SUITABLE SPECIES AND PROVENACES FOR PLANTATION FORESTRY IN UGANDA:

M.D Byabashaija
and
J.F.O.Esegu

FORM

Abstract

Research to select suitable species and provenances for planting in Uganda started in 1908 and 1966 respectively. It was not until 1953 that the research was greatly extended when methods of research planning and recording were established in the first written silvicultural research plan. Todate, more than 170 species have been tried in about 400 research plots.

Among the gymnosperms, *Pinus caribaea, Pinus oocarpa and Pinus patula* are by far the most suitable for timber production in the country. *Araucaria angustifolia, Araucaria hunsteinii, Araucaria cunninghamii* and *Cupressus lusitanica* are also important plantation species.

Eucalyptus species, (*Eucalyptus grandis, Eucalyptus camaldulensis* and *Eucalyptus tereticornis)* performed best among the angiosperms. *Terminalia, Markhamia, Measopsis* and *Cordia species* have also performed satisfactorily.

This paper is a review of past experience in identifying species and provenances for plantation forestry. Emphasis is placed on the period after 1953 when the first silvicultural research plan was written.

Introduction

As early as 1900, the natural forest estate in Uganda was considered to be inadequate for sustainable supply of wood products and services.

By 1908 some hardwood plantations had been established around government stations. These consisted of prime timber species indigenous to Uganda, which included *Melicia excelsa* (Mvule); *Entandrophragma utile*, *E. cylindricum, E. angolense,* and *Khaya anthotheca* (Mahoganies); *Markhamia lutea* (Nsambya), *Measopsis eminii* (Msizi).

These species generally grew too slowly to meet the anticipated increased demand for wood and wood products. Tree species that could grow rapidly and had other desirable characteristics had to be identified for plantation forestry.

The choice of species is an important decision in tree establishment. The species to be planted should be adapted to the site, climate, soil and the abiotic environment. Usually, suitable species and provenances show superiority in survival, growth, form and utility.

Species and provenance research is a very important approach in meeting this challenge. It ensures that plantation forestry is carefully planned and given a proper position in the overall national landuse.

The suitability of a species cannot be judged on the basis of one provenance.
A species trial therefore has to include several promising provenances. Analysis and comparison between the site conditions of the countries involved and the ecological characters of the different provenances is basic to species and provenance trials.

Species trials

Species trials in Uganda are as old as tree planting itself which were generally carried out by District Forest Officers and Local Authority Staff. Species research was greatly extended after 1953 when methods of research planning and recording were established in the first silvicultural research plan (Kriek, 1970). Records indicate that over 42 pine, 11 cypress and 52 eucalyptus species, many of which originated from S. Africa where they had been successfully cultivated for over 70 years.

Three basic parameters; survivorship, growth rate and stem form were investigated in these trials.

In 1966, the East Africa Agricultural and Forestry Research Organization (EAAFRO) initiated provenance research mainly on *P. patula, P.oocarpa, P.caribaea, C. lusitanica* and Eucalyptus which earlier on had been identified for plantation development in Uganda. Tree seed for these trials were obtained from local and foreign sources.

Research Plots were located on the basis of the objective of the subject to be studied.

Traits assessed included;
survival (%),
total height,
diameter at breast height (dbh) over bark,
stem straightness (index)- based on an assessment of straightness in 1-m sections of the first 6m of the stem,
stem lean,
multiple stems,

Unfortunately however, it is apparent that most superior provenances were cut down during the periods of turmoil.

Care was taken during planting to give the plants under trial opportunity to show their true response to site factors. Periodic assessment/raw data collection was done according to experimental plans using specific forms.

Data was analysed using ANOVA (Steel and Torrie, 1980) was carried out on the diameter and height measurements to determine their significance. Other parameters considered include; branching habit(s), crown depth and the shapes of the stems/boles

Plantation Species identified

Following the analysis of the data collected, major species for plantation development in Uganda were identified.

Five conifer species were selected for planting in both highland and lowland reserves. *Pinus patula, Pinus radiata* and *Cupressus lusitanica* were earmarked for the highlands (>1200masl). *Pinus caribaea* and *Pinus oocarpa* were designated for the low-lying reserves (<1200masl). *Araucarias (A. cunninghamii* and *A.hunsteinii)* have performed best on cleared sites in the lakeshore region.

Other pine species, which have shown good performance, include: *Pinus kesiya, P.strobus, P.douglasiana*, and *P.leiophylla*

Out of the 52 species of eucalyptus tried, only 3 species, *E. grandis/saligna* (frequently hybridised), E. *camaldulensis* and *E. tereticornis* were selected as the major plantation species. Unlike the conifers, the general populace of Uganda also readily took the planting of eucalyptus. So that in the highlands of western Uganda, where termites are not problematic, *Eucalyptus grandis* is privately grown very extensively on small holdings. *Eucalyptus camaldulensis* and *Eucalyptus tereticornis* on the other hand are the major species grown in the drier parts of the country.

Other hardwood species, which have demonstrated good performance, include *Measopsis eminii, Terminalia superba, T.ivolensis, Grevillea robusta* and *Melicia excelsa.*

The selected species exhibit rapid growth and when combined with proper silvicultural treatments (spacing, thinning, pruning and rotation age) give good financial returns.

Additional species and provenance trials should be initiated for energy, wood/ pole, and industrial roundwood production particularly for the north and eastern parts of the country and the degraded peri – urban plantation sites. In all these endeavors, entomological and pathological studies should be incorporated from the outset.

References

Kriek W (1970); Performance of indigenous and exotic trees in species trials. FAO Report to the Government of Uganda. FAO paper No. TA 2826.

Steel RGD and Torrie JH (1980): Principles and procedures of Statistics. A biometrical approach. 2nd Edition. McGraw-Hill Book company.

Stuart-Smith A.M. 1967; Species and provenance trials. Uganda Forest Department Technical notes No.137/67.