



Strategy and Progress of the Genetic Improvement of African Mahogany in the NT

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History: The *Khaya senegalensis* (Desr.) A. Juss. (African mahogany) (Meliaceae) is a high-value hardwood species native in some 15 countries of West-Central Africa where it ranges from c. 8° N to 15° N in a belt from Senegal to Sudan and Uganda. It has an elevational range of c. 0-1,800 m asl; mean annual rainfall varies from c. 400-1,750 mm. Thus the species has a vast homoclimate across northern Australia [Booth & Jovanovic 2000, CSIRO, FFP Client (ACIAR) Report No. 758], where there is strong interest in expanding the small estate into commercial plantations.

First Planting: African mahogany was first planted in the Northern Territory (NT) more than 40 years ago. Stands planted in the 1960s-1970s remain near Gunn Point, Howard Springs, other places in the NT, and at Weipa, Queensland. The species is well adapted and fast growing. Trees salvaged in Darwin (from street, park and home-site plantings), and harvested at Weipa, give high quality wood. Properties and drying requirements of wood of 38 selected, in-stand, rotation-age NT trees have been studied for an evaluation of wood qualities.

Broad Genetic Base: African mahogany in the NT mainly comprises stands (c. 20 ha) planted in the early 1970s. Primary breeding needs are to rapidly improve stem straightness [deficiency not due to shoot borer (not reported in the NT)]; and to produce diverse, second-generation progeny. So the first-stage improvement strategy has the following 5 components:

Phenotypic selection of at least a few superior trees from each of the 24 provenances (from 11 countries of nativity and one secondary) represented in the mainland and Melville Is. stands.

Establishment of grafted clones of these trees in both a 'gene recombination orchard' (GRO) (*sensu* Vanclay, JK 1986, *Silvae Genetica* 35:1-3), and in a conservation clone bank (CCB) for security, to ensure protection and use of the best of the provenance diversity present.

Establishment of series of clone tests for identification of deployment clones.

Establishment of a clonal seed orchard (CSO) with the seemingly-best 20, selected trees available to enable a seedling deployment option; and culling the GRO after (e).

Planting a second-cycle, base population as open-pollinated, GRO families and infusions to enable future selection of superior, second-generation trees for on-going improvement.

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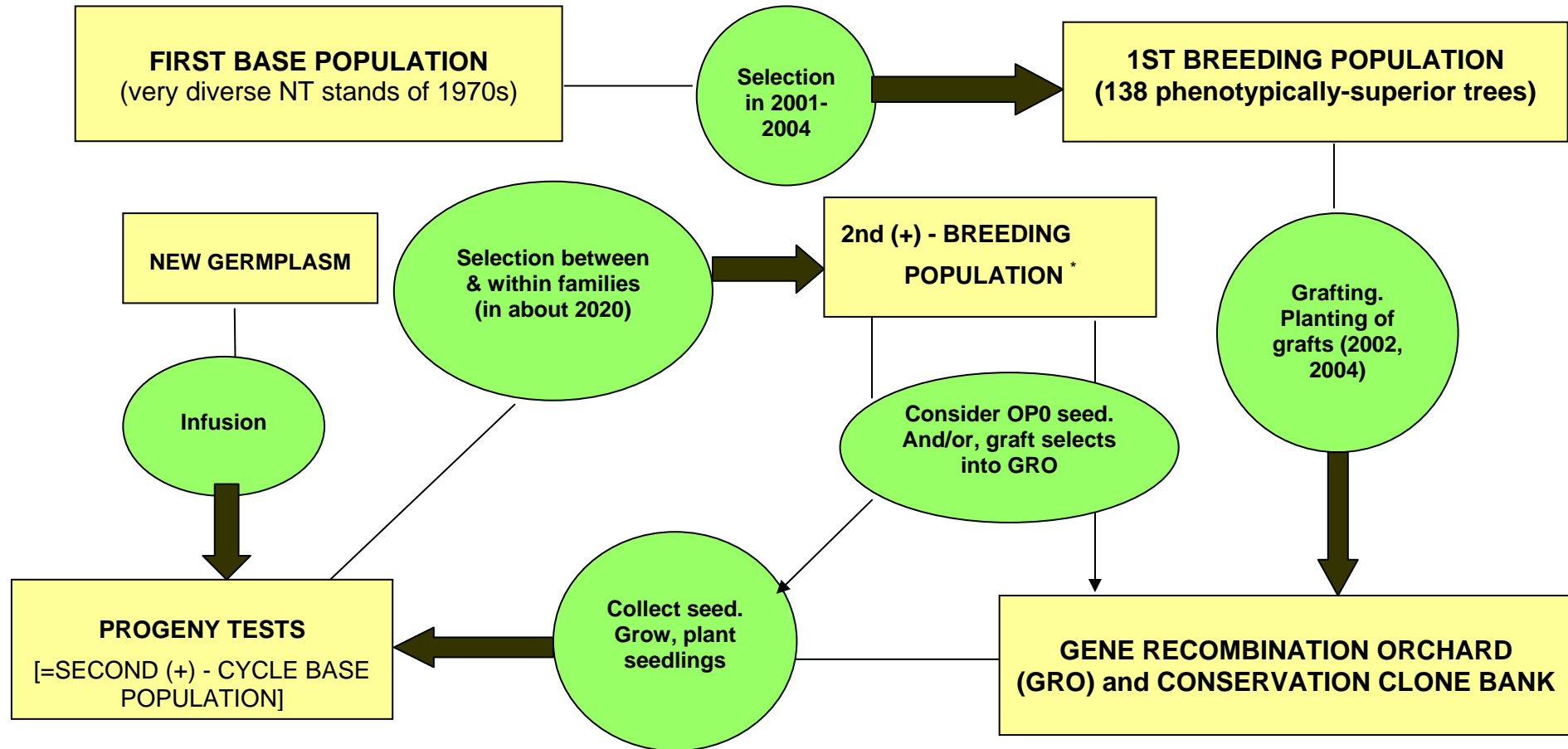
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Progress: On implementation of the strategy in the NT since 2001 includes:

- Selection of 146 mainland trees and establishment of grafts of the better 120 in a GRO and a CCB in 2002 (98 clones) and 2004 (22 clones). Useful seed is expected from 2006 or 2007.
- Congregation of grafts of the seemingly-best 14 clones in a section of the CCB to promote crossing among them and production of seed to raise plants for a second series of clone tests.
- Partial establishment of a hedge garden (in 2004) with i) seedlings from some 30 trees across the NT and a Queensland collaborator's suites of select trees, and ii) rooted cuttings from coppice from the stumps of 15 of the phenotypically-best, 38 trees in the NT program.
- Selection of sites for the CSO, and for the first clone test planned for planting early in 2005.

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FLOW CHART DEPICTING THE LONG-TERM IMPROVEMENT OF *K. senegalensis* IN THE NT



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Seed- or vegetatively-derived, operational planting stock is generated via a PROPAGATION POPULATION based on the most advanced BREEDING POPULATION