FRIM NEWS

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Editorial

The Forestry Season (Tree Planting Season) finally came to a close. We at FRIM, thank all those who have been active planting and inspiring other to plant more trees in various places across Malawi. The rains have been so generous such that the season has been a success for most rain-fed crops including tree crops in most parts of the country. The Forestry Season has closed but moving forward the planted trees will still demand a lot of care. It is only after we have properly managed our trees through weeding and protection from bush fires, pests and diseases that we will achieve a good survival rate of the planted lot and subsequently a well established tree or woodlot. The onus is on us to take care of this valuable investment for environmental sustainability and many other accompanying benefits.

In this News Letter we present to you performance of planted Mulanje cedar which defies the myth that Mulanje cedar can not be planted. We have also presented issues on tree pests. Pests have of late been a major concern to tree planting initiatives and it is important that we monitor our planted stock for pests and disease infestations so that we should not labour in vain. Any suspected infestation must be reported without delay to Forestry Research Institute of Malawi.

You may contact the following for assistance: Henry J. Utila (heutila@gmail.com, +265

Other Services offered by Forestry Research Institute of Malawi

- Supply of certified Tree Seed and Seedlings;
- Seed Testing Laboratory Services;
- Soil Laboratory Services;
- Tree Pathology Laboratory Services;
- Economic Valuation of Trees;
- Consultancy Services in Forestry and Environment.

TREE PEST ALERT

Ambrosia beetle (Coleoptera) of *Senna siamea* in Malawi

An ambrosia beetle (Figure 1), together with its fungal symbiont (Figure 2), has emerged as an important invasive pest killing *Senna siamea* trees including dieback of the trees in Malawi. Important symptoms are shown in Figures 3 and 4.

The ambrosia beetle resembles an invasive insect pest called Poyphagous shothole Borer (PSHB) which has been discovered in South Africa. PSHB is attacking different types of tree species and is native to Southeast Asia. We are collecting samples for identification at FABI, South Africa.

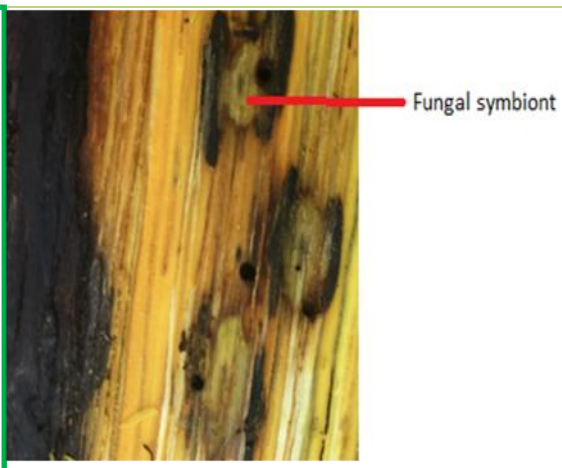

Fig 2. The fungal symbiont

Fig1. Ambrosia beetle of *Senna siamea*

Fig3. Resin oozing from new infestations

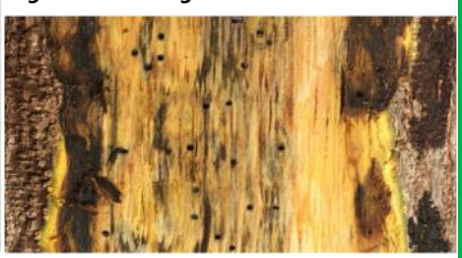

Fig 4. Ambrosia beetle exit holes

In This Issue:

Comparative Growth Performance of Mulanje Cedar

Herbert Jenya

Malawi's national tree Widdringtonia whytei (Mulanje Cedar) is endemic to Mount Mulanje in Malawi. Mulanje cedar is one of the most important commercial timber trees in Malawi (Chapman, 1997), which used to represent about 5% of the evergreen vegetation area on the Mulanje Mountain massif. The wood value of Mulanje cedar is considered the best in terms of its resistance to termite attacks but also its processed products such as timber, fetches good money on the market. The timber is durable and fragrant and has been extensively used for construction work, furniture, and paneling. However, according to Farjon (2013), the species has been exploited for over 100 years on the mountain through illegal harvesting and for government revenue generation while Chanyenga (2013) contended that its natural habitats are subject to fragmentation due to fire. In recognition of its importance and conservation status, the "Malawi's National Tree" has been declared **critically endangered** and at risk of becoming **extinct** in its natural habitat if action is not taken soon.

The destruction of this valuable species has in recent times reached alarming levels, threatening its future availability. It is against this background that Forestry Research Institute of Malawi (FRIM), Mulanje Mountain Conservation Trust (MMCT) and Botanical Gardens International (BGI) joined hands to establish Mulanje Cedar translocation trials on Zomba Mountain, Dedza Mountain, Viphya Mountain (Chikangawa and Luwawa) including Mulanje Mountain (Thuchila), which is its native area. The aim of the trials were to compare survival and growth of the species in the different sites named above.

Fig 3 Mulanje Cedar tree (3 years of age) planted at Thuchila on Mount Mulanje

Seed from three provenances (treatments) namely, Chikangawa (C), Tanzania (T) and Zomba (Z) have been planted to the selected sites mentioned above. Tree assessment after 3 years assessment gives an account of the survival rate, height and root collar diameter growth of the trees after planting out in the field.

Survival of planted seedlings

Highest survival percentage was recorded at 88.8% for seedlings raised from Zomba provenance (seed source) planted at Luwawa in Viphya Mountain (Plantation) and lowest survival percentage recorded was 13.6% for seedlings raised from Tanzania provenance (seed source) planted at Dedza Mountain (Figure 1). The mean survival percentage for Zomba provenance (seed source) was recorded at 66.2% and thus outperformed all the other provenances. The mean survival percentage for seedlings from Chikangawa and Tanzania provenances (seed sources) were 31.2% and 48.16% respectively. In terms of field performance of overall seedling planted, Thuchila site attained the highest total tree survival rate (65.67 %) and the poorest was recorded at Dedza Mountain site (23.2%) (Figure 2).

Tree Root Collar Diameter growth

Best root collar growth was recorded on trees raised from Zomba provenance (7.68 cm) planted in Luwawa, followed by trees raised from Tanzania provenance (7.46 cm) planted at the same site (Luwawa). The least root collar diameter growth (1.57cm) was observed on trees raised from Chikangawa provenance but planted at Thuchila (Table 1). Best root collar diameter growth was recorded for trees planted at Luwawa (6.90 cm), followed by Chikangawa (6.28 cm) and Zomba (5.61 cm). The least root collar growth performance was observed for trees planted at Thuchila (1.60 cm).

Tree Height growth

Mean tree height growth was preponderant in Zomba (3.52 m) for trees raised from Tanzania provenance followed by Luwawa (3.39 m) for the same provenance . The least growth in tree height was observed in Thuchila (1.16 m) for trees raised from Tanzania provenance. Overall mean tree height growth for each site (all provenances combined) was found to be superior in Luwawa (3.03 m) and was observed to be retarded in Thuchila (1.26 m). Figure 3 and 4, give a visual comparison of height growth between Luwawa and Thuchila sites at 3 years of age.

Provenance (Seed source): C = Chikangawa, T = Tanzania, Z= Zomba

Figure 1: Survival of planted trees per provenance in a site

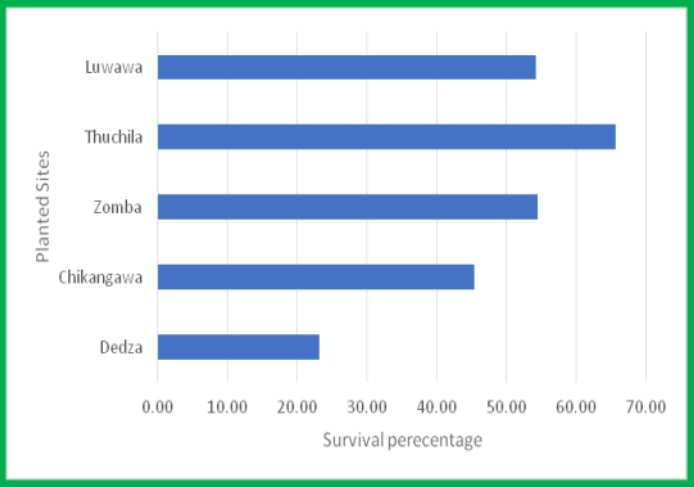

Figure 2: Overall survival of planted trees in a site

Table 1: Tree Root Collar Diameter growth (cm) for provenances (seed sources) in different trial sites

	Treatments			
Site	**C**	**T**	**Z**	**Mean**
Chikangawa	5.09	6.89	6.85	**6.28^{b}**
Dedza	1.83	2.62	2.24	**2.23^{d}**
Luwawa	5.55	7.46	7.68	**6.90^{a}**
Zomba	4.93	5.78	6.11	**5.61^{c}**
Thuchila	1.57	1.61	1.63	**1.60^{e}**
Mean	**3.79^{b}**	**4.87^{a}**	**4.90^{a}**	

Provenance (seed source): C = Chikangawa, T = Tanzania, Z = Zomba

Mean with different superscript within a column and a category significantly differ (P<0.001)

Figure 4: Mulanje cedar tree (3 years of age) planted at Luwawa, South Viphya

Table 2: Tree height growth (m) at 3 years for provenances (seed sources) planted in different trial sites

	Treatments			
Site	**C**	**T**	**Z**	**Mean**
Chikangawa	1.81	2.94	2.29	**2.35^{b}**
Dedza	1.47	1.87	1.23	**1.52^{c}**
Luwawa	2.56	3.39	3.13	**3.03^{a}**
Zomba	2.89	3.52	2.82	**3.08^{a}**
Thuchila	1.16	1.43	1.20	**1.26^{c}**
Mean	**1.98^{b}**	**2.63^{a}**	**2.13^{b}**	

Provenance (seed source): C = Chikangawa, T = Tanzania, Z = Zomba

Mean with different superscript within a column and a category significantly differ (P<0.001)

The results have shown that Mulanje cedar is adapted to survive in its native range with minimal growth rate but likely to grow faster outside its native range with few trees surviving. Therefore, both *in-* and *ex-situ* conservation of the species is recommended for both genetic conservation and commercial exploitation.

A Novel Pest of *Senna siamea* in Malawi

Davie Moyo and Herbert Jenya

Senna siamea (*Kesha wa milimo*) has proved to be one of the most important tree species in Malawi especially in the tobacco growing district where it is extensively used for the construction of live barns. The availability of the species across the country has minimized the pressure which could have been exerted on highly demanded indigenous trees. Traditionally, barns in Malawi are used by smallholder farmers for curing tobacco. Use of traditional barns have proved to be unsustainable as they require regular maintenance thereby contributing to deforestation and forest degradation in the country. Research has shown that live barn technology if successfully implemented can positively reduce deforestation and forest degradation. *Senna siamea* which fits well in the live barn technology, offers an opportunity to smallholder tobacco farmers to slow the rate of deforestation. Unfortunately, the species is now under pest attack.

The species has lately been attacked by - a yet to be identified - stem borer at larva stage (Figure A). The stem borer bores into the stem (Figure B) and as it grows it tunnels downwards hollowing out the main root. The larva ejects the frass through a hole in the stem just above the ground level and the frass accumulates at the base of the stem.

Figure: A

Figure: B

The attack of the borer results in tunnels in the taproot and the stem immediately above ground. If the situation becomes worse, the tree stops growing and eventually dies (Figure C). The tunnel may reach about 40-60 cm in length. Vigorous and strong growing trees may survive the attack with some serious deformations and girdling on the stem (Figure D).

Figure: C

Figure: D

As the pest pupates to adult, it burrows a noticeably big exit holes (Figure E) that is also injurious to the plant. Additionally, during the exit time the pest leaves its shell (Figure F) on the exit hole as the adult goes elsewhere to seek another host for further reproduction. Many shells (Figure G) have been collected in the sites during pest monitoring field expeditions and the number of shells defines the rate at which the insect is multiplying.

Figure: E

Figure: F

Figure: G

In worse circumstances, the exit holes might enlarge to the extent of exposing the inner cambium of the tree stem (Figure H). The enlarged exit holes might attract other opportunistic beetles that might turn it into their habitat (Figure I) and further damage that part of tree where they are residing.

Figure: H

Figure: I

The larva has not yet been identified in terms of species name because the process requires application of molecular techniques and no adult beetle has been observed, but it is suspected to be the larvae of a long-horned beetle (*Cerambycidae coleoptera*). We are planning to collect as many samples as possible across Malawi that shall be sent to RSA for molecular identification by experts. Currently, pest monitoring surveys are underway across the country to establish its distribution, severity, incidence and the underlying bio-physical environment in which they survive. Once that information is gathered then we will be proposing mitigation options to curb pest infestation. FRIM is once again appealing to the general public to report immediately any tree pest detection to the institute or any Forestry office. Early detection and reporting are critical as it ensures rapid response to avert serious pest damage through timely interventions.

Our Mission

To conduct operational forestry research to generate usable technologies and provide information for sustainable management, conservation and utilization of forests/trees and allied natural resources in order to contribute to improving the welfare of the people of Malawi.

Website: www.frim.org.mw

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Covid 19 is still here ...Please protect yourselves and others