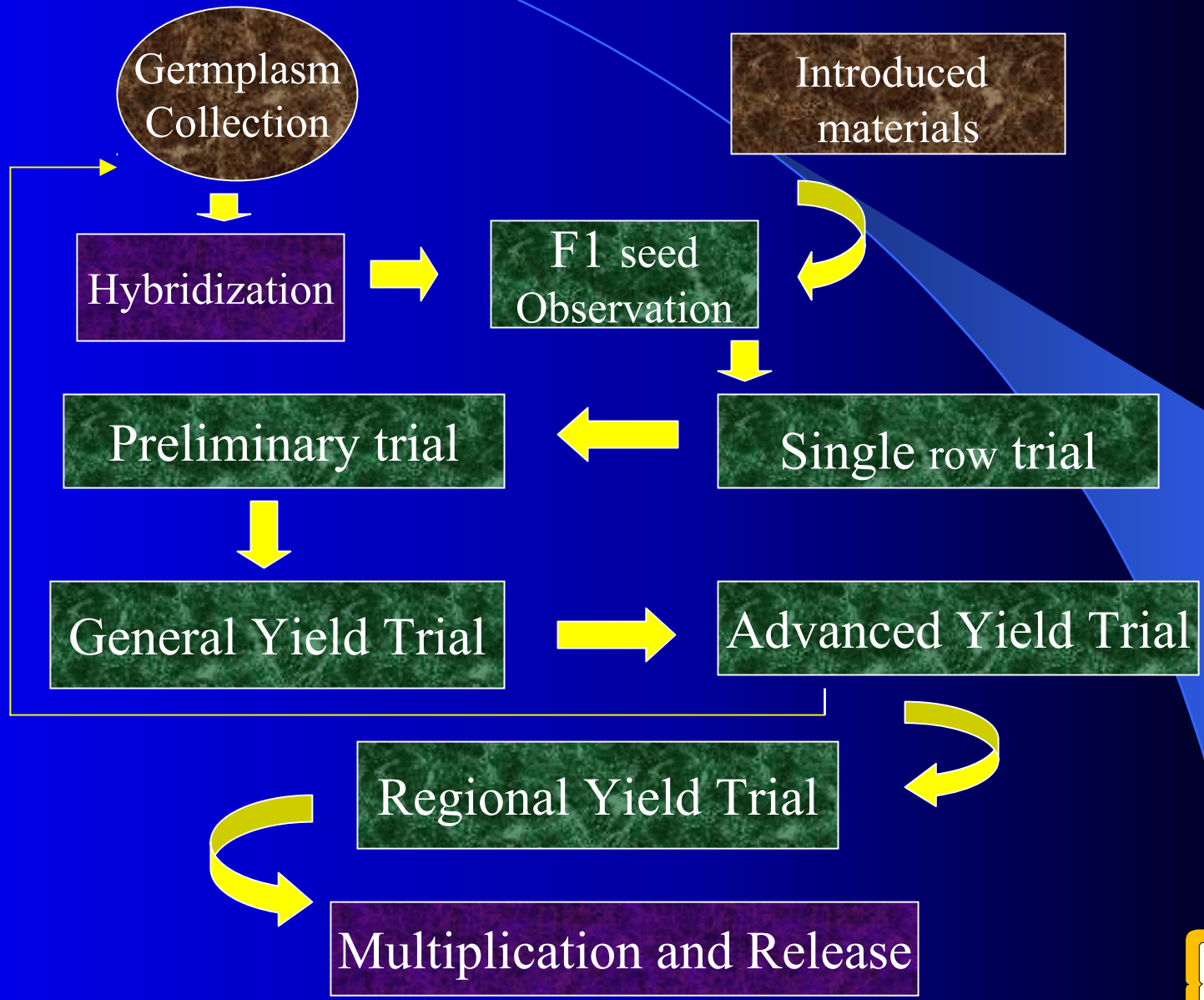
- Cassava varietal improvement in the Philippines started in 1960.
- The establishment of Philippine Root Crop Research and Training Center in 1977 by virtue of PD 1107 bolstered the breeding program of cassava.
- Close collaboration with CIAT starting 1982 brought about modest improvement in the selection and evaluation of improved cassava
- Several varieties derived from CIAT materials were released and cultivated by farmers.

Breeding Objectives

- High yield.
- High dry matter and starch content.
- Low cyanide varieties for fresh market.
- Resistance to pest and diseases.
- Good plant type.
- Resistance to environmental stress.



Breeding and Selection Strategy



Source of Genetic Variability

Table 1. Germplasm collections maintained at PhilRootcrops (2002).

Source	Number of Accessions
Local	68
Foreign	92
Tissue culture	25
Elite clones	117
Released varieties	20
Total	322

Table 2. Total number of cassava hybrid seeds evaluated at PhilRootcrops (1999-2002)

Source	Year	No. of seeds	No. of crosses
Thai-CIAT Program	1999-2000	2,400	38
PhilRootcrops	2000-2001	2,644	17
Total		5,044	55

Advances in Selection

Table 3. Number of cassava hybrids evaluated at different stages of selection at PhilRootcrops.

Selection Stage	'99/00	'00/01	'01/02	Total
Single plant trial	1,216	610	-	1,826
Observational trial	-	180	59	239
Preliminary trial	30	-	56	86
General yield trial	21	21	29	71
Advanced trial	18	15	11	44
Regional yield trial	10	10	12	32
Variety released	1	2	1	4

Table 4. Performance of selected Thai-CIAT cassava hybrids under preliminary yield trial (2001-2002)

Entry	Fresh root Yield (t/ha)	Dry matter (%)	Harvest Index	HCN Content
1.OMR 39-35-22	41.1	32.8	0.61	5
2.OMR 39-43-04	42.2	33.6	0.68	3
3.OMR 39-48-02	34.2	34.6	0.56	6
4.OMR 40-09-34	45.0	32.2	0.55	3
5.CMR 39-07-02	38.1	33.2	0.64	4
6.CMR 39-07-03	40.8	30.8	0.63	5
7.CMR 39-07-04	42.2	31.3	0.56	2
8.CMR 39-50-23	40.6	32.4	0.75	3
9. Lakan 1(Check)	22.4	30.2	0.41	5
10.Lakan 2(Check)	29.5	32.2	0.50	3

Table 5. Performance of selected cassava hybrids from CIAT Colombia under general trial (2000-2001)

Entry	Fresh root Yield (t/ha)	Dry matter (%)	Harvest Index	HCN[1] Content
1.SM 2454-23	22.1	33.6	0.46	5.0
2.CM 9222-3	37.0	32.7	0.65	4.0
3.CM 9165-9	22.6	34.2	0.52	6.0
4.CM 9165-17	33.3	31.7	0.55	3.0
5.CM 9165-20	24.5	34.5	0.47	5.0
6.CM 9175-25	26.2	35.1	0.51	5.0
7.Lakan 1 (Check)	32.4	32.6	0.59	3.0
8.VC-5 (Check)	26.3	31.0	0.52	6.0

[1] Sodium picrate method

Table 6. Performance of selected cassava hybrids from CIAT Colombia under advanced yield trial (2000-2001)

Entry	Fresh root yield(t/h)	Dry Matter(%)	Starch content (%)	Harvest index	HCN[1] content
1.SM 1971-7	22.5	31.3	17.9	0.48	3.0
2.SM 2065-1	25.1	33.3	20.6	0.44	5.0
3.SM 2117-8	30.8	31.4	18.1	0.57	4.0
4.SM 2196-4	27.7	32.1	19.0	0.58	5.0
5.SM 2200-27	21.1	30.4	16.7	0.49	5.0
6.SM 2225-36	41.9	30.2	16.4	0.62	4.0
7.Lakan 1(Check)	29.6	30.8	17.3	0.51	5.0
8.VC-5 (Check)	26.0	28.3	13.7	0.54	7.0

[1] Sodium picrate method

Table 7. Performance of selected cassava hybrids from CIAT under advanced yield trial (2000-2001)

Entry	Root yield (t/ha)	Dry matter (%)	Starch content (%)	Harvest index	HCN[1]	Scale[2] insect rating	Mites[2] rating
1.SM 2353-17	26.2	34.9	22.9	0.61	5.0	6.0	1.0
2.SM 2353-39	21.1	34.0	21.7	0.56	2.0	1.0	4.0
3.SM 2359-4	22.1	34.0	21.7	0.49	4.0	3.0	2.0
4.SM 2353-7	22.2	32.9	20.1	0.56	2.0	1.0	1.0
5.SM 2353-25	20.4	31.0	17.5	0.64	3.0	1.0	3.0
6.Lakan 1(Chk)	24.0	33.9	21.5	0.59	4.0	5.0	1.0
7.VC-5 (Chk)	18.7	30.9	17.4	0.61	6.0	3.0	3.0
8.Lakan 2(Chk)	16.9	34.3	22.1	0.58	3.0	2.0	3.0

[1] sodium picrate method

[2] Rating scale of 1 to 9 with increasing order of severity

Table 8. Performance of selected cassava hybrids from CIAT under advanced yield trial (2001-2002)

Entry	Fresh root yield (ton/ha)	Dry matter (%)	Harvest index	HCN[1]	Scale[2] insect rating	Mites[2] rating
1.CM 9175-25	23.9	48.6	0.60	6.0	2.0	2.0
2.CM 9165-20	22.4	37.0	0.60	7.0	2.0	3.0
3.CM 9165-9	21.6	37.1	0.50	5.0	2.0	3.0
4.SM 2440-6	23.0	32.9	0.70	6.0	2.0	6.0
5.CM 9165-17	31.0	35.6	0.60	4.0	4.0	3.0
6.CM 9222-3	24.9	37.4	0.60	4.0	4.0	4.0
7.Lakan 1 (Chk)	23.7	35.1	0.60	4.0	3.0	4.0
8.VC – 5	16.4	31.5	0.60	7.0	2.0	4.0

[1] sodium picrate method

[2] rating scale of 1 to 9 with increasing order of severity

Varietal Release

- Varietal release of new cassava varieties shall pass through the Technical Working Group for evaluation and recommendation to the National Seed Industry Council for final release.
- The Technical Working Group evaluate the performance of the candidate varieties for two croppings in at least 8 locations throughout the country.
- Varieties for release should be identified for specific purpose, i. e. food and starch.
- Breeder is responsible for the initial seed stock for distribution to interested users.

New cassava varieties released

Varietal Characteristics	PSB Cv-17 (CG87-3-1)	PSB Cv-18 (CG87-2-13)	PSB Cv-19 (SM 808-1)	PSB Cv-20 CG91-13-1
Fresh root yield (t/ha)	39.3	39.0	32.3	35.8
Dry matter content %	32.0	32.5	35.0	35.3
Starch content (%)	18.9	19.6	22.9	23.4
HCN level	Medium	Medium	Medium	Medium
Root flesh color	White	White	White	White
Reaction to pest				
Scale insect	R	R	R	R
Spider mites	MR	R	R	R
Intended Use	Starch,feed	Flour,starch	Starch,feed	Starch,feed
Year released	1999	2000	2000	2001

Varietal Dissemination

1. Information drive among farmers through trainings, field day and mass media
2. Private entrepreneur contact
3. Adaptability trial in specific area of cultivation
4. Establishment of seed system

Future Directions

- Monitor performance of released varieties planted in large scale production
- Aggressively promote adoption of new recommended cassava varieties
- Strengthened cassava hybridization work using elite clones and local varieties
- Continue screening for superior varieties that will suit the needs for food, feed and starch industry


Thank you very much