

CRIAA SA-DC / INDIGENOUS PLANT TASK TEAM (IPTT)
KALAHARI MELON SEED (KMS) OIL DEVELOPMENT PROJECT

The Kalahari Melon Seed Breeding Project

FARMERS' FIELD TESTING OF IMPROVED KMS CROSSES

GUIDELINES, January 2009

The Kalahari Melon Seed (KMS) Breeding Project has selected 3 lines (crosses) of improved KMS to be tested by farmers in Northern Namibia during the 2008/09 cropping season. The 3 crosses are described in the next page. The 3 crosses have been multiplied during the second part of 2008 to be available early January 2009. 175 sets of 30 seeds have been packed and marked for field testing.

The objective of the field testing is to evaluate the performance of the 3 selected crosses in comparison to the traditional varieties (farmers' cultivars). The results of the field testing will assist the breeding project in its further selection programme.

Farmers participating in the field testing should plant each improved cross in a small plot and grow the Kalahari melon crosses the same way as traditional varieties without providing extra care. However, testing farmers must follow a specified procedure and record results along the growing season (up to harvesting and seed extraction) in order to report back on their evaluation.

At the KMS Stakeholders' workshop held in Ongwediva on 2-3 December 2008, it was decided that there will be 2 categories of KMS testing farmers:

- "Full test farmers" who are able to follow the full testing protocol and record data at each steps of the growing cycle until harvesting and seed extraction, as provided in the attached KMS Field Testing Record Form
- "Qualitative test farmers" who will provide a qualitative evaluation of the performance of the improved crosses (but are welcome to record as much information as they can along the growing season using the Record Form).

The basic requirements to be followed by all test farmers are:

- To plant each of the 3 improved crosses in a different testing plot
- To mark the places where the improved cross seeds are planted with strong pegs so as to clearly follow on their germination and growing without confusion
- To record the date(s) of planting of each crosses and their dates of germination
- To weed off the other melons (/watermelons) growing in the testing plots.

Back-stopping and monitoring visits to test farmers will be limited and probably to the "full test farmers" only. However, in case of any problem please contact the CRIAA team (details below) or your nearest Agricultural Extensionist or support project participating in the KMS field testing.

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The Kalahari Melon Seed Breeding Project

Brief description of the selected KMS crosses for evaluation by KMS growers in Northern Namibia 2008/09

KMS 07-2

- Round to elongated fruit
- Seeds white with red border
- Good germination (>80%)
- Average fruit mass of 1.5 kg
- 3.2 % of fruit mass are seeds
- 32 % seed oil extracted
- 67 % linoleic acid in seed oil



KMS 07-17

- Elongated fruit
- Seeds white with red border
- Average germination (+/- 60%)
- Average fruit mass of 1.4 kg
- 3.5 % of fruit mass are seeds
- 32 % seed oil extracted
- 67 % linoleic acid in seed oil



KMS 06-27

- Elongated fruit
- Brown – black seeds
- Good germination (>80%)
- Average fruit mass of 1 kg
- 3.5 % of fruit mass are seeds
- 26 % seed oil extracted
- 69 % linoleic acid in seed oil



TESTING GUIDELINES

Test plots and planting of test crosses

(For all testing farmers)

- Each of the 3 crosses should be planted in a different small plot, in different fields or in different areas of the same field but not too close to each other
- It is recommended to plant 2 seeds per planting spot and have at least 10 planting spots for each cross (with each sachet of planting crosses containing around 30 seeds, there is a sufficient number of seeds for up to 15 planting spots, but you can keep some seeds for replanting if some germinations fail or for comparing with the newly harvested seeds at the end of the testing)
- It is recommended to space the planting spots by around 5 meters in the row and around 5 meters between rows
- For 10 to 15 planting spots per cross, a testing farmer needs 3 plots of around 250 m² to 375 m² each
- Take note and identify clearly which cross is planted in which plot (large marked pegs are provided to the “full test farmers”)
- Mark the spots where the improved cross seeds are planted with strong pegs so as to clearly follow on the germination and growing of the improved crosses (small marked pegs cannot be provided by the project to all of the “full test farmers” and might not be strong enough anyway, please make your own pegs out of strong wood or metal bars)
- Record the date of planting of each crosses
- Weed out the other melons (/watermelons) growing in the testing plots
- Mono-cropping of Kalahari melon crosses or inter-cropping with Mahangu is left to each farmer to decide
- Grow the testing crosses the same way as traditional varieties without providing extra care.

Qualitative evaluation

“Qualitative test farmers” should aim at providing the following information on the improved crosses (as compared to their traditional varieties) upon harvest and later at seed extraction.

But farmers are welcome to record as much data as they can along the production season using the attached KMS Field Testing Record Form for “full test farmers”.

Performance of each selected cross compared to traditional varieties:

- Germination (rate of germination, speed of germination)
- Plant establishment (plants surviving and growing after germination)
- Plant growth, flowering and fruiting
- Plant resistance to weather stress (dry spell and heat, excess rain and flooding)
- Plant resistance to pests and diseases (which ones affected or not the plants)
- Harvesting time (early, normal or late fruit maturing)
- Fruit harvest (number of melons, size of melons, shape and colour of melons)
- Seed extraction (easier or more difficult)
- Yield of seeds (quantity and size of seeds in fruits)
- Colour, size and shape of seeds extracted (all looking the same for each cross? same or different than planted seeds?)
- Overall qualitative evaluation of each selected cross compared to traditional varieties:
 - Strong points of the cross tested
 - Weak points of the cross tested
 - Overall rating: cross tested better, same or worse than traditional varieties
 - Will you plant next season the cross seeds harvested?
 - What characters of the cross tested will need further improvements?
 - Any other relevant comments?
- If possible, please keep for the project 5 matured melons for each cross and a small quantity of seeds (+/- 100g per cross).
- Hoping the harvest will be good, you are free to use the rest of your harvest as you wish.
- Thanking you very much for your co-operation.

Recording guidelines for full testing with quantitative data

“Full test farmers” are expected to fill in the attached form for each of their testing plots and testing crosses. Additional relevant information should also be noted, on additional paper if needed.

At least 3 forms must be filled in (for the 3 different crosses) but you can also use the form to evaluate your traditional variety(/ies) along the same lines.

The general format of the form is as follows

No	Criteria	Details ...	Data entry by	On (date)
	The questions asked	Where you must fill in the information required, the data measured, your comments etc.	Name or initials or signature of the person that wrote the information (yourself alone or assisted by someone else)	The date the information was written

If you experience difficulties in filling in the form, please ask for the help of the Agricultural Extensionists of your area or CEDP staff for Caprivi (Richard Sihani) or CRIAA SA-DC.

Please fill in the form as accurately and comprehensively as possible, giving the necessary explanations when needed.

After harvesting, please keep for the project a sample of 5 to 10 fruits for each cross, as well as a sample (+/- 250g) of extracted seeds from each cross. The project will need to take pictures of the fruits and analyse in laboratory the seeds for oil content and chemical composition.

Wishing you all the best for the KMS testing, we thank you very much in advance for your dedicated collaboration.

KMS Field Testing Record Form (2008/09 cropping season)

1.	Testing Farmer	Details	Data entry by	On (date)
1.1	Full name			
1.2	Residence & contact details			
1.3	Place of farming	Region & constituency:		
1.4	Place of farming	Village name:		

2.	Testing seeds	Details	Data entry by	On (date)
2.1	KMS cross tested <input checked="" type="checkbox"/>	KMS07-02 <input type="checkbox"/> KMS07-17 <input type="checkbox"/> KMS06-27 <input type="checkbox"/> or Traditional variety* <input type="checkbox"/>		
2.2	Date testing cross received			
2.3	Traditional variety No 1 grown this season	(name it & describe it)		
2.4	Traditional variety No 2 ...			
2.5	Traditional variety No 3 ...			

Note *: The testing farmer can use this form to record the performance of his/her traditional variety(/ies) in comparison to the improved crosses tested

3.	Testing plot in crop field	Details	Data entry by	On (date)
3.1	Location of test plot in field*	(N/S/W/E)		
3.2	Location of the 2 other test plots if in same field*	(distance of the other 2 test plots to this test plot)		
3.3	Approximate size of test plot*	(m x m or m ²)		
3.4	Crop(s) on plot last season			
3.5	Crop(s) on plot this season	KMS intercropped?		
3.6	Plot preparation this season (zero tillage, hoeing, ploughing, manure, fertiliser etc.)			

* Make a drawing if needed (use next page)

3.7 Drawing of crop field and location of testing plot(s) with approximate size and distances between testing plots*

* External assistance (Agricultural Extension, CEDP, CRIAA SA-DC, ...) might be needed if you experience difficulties. The drawing only needs to be prepared once for all plots if located in the same field represented in the drawing above.

4.	Seed planting	Details	Data entry by	On (date)
4.1	Date of planting			
4.2	Number of planting spots*			
4.3	Number of seeds/planting spot			
4.4	Total number of seeds planted			
4.5	Spacing between planting spots	(in row & between rows)		
4.6	Type of pegs at planting spots			
4.7	Number of pegs used in plot			

* A planting spot is where seed(s) is/are planted, generally 2 seeds per spot

5.	Rains (since planting)							H (Heavy) / M (Moderate) / L (Light) [or mm of rains if rain gauge available]															Data entry by								
								Please fill in below at the appropriate date with H / M / L or mm of rains																							
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
January																															
February																															
March																															
April																															
May																															

6.	Seed germination																Data entry by	On (date)
6.1	Planting spot No*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
6.2	Date germination																	
6.3	Date 50% planted seeds germinated																	
6.4	Total number of seeds germinated																	
6.5	% seeds germinated / planted (sown)																	
6.6	Any seed replanting? (using same cross seeds if available)	Give details (date of replanting, number of planting spots and seeds replanted ...)																

* A minimum of 10 planting spots is recommended

7.	Plants establishment	Details	Data entry by	On (date)
7.1	Number of plants dead after germination			
7.2	Number of plants surviving after germination			
7.3	% plants surviving / seeds germinated			

8.	Plants growing	Details and comparison to traditional varieties of your field	Data entry by	On (date)
8.1	Plant growth			
8.2	Plant flowering			
8.3	Plant fruiting			
8.4	Plant resistance to dry spell & heat (any damages observed?)			
8.5	Plant resistance to excess rain & flood (any damages observed?)			
8.6	Plant resistance to pests (any pests causing damage?)			
8.7	Plant resistance to disease (any disease causing damage?)			

Ref.	Additional comments for pages 1, 2, 3 & 4 (if needed)	Data entry by	On (date)

9.	Fruit harvesting	Details	Data entry by	On (date)
9.1	Fruit maturing on plot (early, normal, late compared to traditional varieties)			
9.2	Fruit harvesting date(s) on plot			
9.3	Number of fruits harvested on plot			
9.4	Kg of fruits harvested on test plot* (& date of weighing)			
9.5	Average kg of fruits harvested			
9.6	Shape of fruits harvested: round, elongated (number or %)			
9.7	Additional comments			

* External assistance (Agricultural Extension, CRIAA SA-DC, ...) might be needed if no scale is available to Farmer

10.	Seed extraction & yield	Details	Data entry by	On (date)
10.1	Date of seed extraction			
10.2	Number of fruits processed			
10.3	Kg of fruits processed*			
10.4	Fruit processing, seed extraction and cleaning compared to traditional varieties	(easier, same or more difficult)		
10.5	Kg of fresh seeds extracted* (& date of weighing)			
10.6	% kg fresh seeds / kg fruits*			
10.7	Duration of seed drying			
10.8	Kg of dried seeds extracted* (& date of weighing)			
10.9	% kg dried seeds / kg fruits*			
10.10	Size of seeds compared to planted seeds	(smaller, same, bigger)		
10.11	Size of seeds compared to traditional varieties	(smaller, same, bigger)		
10.12	Colour of seeds (are all seeds of the same colour?)			
10.13	Additional comments			

* External assistance (Agricultural Extension, CRIAA SA-DC, ...) might be needed if no scale is available to Farmer

11.	Overall evaluation of the cross	Details (and comparison to traditional varieties)	Data entry by	On (date)
11.1	Strong points of the cross tested			
11.2	Weak points of the cross tested			
11.3	Overall rating of cross tested compared to traditional varieties	(better, same, worse, compared to which traditional variety)		
11.4	Will you plant these harvested seeds next season?			
11.5	Will you want more seeds of the same cross to plant next season?			
11.6	Characters of the cross tested that will need further improvements			
11.7	Additional comments			