

# Genetic resources management of *Melia volkensii* in Kenya.

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## 1. Introduction

*Melia volkensii* is a deciduous, broad-leaved, monoecious tree species, and it distributes semi-arid region in Kenya. Because the species shows fast growth, high wood quality and termite resistance, it is recognized as a valuable tree species in the drylands for forestry and agroforestry in Kenya.

Tree breeding project<sup>\*1,2</sup> was started in 2012 with the support of Japan International Cooperation Agency (JICA). Through collaboration between FTBC and Kenya Forestry Research Institute, genetic diversity and population structures of the species was studied for better management of its genetic resources in Kenya.



Pic.1: A tree of *M. volkensii*

## 2. Methods

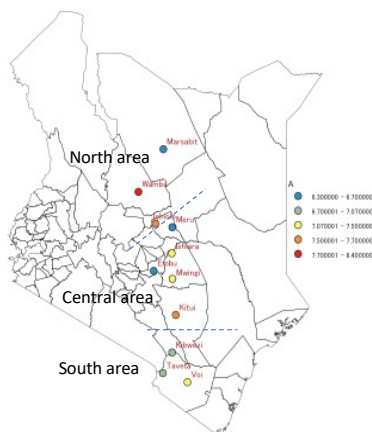


Fig.1: Sampled populations and results of Allelic richness.

- We developed 15 novel polymorphic SSR markers for the species. (Hanaoka et al. 2012, Conservation Genetics Resources 4: 395-398)

- For genetic diversity study, leaf tissues were collected from 11 putative populations covering most of the *M. volkensii* distribution range in Kenya (Fig.1). (30 trees/population)



Pic.2: Example of sampled trees

- DNA was extracted from all samples, and genotyped using the developed SSR markers. The genetic diversity and population structures of *M. volkensii* were then estimated.

## 3. Results and Discussion

- The level of genetic diversity was different among populations, however, there was no clear geographical trends (Fig.1, results of allelic richness<sup>\*3</sup> are shown).
- Structure analysis<sup>\*4</sup> revealed clear genetic structure among three geographical groups (three northern populations, four central populations and three southern populations.)

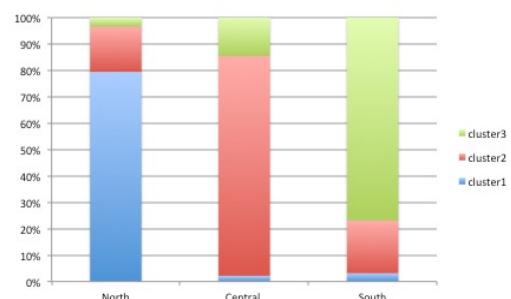


Fig.2: Results of Structure analysis.

- We suggest that the north, central and south geographic groups should be considered as provisional “management units” of *M. volkensii* genetic resources.

(Hanaoka S (ed), Hanaoka S, Matsushita M and Omondi S.F (wr) (2017) Guideline on conservation of genetic resources of *Melia volkensii* and *Acacia toritilis* in the dryland of Kenya)

- These findings were also used during the selection of progeny and provenance test sites, and 12 test sites were established between 2014 to 2015. The results will also contribute to consider the conservation and managements of *M. volkensii* natural genetic resources.

## 4. Progress of tree breeding project<sup>\*2</sup>

- Second generation plus trees have been selected from the progeny test sites. Those plus trees will be cloned for establishing advanced clonal seed orchards.

<sup>\*1</sup> Project on development of drought tolerant trees for adaptation to climate change in dry lands of Kenya (2012-2017)

<sup>\*2</sup> Capacity development project for sustainable forest management in Kenya (Tree breeding component). (2017-2021)

<sup>\*3</sup> El Mousadik and Petit (1996) Theoretical and Applied Genetics 92: 832-839

<sup>\*4</sup> Pritchard et al (2000) Genetics 155: 945-959