

## **KALAHARI MELON SEED DEVELOPMENT PROJECT 2008/09**

### **UPDATE ON FARMERS' FIELD TESTING OF IMPROVED KMS CROSSES: HARVESTING & SEED EXTRACTION**

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#### **Background**

The Kalahari Melon Seed (KMS) Breeding Project selected 3 crosses (KMS07-02, KMS 07-17 and KMS 06-27) of improved KMS to be tested by the farmers in Northern Namibia and Caprivi during the 2008/9 cropping season. The main objective of this field testing was to evaluate the performance of the 3 selected crosses in comparison with the traditional varieties (farmer's cultivars). The results of this testing will assist the breeding project in its further selection programme.

The field testing was planned with two categories of farmers

1. 23 "Full testing farmers" who were expected to follow the full testing protocol and record data using a special form at each steps of the growing cycle until harvesting and seed extraction. CRIAA Project Officer (PO) and/or local Agricultural Extensionists were to assist testing farmers in recording data, when needed.
2. 76 "Qualitative testing farmers" who were expected to provide a qualitative evaluation of the performance of the improved crosses (but they might also record information along the growing season).

#### **Results**

Harvesting and seed extraction were done during the last field trip of the PO (24 May – 09 June 2009). This was done because melons were starting to rot and could not be kept for so long. However, not all the melons could produce seeds due to the fact that some melons did not reach full maturity. Quantitative information obtained from 22 out of 23 full testing farmers are presented in the Annexes A and B. From the qualitative test farmers who were expected to provide information on the performance of the crosses, only 5 out of the 76 selected farmers could do so and their comments are included in the Annex B. This was because the growing season was short and bad due to floods not allowing most farmers to grow the crosses successfully. Some farmers were also not willing to actually provide feed-back information.

#### **Conclusions**

The crosses KMS07-02, KMS 07-17 and KMS 06-27 were tested by the farmers in Northern Namibia and Caprivi during the 2008/9 cropping season. The performance of the three crosses in comparison with the traditional varieties (farmer's cultivars) was evaluated by the farmers. However, the quantitative results of the tests are not as comprehensive as it was expected.

- The planting of the cross seeds could only take place towards end-January/early-February 2009. After a relatively long dry-spell between December 2008 and January 2009, the following rains were heavy and eventually stopped early by the beginning of April giving a relatively short growing season to crops planted late.
- Germination and plant growth were poor due to heavy rain and flood water, which also induced damages by pests. In Caprivi, animals destroyed the plants and fruits in the testing plots that survived the heavy rains and floods.
- Most testing plots could reach the fruiting stage. The few fruits that could be harvested did not all reach full maturity. Consequently, a very limited quantity of seeds could be harvested.
- The small quantity of seeds harvested from the test plots and their limited statistical significance does not warrant conducting oil analysis.

A photographic record of cross seeds harvested compared to the planting materials is provided in Annex C.

The performance of the field tested crosses was affected primarily by timing, from which testing farmers suggested that it would be better if the trial could be done for the second time in the next season with planting starting around November-December, should there be a chance to do so.

## ANNEX A

<b>Summary of the farmers test results</b>			
	<b>KMS06-27</b>	<b>KMS07-17</b>	<b>KMS07-02</b>
<b>Total No. of “full testing farmers”:</b>	<b>22</b>	<b>22</b>	<b>22</b>
- Oshikoto	5	5	5
- Oshana	3	3	3
- Ohangwena	6	6	6
- Omusati	4	4	4
- Caprivi	4	4	4
No. of plots planted	22	22	22
<b>Total No. of seeds planted</b>	<b>460</b>	<b>480</b>	<b>478</b>
No. of seeds replanted	+30	0	0
No of seeds planted per plot (range)	20-30	20-30	18-30
<b>Total No. of seeds that germinated</b>	<b>160</b>	<b>303</b>	<b>312</b>
<b>% germination</b>	<b>35%</b>	<b>63%</b>	<b>63%</b>
No. of plots with no germination	1	1	0
No. of plots with $\geq 50\%$ germination	19	18	16
No. of plots with 100% germination	2 (Caprivi)	3 (Caprivi)	6 (4 NCRs)
<b>No. of plants growing after germination</b>	<b>82</b>	<b>134</b>	<b>156</b>
as % of seeds planted	<b>18%</b>	<b>28%</b>	<b>33%</b>
as % of seeds germinated	<b>51%</b>	<b>44%</b>	<b>50%</b>
No. of plots that failed after germination	3	5	5
<b>No. of plots with surviving plants</b>	<b>2</b>	<b>5</b>	<b>8</b>
No. of plots with $\geq 50\%$ surviving plants / planted seeds	2 (2 Caprivi)	4 (3 NCRs)	8 (5 NCRs)
<b>No. of plots that produced fruits &amp; seeds</b>	<b>2</b>	<b>4</b>	<b>2</b>
Location of plots:	(NCRs) Omuthiya Eenhana	(NCRs) Onakalunga Uukwiyu Omuthiya Eenhana	(NCRs) Onakalunga Eenhana
<b>No. of fruits harvested and processed</b>	<b>5</b>	<b>21</b>	<b>15</b>
g of fruits processed	80g	1078g	590g
<b>g of dried seeds produced</b>	<b>24g</b>	<b>111g</b>	<b>59g</b>
as % of dried seeds/ fruits (w/w)	30%	10%	10%

2. Plants growth		Details and Comparison with Traditional Cultivars			
Cross No:		KMS 07-17	KMS 07-02	KMS 06-27	Traditional Cultivars
2.1	Plant growth	- KMS 07-017 & KMS 07-2 germinate faster than the traditional cultivars		-Traditional cultivars germinate faster than KMS 06-27	
		<ul style="list-style-type: none"> <li>- Grow differently depending on the type of soil and the amount of water</li> <li>- Water logging affect the growth of plants (crosses &amp; traditional cultivars)</li> </ul> <p>NB: Based on the recordings made by the farmers, tested crosses grow better in loamy soil while traditional cultivars grow better in sandy soil. Although with some other farmers it is otherwise.</p>			
2.2	Plant flowering	<ul style="list-style-type: none"> <li>- Crosses take a shorter time to flower</li> <li>- Do not stretch long (short runners) compared to the traditional cultivars which grow longer runners</li> </ul>			
2.3	Plant fruiting	<ul style="list-style-type: none"> <li>- Fruiting quickly after flowering</li> <li>- Fruits grow faster than traditional cultivars</li> <li>- Season was too short to determine how many fruits one plant could produce. So it is still not clear as to which traditional/crosses produce more fruits than the other plant. Tested varieties seem to bear more fruits than the traditional cultivars according to the farmers</li> </ul>			
2.4	Plant resistance to dry spell & heat (any damages observed?)	- Resistant to dry spell			
2.5	Plant resistance to excess rain & flood (any damages observed?)	<ul style="list-style-type: none"> <li>- Vulnerable to excess rain &amp; flood water</li> <li>- Stunted plants due to excess rain and flood water, same as traditional cultivars</li> </ul>			
2.6	Plant resistance to pests (any pests causing damage?)	<ul style="list-style-type: none"> <li>- Fruits have been damaged by the pests: melon bug (<i>oinghili/Iinkili</i>) &amp; other insects (worms)</li> <li>- Pests (worms) lay their eggs into fruits causing poor growth of the fruits and sometimes fruits can go bad early before the extraction period. Many fruits had signs of deformity that may be a result of insects attacking the immature fruits. The affected fruits could hardly produce seeds, this was the same case with the traditional cultivars</li> </ul>			
2.7	Plant resistance to disease (any disease causing damage?)	<ul style="list-style-type: none"> <li>- NCRs: no diseases observed</li> <li>- Caprivi: diseases observed (fruits had "wounds" but causes was not confirmed)</li> </ul>			

<b>3. Fruit harvested</b>		<b>KMS 07-17</b>	<b>KMS 07-02</b>	<b>KMS 06-27</b>
<b>3.1</b>	Fruit maturing on plot (early, normal, late compared to traditional varieties)	Fruit mature early compared to traditional varieties, since crosses were planted late but could still produce some fruits.		
<b>3.2</b>	Fruit harvesting date(s) on plot	Late May - early June		
<b>3.3</b>	Number of fruits harvested on plot	Minimum 1 & Maximum 8 fruits/plot		
<b>3.6</b>	Shape of fruits harvested: round, elongated (number or %)	NCRs: tested crosses produced elongated fruits Caprivi: elongated and round fruits produced, although no seeds could be extracted because fruits had been destroyed by livestock.		

<b>4. Seed extracted &amp; yield</b>	<b>KMS 07-17</b>	<b>KMS 07-02</b>	<b>KMS 06-27</b>
<b>4.1</b> Date of seed extraction	<b>05/06/09 &amp; 08/06/09</b>		
<b>4.2</b> Number of fruits harvested & processed (date of harvest)	Omuthiya 7 fruits (26/05/09) Eenhana 7 fruits (12/05/09) Onakalunga 4 Fruits (27/05/09) Uukwiyu 3 fruits(29/05/09) <b>Total: 21 fruits</b>	Eenhana 8fruits (12/05/09) Onakalunga 7fruits (27/05/09) <b>Total: 15 fruits</b>	Omuthiya 1fruit (26/05/09) Eenhana 4fruits (12/05/09) <b>Total: 5 fruits</b>
<b>4.3</b> Total g of fruits harvested & processed	<b>1078g</b>	<b>590g</b>	<b>80g</b>
<b>4.4</b> Fruit processing, seed extraction compared to traditional cultivars	Covering (skin) of the test fruits are soft, so extraction of the seeds was easier compared to traditional cultivars.		
<b>4.5</b> g of fresh extracted cross seeds <i>05/06/09 &amp; 08/06/09</i>	Omuthiya: 132g Eenhana: 45g Onakalunga: 39g Uukwiyu: 38g	Eenhana: 120g Onakalunga: 89g	Eenhana: 16g Omuthiya: 39g
<b>4.6</b> Total g of fresh seeds produced	<b>254g</b>	<b>209g</b>	<b>55g</b>
<b>4.7</b> as % of total fresh seeds produced / g of fruit harvested	24%	35%	67%
<b>4.8</b> g of dried seeds extracted <i>(weighed on 12/06/09)</i>	Eenhana: 21g Omuthiya: 66g Onakalunga: 14g Uukwiyu: 10g	Eenhana: 36g Onakalunga: 23g	Eenhana: 6g Omuthiya: 18g
<b>4.9</b> Total g of dried seeds produces as % dried seeds / g fruits	<b>111g</b> 10%	<b>56g</b> 10%	<b>24g</b> 30%
<b>4.10</b> Size of harvested cross seeds compared to planted seeds	Some seeds are smaller, while some are of the same size with the panted seeds		
<b>4.11</b> Size of harvested cross seeds compared to traditional cultivars	Same to bigger sizes		
<b>4.12</b> Colour of harvested cross seeds (are all seeds of the same colour?)	Different colours (See picture)	Different colour (See picture)	Some seeds are darker (See picture)

5.	Overall evaluation of the cross	Details (and comparison to traditional cultivars)
5.1	Strong points of the crosses tested	<ul style="list-style-type: none"> <li>- Crosses grow better on the loamy soil, although farmers explain that it is also important to use manure</li> <li>- Better stand with too much water because all the traditional varieties planted on the same dates died from heavy rains and flood water.</li> <li>- Flower easily</li> <li>- High fruiting speed compared to traditional cultivars</li> <li>- Resistant to dry spell</li> <li>- Resistant to diseases</li> <li>- Crosses &amp; traditional varieties both are vulnerable to heavy rain and flood water</li> </ul>
5.2	Weak points of the cross tested	<ul style="list-style-type: none"> <li>- Affected by Pests</li> <li>- Soft skins, reduces the waiting time of the seeds to be extracted</li> </ul>
5.4	Planting of these harvested seeds next season by the farmers?	Farmers comment, re-do the trial next season, insisting that planting was done late that might had affected the results of the test. Also flood situation probably would not be the same as the first trial. Caprivi- seeds kept for planting in the next season
5.5	To the question whether farmers would want more seeds of the same cross to plant next season?	Most of the full-test farmers indicated that they would need more seeds of the crosses to plant on their fields next season, hoping to have planting done on time and rain to be average, to see if there will be some changes regarding performance of the varieties



