

## **PRELIMINARY OBSERVATIONS ON SUGAR BEET (*BETA VULGARIS SACCHARIFERA*) GROWING AT MUMIAS, KENYA**

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### **Abstract**

Sugar beet is a fleshy root crop processed for sugar production. It is native to temperate countries and hence has been associated with the temperate environments. The leading sugar beet producing regions include the European Union, the USA and Russia. Despite being a temperate crop, sugar beet trials have been going on in some selected tropical countries (e.g. India and South Africa).

Proponents of tropical sugar beet production argue that this would be a viable solution to problems facing sugarcane farmers in the tropics. According to David and Young (1981), sugar beet matures and is ready for harvest in 5-6 months. The short maturity period of sugar beet may result in a quick and reliable income for farmers, unlike sugarcane that matures in 18-24 months in Kenya.

Observations on two cultivars grown at Mumias have illustrated a technical potential for sugar beet production. The crop established in July 2005 (short rains season) recorded over 95% germination. It showed fair resistance to pests and diseases and the tuber sizes were within the normal ranges of those reported elsewhere. Yield estimation at 5-6 months indicated a potential of 40-47 tons/ha.

Introduction of sugar beet in Kenya would supplement sugarcane production, resulting in sugar crops diversification. This may culminate in a regular income for farmers as well as domestic sugar security.

*Keywords:* sugarcane, sugar beet, *Beta vulgaris saccharifera*, cultivars, tropics, varieties

### **Introduction**

Eighty-three countries produce sugar from sugarcane and 50 countries from sugar beet. Due to climatic adaptation, 10 countries produce both cane sugar and beet sugar. Sugarcane is grown in tropical and subtropical countries in the southern hemisphere, and sugar beet mostly in temperate countries in the northern hemisphere. The total 2005/06 world sugar production, including sugar beet sources, is estimated at 150.9 million tons (MT), having increased consistently since 1993/94 (FAO, 2000). World sugar consumption has grown consistently by 1.9% per annum and reached 133 MT in 2002/03. Of the total sugar production, cane sugar constitutes 75% and beet sugar 25%.

Beet sugar is produced by countries in Europe (e.g. France and Germany), Egypt, Morocco, North and Central America, Chile, Iran, Japan, Pakistan and Syria (Balasundram, 2002).

In Kenya, total annual cane sugar production ranges from 400 000-500 000 MT against an estimated consumption of 600,000 MT. The deficit of about 200 000 MT is met by imports, of which 111 000 MT is refined sugar and 89 000 MT is raw/mill sugar. The imports may increase should the world price remain low and erratic weather conditions continue, since the cost of production is high. It is against this backdrop that Mumias sugar company, the leading sugar producer at 65% of total production, ventured into trials to assess the potential and challenges to sugar beet production with intent to address the domestic sugar deficit.

### **Materials and Methods**

Two sugar beet cultivars, Posada and Dorotea, were acquired from Sweden and planted on 10 ha in July 2005. The trial was located was at 1314 m a.s.l. on longitude 34°30'E and latitude 0°21'N, with annual rainfall ranging from 1500-2000 mm. Mean long term daily air temperatures are 22.1°C and range from 14.4-29.7°C. The crop was spaced at 50 cm and received 50 kg P<sub>2</sub>O<sub>5</sub>/ha at planting and 80 kg N/ha as a top-dressing. Data collection stations were randomly assigned to enable sampling on a monthly basis for leaf numbers, shoots and tuber weights. Sampling and analysis for sugar content began at 14 weeks after planting and continued until harvest. The wet digestion method used in cane analysis was employed in the determination of sugar content.

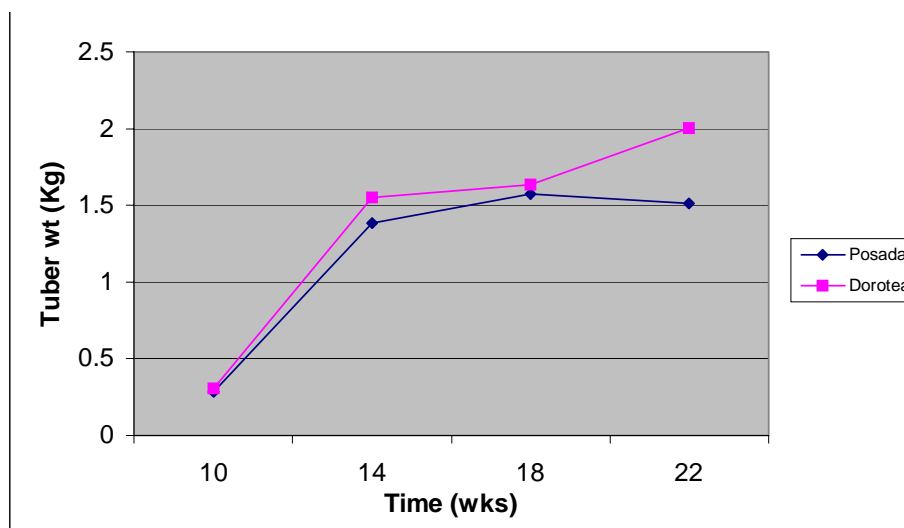
### **Results and Discussion**

The crop established well and had good growth vigour, as shown in Figure 1. It matured in 5-6 months and was harvested in January 2006.



**Figure 1. Lund University PhD student Nicodemus Mandere (right) and Technical Supervisor F Maguge of Mumias Sugar Company shown with the developing tuber of the sugar beet crop growing at Mumias in western Kenya.**

There was no significant difference ( $p < 0.05$ ) in tuber size between the two cultivars through time and at harvest. However, Dorotea had larger tubers (see Figure 2). The sugar content (Pol % beet) averaged 11.4% in Posada and 12.8% in Dorotea, and was not significantly different ( $p < 0.05$ ). The yield realised ranged from 40-47 tons/ha and corroborated that of other tropical sugar beet trials. According to Doorenbos and Kassam (1979), sugar beet in a tropical environment is expected to give root yield within the range of 40-60 tons and sugar content of 15% dry matter. The low yields and sugar content may be attributed to low rainfall at the study site and attack by *Rhizoctonia* crown and root rot in mid-season.



**Figure 2. Tuber weights (kg) of two sugar beet cultivars grown at Mumias, Kenya.**

The results from the 2005 trial illustrated that sugar beet could grow well to maturity under Mumias conditions, as was observed in the 2001 and 2003 trials. Due to the short maturity period, sugar beet would be suitable as a rotational crop or an intercrop with sugarcane. Farmers can grow sugar beet to generate more income; however, the following issues need to be addressed:

- The economic viability of growing beet, given the high cost of seed that has to be procured by the farmers each planting season.
- The acquisition of sugar beet processors that currently are not available in the country.
- The need for cost comparisons between sugar beet and sugarcane growing, to establish gross margins.

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