



The story of mukau



Left: A plus-tree from the KEFRI collection in Mbeere district (2008). Since then, this tree has been cut for timber, a sign that even protected germplasm is not secure. Top: A view of mass production of mukau in the Forest Department nursery in Nuu, Mwingi District, in 2003

A tree species of Kenyan drylands with a bright future

Mukau is the Kamba name of the tree *Melia volkensii*, reflecting the fact that the species grows mostly in Eastern Kenya (where the Kamba live). Small quantities of the tree are also found in northern Tanzania and southern Somalia.

Farmers in Kenyan drylands have for long known of the benefits of this tree species, and planted it on their farms for a variety of uses like timber, medicine and as fodder. The species grows in the wild, but is also cultivated on farms, in agro-forestry systems. The latter practice is however

hampered by the difficult propagation of the species in the nursery, partly due to the hard woody shell that contains the seed.

The wood is first rate, comparable to mahogany, and the species is able to grow in quite dry climates in hot, low-lying areas (400-1600 masl). Combined with the fact that it is a fast grower, mukau is able to produce valuable timber that is resistant to termites in a generally hostile environment.

The Kenya Forest Research Institute (KEFRI) started recognising the value of the species in the 1980s, among others through the work of a

researcher (P Milimo) on germination in a nursery in 1986. Other researchers like Kidundo (1997) and Mulatya (2000) followed, with work that put mukau more into focus. JICA, the Japanese aid organisation, assisted KEFRI in its Kitui dryland research station, to develop a methodology for nursery propagation, including a "nut cracker" for obtaining the seeds. This happened in the late 1990s.

KEFRI had also started laboratory trials to propagate mukau through in-vitro culture, to circumvent the sexual propagation issue. However, the in-vitro work hit a technical bottleneck, notably root development, and a



Top: Cracking the hard mukau nuts to obtain the seeds.

Top right: Young mukau trees, eight months old, in BGF's plantation in Kiambere, Mwingi District, Kenya



satisfactory propagation protocol was never achieved.

Meanwhile, several people – among them Jan Vandenabeele*, a Belgian forester working in an overseas development assistance programme funded by the Belgian and Kenyan Governments – realised that good mukau specimens in the wild were becoming increasingly rare. They were being poached both on farms and in the dryland woods, leaving inferior trees and shrubs behind, crooked and of poor general form and condition.

In 2004, Vandenabeele, through the ODA programme he coordinated with the Kenyan Government, funded a KEFRI survey of the surviving mukau populations in the Eastern and Coast provinces of Kenya. The objective was to select superior or "plus" trees, to preserve their germplasm for future genetic improvement work. In fact, this was the first step towards a systematic genetic improvement ever undertaken on the species. Two years later, KEFRI undertook a second survey, assisted by JICA, to widen the collection.

Vandenabeele, working with the Kenyan Forest Department, also took the initiative to propagate mukau

on a hitherto unseen scale, in two nurseries in the Kenyan drylands where farmers could buy seedlings to establish small-scale plantations on their farms. In itself, the numbers were not enormous, but the presence in 2003 - 2004 of 40,000 seedlings of mukau in the nursery of Nuu alone, in the remote district of Mwingi, was quite a novelty.

As such, the idea was launched to grow mukau on an industrial scale, as one of the few available options to make profitable use of extensive dry "wastelands". This contrasts with the traditional extension approach where farmers were encouraged to plant a few dozen mukau trees on their land.

By the end of 2006, when employed by Better Globe Forestry Ltd, Vandenabeele established contacts with the University of Ghent, in Belgium, to restart research on in-vitro propagation of mukau. The research, now in its second year, is steadily making progress towards an effective propagation protocol. It is anticipated that the latter will be available towards the end of 2009, opening the way to clonal forestry based on superior germplasm for high-yielding and fast-growing mukau plantations on an industrial scale.

However, such a propagation programme will have to be supported by continuous genetic improvement research to avoid in-breeding and problems related with clonal tree production such as pests and diseases on *Populus* as occurs in Europe.

In the last couple of years, KEFRI has fully realised the potential of growing mukau by smallholders in semi-arid zones of the country, and is funding various research programmes regarding its silviculture, pest and disease management and wood characteristics of the species. Simultaneously, through its network of dryland stations like Kibwezi and Kitui, KEFRI is actively encouraging farmers to plant mukau. At the same time, the Kenya Forest Service is also promoting mukau plantations through its extension services in areas like Mwingi and Kitui. Decidedly, the future looks bright for mukau. **M**

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