

CLONAL EUCALYPTUS; COMMERCIAL TREES FOR TOMORROW

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Background

More than 600 species of eucalypts are known, and new ones are still being discovered while some have recently been discarded from the genus e.g. *Eucalyptus citrodora*. Characteristically, the genus has many useful biological traits which include fast growth rates, wide adaptability to soils and climate, prolific breeding habits, ability to coppice quite easily and high degree of tolerance outside their natural habitat. Indeed, because of these characteristics, eucalypts are planted widely all over the world for fuel wood, poles and industrial wood. Uganda has had a long history of growing eucalypts characterized by three successive introductions of fresh *Eucalyptus* germplasm from different sources. Eucalypts grown in plantations, fire lines, windbreaks, woodlots, boundary plantings or in groves are now an integral part of many rural landscapes in Uganda.

The first introduction which dates back to 1912 was motivated by desire for fuel wood for the steam engines of the Uganda Railway and as mosquito plantations in peri-urban areas. The second wave of introduction of eucalypts to Uganda was driven by the demand for industrial wood. Of the four *Eucalyptus* plantation species selected out of the 52 species which were originally tested for their suitability, two, *E. grandis* and *E. saligna* are grown in the moist southern parts of Uganda and *E. cameldulensis* and *E. tereticornis* are grown in the relatively arid northern parts of the country. The third introduction was the introduction of clonal *Eucalyptus* resources in 2002. In third introduction, eleven hybrid clones and one pure clone were brought into Uganda from South Africa. This was motivated by the need to bridge quickly an approximate 30-year gap created in the national wood production which began during the military regime of the 1970s.

Clonal introduction was demand driven with the overall objective of improving the living standards of the rural communities in Uganda, particularly of the resource poor segment of the population by enhancing forestry production. These specific objectives that guided the introduction were: to transfer and apply in Uganda clonal forestry biotechnology of superior proprietary *Eucalyptus* clones from Mondi Forests Limited, and growing them for field evaluation trials and demonstrations, test their performance and monitor environmental adaptation and suitability; to establish through private sector involvement large-scale clonal seedling production in Uganda using Mondi superior proprietary *Eucalyptus* clones; to select and utilize Uganda tree biodiversity with economic value for forestry and agroforestry through clonal tree technology, learning from the *Eucalyptus* model from South Africa and Kenya, through public and private inter-phase activities for sustainable environment and niche markets; and to build the capacity clonal forestry technology in Uganda that would expand creating new opportunities, jobs and encourage entrepreneurship in rural and urban environments.

Success story

Four institutions were pivotal in the introduction of the clones in Uganda: the National Agricultural Research Organization (NARO) of Uganda, International Service for the Acquisition of Agri-biotech Applications (ISAAA) AfriCenter, Kenya, Gatsby Charitable Foundation (GCF) of UK and Mondi Forests Limited of South Africa. In close collaboration with ISAAA and intense consultations with the Kenya Tree Biotechnology Project (TBP-K)

Admittedly the TPB-K experience motivated and inspired the Uganda project (TBP-U) in several ways. TBP-K trials in the first Phase (1997-1999) showed that the clones performed exceptionally well in marginal areas like Machakos by attaining 100% survival rate with record top height of 6 m within one year after planting with virtually no incidents of pests and diseases: not even termites which in Uganda can cause significant losses.

From preliminary field executions by Mondi and NaFORRI scientist, Twelve clonal hybrids were recommended for Uganda. It is important to note that out of the twelve clones only one: GC 796 had also been given to TBP-K earlier. The rest: GC 514, GC 540, GC 550, GC 578, GC 784, GU 7, GU 8, GU 21, GU 607, GU 609 and TAG 5 given to TBP-U were different. The GC hybrids are crosses between *Eucalyptus grandis* and *Eucalyptus cameldulensis* while GUs are the hybrids from crossing *E. grandis* with *Eucalyptus urophylla*. TAG 5 is a pure *E. grandis* that was specifically bred for the Transvaal area of South Africa.

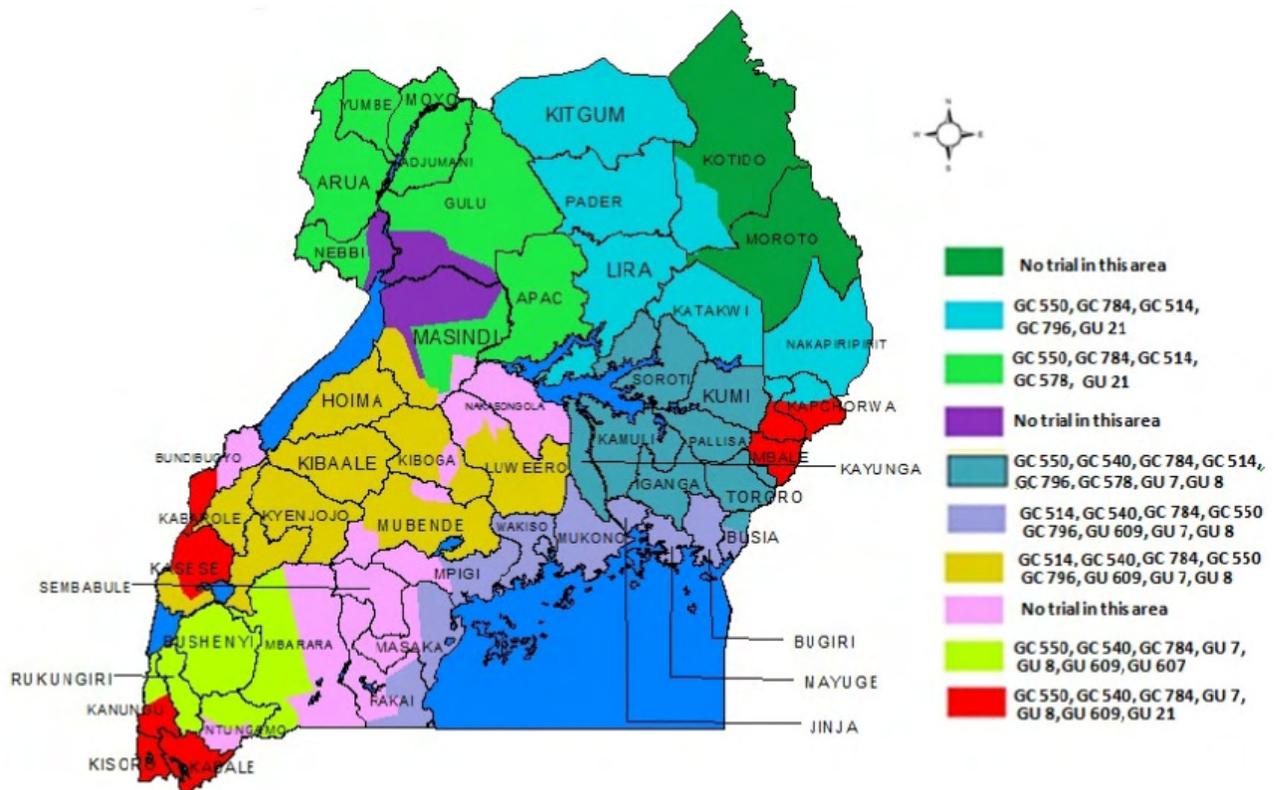
Trials established in March-May 2002 were sited in Kifu, Ikulwe, Serere, Ngeta, Abi Other trials at Apala, Akol, Kumi, Masindi, Sembabule, Bugongi, Ntungamo and Nyabushabi and Kyembogo.

Growth assessment for the first seven years showed that clonal hybrids, namely GC 514, GC 540, GC 550, GC 796, GU 7 and GU 8 performed relatively well throughout Uganda while GC 784 performed exceptionally good in Northern Uganda. Studies have further shown that clones GC 540, GC 550 and GC 796 and GU7 and GU 8 produce equally competitive timber and wood products at 7 year rotation (Fuel wood, poles and timber for light construction)).

Based on study results, clonal performance was used to select and recommend site-specific clones for forest plantation development throughout Uganda. In addition, the results provided the basis for recommendation of clones GC 514, GC 540, GC 550, GC 784, GC 796, GU 7 and GU 8 for mass production.

Remarkable innovations have been registered in the area of potting material and tunneling technology and this has tremendously improved rooting of some of the clones. Commercialization of production of the recommended clones is in high gear, Sale statistics from the three commercial Gatsby clonal nurseries at Kifu, Mbale and Fort Portal show very clearly the rapid adoption of clones for private plantation development.

Recommended eucalyptus clones for different agro-ecological zones of Uganda



Note: These recommendations were based on establishment and early growth characteristics

Threats to commercialization

Currently, there is high demand for clonal plantlets but commercial production of the clones has remained narrow and low. There has been an incidental emphasis of those clones which are easy rooters by private nurseries leading to near loss of 5 of the recommended clones!

It is important to note that not all recommended clones are being produce by commercial nurseries; for example nurseries in central Uganda are manly producing easy rooters such as GC 796 and GC 578. The nursery in Fort Portal is specializing in production of GU7 and GU 8. There is no nursery currently massively producing GC550, GC540, GC784, and GC 514. In addition GC 578 which did not perform well in the field has found its way into mass production.

Key take home NOTES

- Clones recommended for further development are GC 514, GC 540, GC 550, GC 796, GC 784, GU7 and GU 8
- GC 540, GC 550 and GC 796 and GU7 and GU 8 produce equally competitive timber and wood products at 7 year rotation (Fuel wood, poles and timber for light construction). Wood property studies for GC514, GC 784, and GU609 are under way.
- Studies aimed at improving nursery performance e.g rooting are ongoing and therefore nursery practitioners and tree growers are encouraged not to rush for good rooters! A good rooster may not necessarily give a good product!
- Farmers are encouraged to buy and plant only recommended clones from certified nurseries. You can find clones at Gatsby Nurseries at Kifu, Mbale, Fort Portal and Sunset Tree Biotec Nursery in Bukerere off Seeta (Jinja Road).
- NaFORRI is currently seeking funding to establish another mother garden for the recommended clones and will invest in research to improve rooting and eventually rejuvenate production of the threatened clones.
- Research efforts to produce a suitability map based on volume, form, and taper at 7-8 year rotation are under way.
- Always seek professional advice before buying and planting clonal eucalypts

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