



KENYA FORESTRY RESEARCH INSTITUTE  
KITUI REGIONAL RESEARCH CENTRE

*Melia Volkensii* Spacing and Pruning Trial for  
Establishment of Plantations in Asals and Its  
Effects on Green Grams

By: D. Muchiri, Dr. J. Ndufa, B. Kigwa, V. Oeba, and L. Kimotho  
June 2011

## Introduction

*Melia volkensii* is one of the indigenous timber species in Drylands that is being promoted by KEFRI

The species naturally occurs in eastern, north and coast provinces of Kenya.

The growth of melia varies from one region to another depending on rainfall, altitude and soil types.

For farm forestry to succeed, tree of high economic and direct benefit to farmers have to be promoted (Ayuk et al., 1999).

*Melia* has a lot of desirable qualities and farmers would required to adopt it on their farms

Kidundo (1997) reported that farmers were allowing closely regenerated trees on their farms without considering the tree impact on crops, although they believe *Melia* did not compete with crops.

Despite, the multiple uses that melia volkensii trees exhibits, very few or no plantations of commercial purpose have been established in the ASALs at either on-farm or on-station levels

Currently, through the awareness created by KEFRI, farmers are encouraged to plant melia on their farm and in plantations

some questions are now being asked by farmers about appropriate silvicultural aspects to be applied to the species in order to get good quality timber and at the same time get a good crop when melia is intercropped with the food crops.

How high should Melia be pruned ?

Which is the best spacing for establishing of Mukau plantation?

At what age will melia be harvested for timber?

How much money do I expect from one hectare of Mukau plantation?

To answer the above questions, data to support and guide the promotion of mukau is necessary



### Objectives

- To determine the optimal spacing for establishing *Melia volkensii* plantations in the ASALs
- To determine the appropriate rotation age for clear felling *Melia volkensii* plantations
- 
- To determine the pruning regimes for *Melia volkensii* plantations
- To determine the effect of *Melia volkensii* on the yield of green grams
- To determine the economic benefit of growing *Melia volkensii* as compared to other crops in ASAL

### Methods

The trial was established at Kibwezi on farm in Nov.2009 on an area of 1.5 hectare

The plot was cleared, and oxen ploughed. The experimental design was RCBD with 6 treatments replicated 3times.

The treatments are 3mx3m, 4mx4m, 5mx5m, 6mx6m, 4mx4m total pruning and no Melia Melia trees was planted in pits measuring 45cm x45cm x45cm

Tree data is collected twice per year during the months of November and May. All the trees in each net plot were assessed for the following- survival counts, Height growth(m), Diameter at breast height (dbh) cm, Crown depth and crown diameter. Buds were removed during the first year and subsequently, pruning was done uniformly to 2/3 of the crown depth in all the treatments except in the total pruning plot where total crown removal was done.

Weeding was done four times during the year in all the treatments.

Green grams were planted uniformly in every treatment at spacing of 45cm X 15cm with 2 plants per hill. This was repeated every rainy season. The Green grams data taken included, Total no of plants per net plot, Total no of plants per sample plot, No of pods- 3 plants for each sample plot, and Grain wt. for sample plots & for net plot. This information was collected from both net plot and sample plot as indicated below

### Treatments

Spacing	Plot size	Net plot size
3m by 3m	12m by 12m	9m by 9m
4m by 4m	20m by 24m	8m by 8m
5m by 5m	20m by 20m	10m by 10m
6m by 6m	24m by 24m	12m by 12m

### Sample plots

3mx3m- Green grams were harvested from 1 rows 3m, next row 3m, next row 3m

4mx4m- Green grams were harvested from 1 rows 4m, next row 4m, next row 4m

5mx5m- Green grams were harvested from 2 rows 4m, next 2 rows 4m, next 2 rows 4m

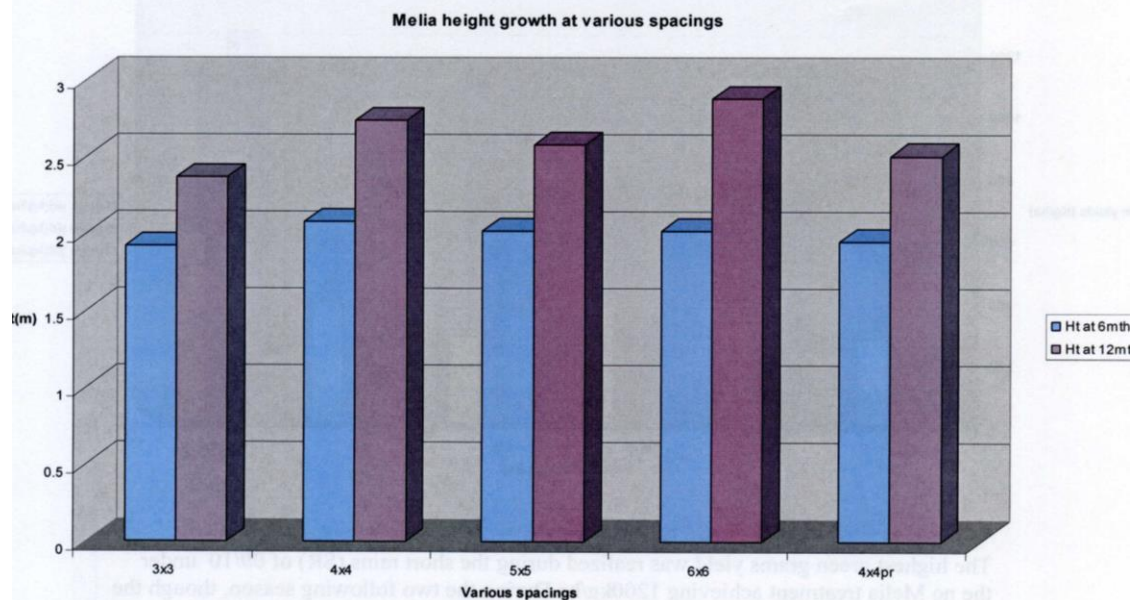
6mx6m- Green grams were harvested from 2 rows 4m, next 2 rows 4m, next 2 rows 4m

4mx4m(total pruning)- Green grams were harvested from 1 rows 4m, next row 4m, next row 4

### Kibwezi field layout

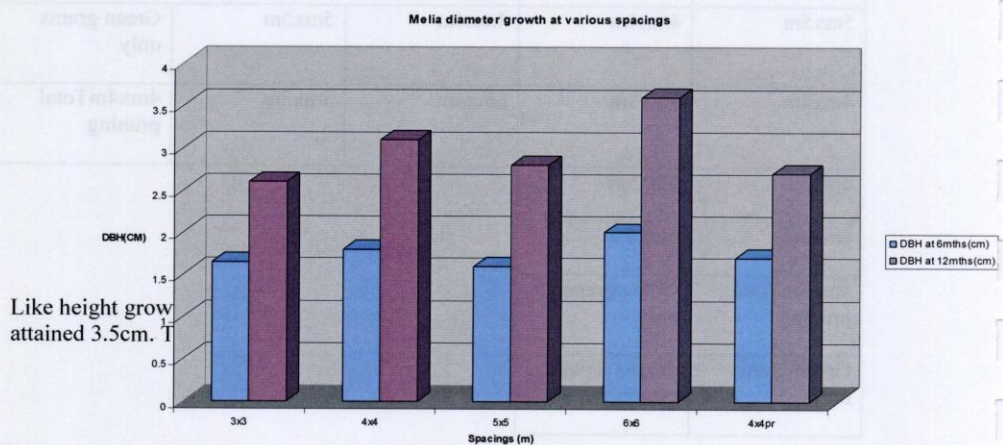
Block 1	Block 2	Block 3		
5mx5m	4mx4m	4mx4m	5mx5m	Green grams only
4mx4m	3mx3m	6mx6m	3mx3m	4mx4m Total pruning
3mx3m	5mx5m			
6mx6m	6mx6m			
4mx4m Total pruning	Green grams only			
Green grams only	4mx4m Total pruning			

### Preliminary results



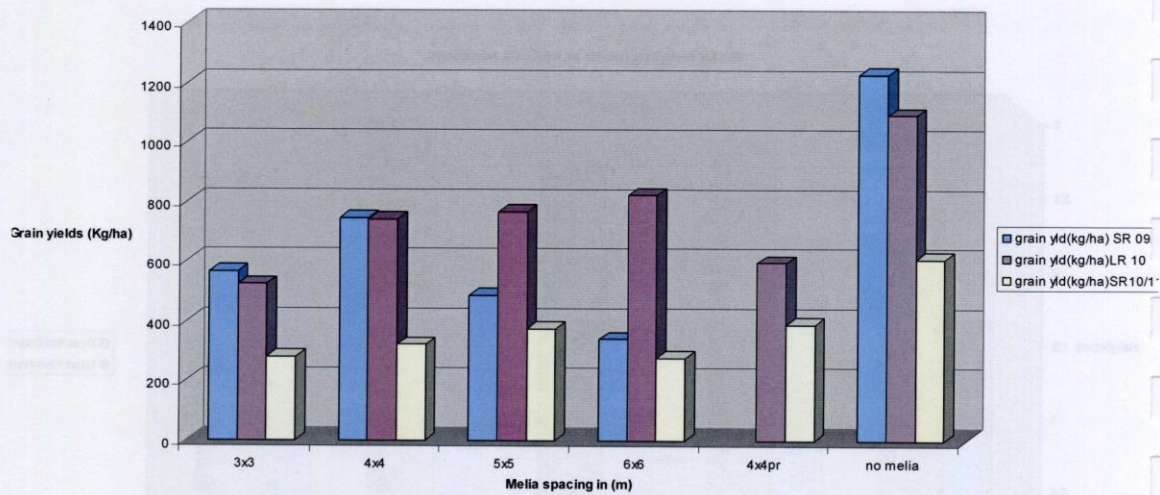


At the age of six months there was no difference in height growth. All treatments height was above 1.5m but below 2.0m mark but at 12 months, 6mx6m had shown some vigour of out performing the rest.



Like height grow attained 3.5cm.

**Green grams grain yields at various melia spacing for three seasons**



The highest green grams yield was realized during the short rains (SR) of 09/10 under the no Melia treatment achieving 1200kg/ha. During the two following season, though the

yields were lower, the same treatment(control) produced better grain yields than all the other treatments with Melia.

The total pruning treatment was not planted during the SR of 09/10 but the following two seasons, the yields were lower during the LR of 2010 with less than 600kg/ha compared to over 100kg/ha in the no melia treatment.

### **Conclusions and way forward**

It is too early to draw conclusions because melia is a long-term crop. These minor variations could change trend in the future.

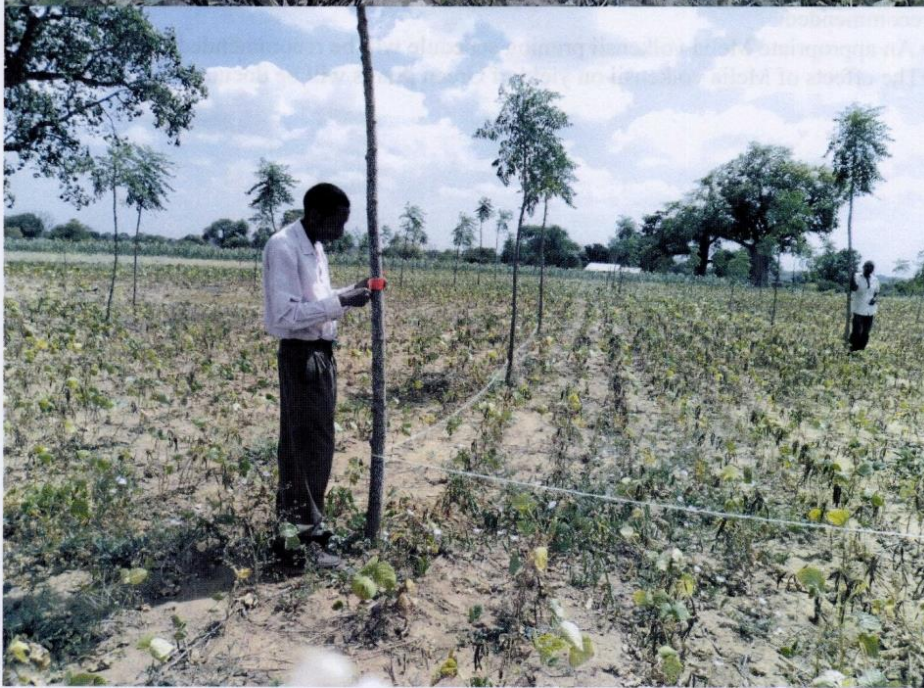
The trial requires funding for 2010-2011 activities which include

- Melia volkensii management –Pruning ,trial maintenance- Weeding , planting crops (green grams), praying, harvesting, threshing and weighing
- Monitoring and data collection

### **Expected outputs**

- The appropriate spacing for establishment of Melia volkensii plantation will be recommended.
- An appropriate Melia volkensii pruning schedule will be recommended.
- The effects of Melia volkensii on yield of Green grams will be documented





PCL XL error

Error: InsufficientMemory

Operator: PopGS

Position: 15262





## References

- Kimondo, J.M. 2002. *Melia volkensii*: establishment and yields. Proceedings of INRMU Regional Seminar on agroforestry in Eastern Africa held at Mwingi Cottage Hotel, Mwingi, 19<sup>th</sup> – 25<sup>th</sup> May 2002. Unpublished proceedings
- Kimondo, J.M. & Ouma, G. 2006. Performance of *Melia volkensii* at different spacing in Tiva, Kitui district. In Kamondo, B.M., Kimondo, J.M., Mulatya, J.M. & Muturi, G.M. (eds). 2006. Recent Mukau (*Melia volkensii* Gurke) Research and Development. Proceedings of the 1<sup>st</sup> National Workshop held at KEFRI Kitui Regional Research Centre. 16-19 Nov 2004. p27-28.
- Maina, A.M. 2006. Growth and yield models of *Melia volkensii*. In Kamondo, B.M., Kimondo, J.M., Mulatya, J.M. & Muturi, G.M. (eds). 2006. Recent Mukau (*Melia volkensii* Gurke) Research and Development. Proceedings of the 1<sup>st</sup> National
- Mulatya, J.M. & Misenya, T. 2006. *Melia volkensii* growth in the Southern drylands of Kenya.
- Kamondo, B.M., Kimondo, J.M., Mulatya, J.M. & Muturi, G.M. (eds). 2006. Recent Mukau (*Melia volkensii* Gurke) Research and Development. Proceedings of the 1<sup>st</sup> National Workshop held at KEFRI Kitui Regional Research Centre. 16-19 Nov 2004. p37-39.