Insect pests of Eucalyptus – Challenges and opportunities for their management

Two recent field days saw FABI's Dr Brett Hurley recapping on the current and future pests that target Eucalyptus and some of the measures implemented to safeguard commercially grown Eucalyptus from such attacks.

New product for tree growers

The mortality rate of newly planted seedlings can be greatly reduced if optimal growing conditions are in place to support the seedling once planted.

This was the message that came from I-Cat Environmental Services Mike Martyn during his presentation at United Forest Products' recent field day where I-Cat introduced its Aqua Matrix Biosorb seedling supporting medium to the growers attending the event.

In his overview, Mike Martyn said that Aqua Matrix Biosorb combines the advantages of a planting gel with those of proprietary combinations of Mycorrhiza and Trichoderma to provide for the necessary ingredients to support the seedling once settled in the soil.

"Insufficient water and nutrition are major variables limiting growth and survival of newly transplanted seedlings," Mike continued. "Aqua Matrix Biosorb gives the seedling the advantage of a water reservoir and enhances uptake of nutrients and water through the beneficial effect of enhanced root mass.

"The water volumes used at planting are significantly reduced without negatively affecting current silvicultural standards.

"By applying Aqua Matrix Biosorb the planting season can be extended to include the dry months, previously unattainable due to the risk of unacceptable high mortality.

"Aqua Matrix Biosorb reduces plant stress at the time of planting, especially during times of drought or reduced water supply," Mike Martyn concluded.

Aqua Matrix Biosorb is distributed by Mike Martyn: 082 451 2753 (Nelspruit); silvix@vodamail.co.za; Dix van Dam 082 804 7942 (Sabie); dix@hlatini.co.za; Alasdair Mackenzie: 082 305 1269 (Pietermaritzburg); eradispray@iafrica.com; Leon Martens: 082 560 3094 (Pietermaritzburg); silvix@futurenet.co.za; and Julian Pybus: 082 651 7497: (Gingindlovu) silvix@iafrica.com.

As part of the University of Pretoria's respected Forestry and Agricultural Biotechnology Institute (FABI) team that is intimately involved in research aimed at safeguarding commercial forests from insect and pathogen attack, Brett used three recent field days to recap on the pests that target *Eucalyptus*.

Dr Brett Hurley at the UFP Forest Products' field day

The first two field days in Dalton and Paulpietersburg were both arranged by the Institute for Commercial Forestry Research (ICFR) while the UFP Forest Products field day in White River, gave Brett further opportunity to summarise where we stand with regard to pests in gum.

Insect pests pose a serious threat to sustainable *Eucalyptus* plantation forestry in South Africa. This includes native insect

The release of Selitrichodes neseri (Sn) is an important milestone in the local forest protection programme's efforts to safeguard Eucalyptus against attack from L. invasa. Here Sn is seen ovipositing in a L. invasa gall. (Photo: Prof Stefan Neser)

The author, Dr Brett Hurley (right) together with Professor Stefan Neser at a Cedara-based monument that earmarks the release of Anaphes nitens in 1926 to control the Eucalyptus snout beetle, Gonipterus scutellatus. G. scutellus was first noted in SA in 1916 with widespread damage to Eucalyptus following. The release of A. nitens saw a significant reduction in the extent of G. scutellus

pests, mainly the larvae of numerous moth species, but also the larvae and adults of numerous beetle species. The native insect pests are most often generalists, feeding on different plantation species, but more specific host associations between native insects and plantations species, such as the cossid moth *Coryphodema tristis* feeding exclusively on *E. nitens*, also exist. The number of native insects pests, both with broad and narrow host ranges, is likely to increase in the future.

In addition to native pests, there are also a number of non-native insect pests of *Eucalyptus* plantation forestry that have been accidentally introduced into South Africa.

This includes *Phorocantha* spp. (Eucalyptus long-horn beetles; detected 1906), *Gonipterus scuttelatus* (Eucalyptus snout beetle; detected 1916), *Ctenarytaina eucalypti* (Bluegum psyllid; detected 1958), *Trachymela tincticollis* (Eucalyptus tortoise beetle; detected 2003), *Thaumastocoris peregrinus* (Bronze bug; detected 2003), *Blastopsylla occidentalis* (Eucalyptus psyllid; detected 2006), *Leptocybe invasa* (Eucalyptus gall wasp; detected 2007), and most recently, *Glycaspis brimblecombei* (Red gum lerp psyllid; detected 2012).

The importance of these pests varies, and some are currently confined to certain hosts or certain areas, but it is clear that in combination, insect pests pose a serious threat to plantation forestry on a national level. Of added concern is that new pest arrivals are imminent. These include the anticipated arrival of *Ophelimus eucalypti* and *O. maskelli* which have already been introduced and become established in various parts of the world, but also the introduction of numerous other *Eucalyptus* feeding insects from Australia, some yet unknown to science.

To combat the increasing threat of insect pests to *Eucalyptus* plantation forestry in South Africa, innovative and effective management strategies are required. Control methods currently most suitable for the management of forestry pests include silviculture (cultural control), using host resistance, and biological control.

Silvicultural practices that increase the health and vigour of a tree will likely increase the tree's ability to defend itself against insect attack. However, exceptions to this do exist, for example where insects prefer vigorous growth. The relationship between plant vigour and susceptibility is not always well understood (for example with *L. invasa*), and requires further investigation. The use of resistant species or genotypes is an effective tactic for various insect pests, including *L. invasa*, *G. brimblecombei* and *C. tristis*.

Limitations associated with this strategy include the insects' ability to overcome host resistance over time, the trade-off between insect resistance and host performance, and the difficulty of managing an increasing number of insect pests with different host preferences. The use of biological control is a long-term, low cost approach, which has been used for various pests of *Eucalyptus* in South Africa, most recently including *L. invasa*. The release of the biological control agent *Selitrichodes neseri* in July 2012 represents an important milestone in the local forest protection programme's on-going efforts to safeguard *Eucalyptus* against attack from *L. invasa*.

S. neseri was discovered by Professor Stefan Neser who is a semi-retired entomologist and also a leading expert in

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Sn being released on the land of a small scale farmer in Zululand. On the left is Stefan Neser as well as two students, Daniella Pineda (PhD working on Gonipterus) and Kwabena Baffoe (PhD working on biocontrol and host resistance strategies for L. invasa)

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biocontrol of weeds. He is currently associated with FABI as an Extraordinary Professor, where he provides advice and guidance for the various projects at the FABI Biocontrol Centre (incl. projects on *Leptocybe, Thaumastocoris* and *Glycaspis*). He first discovered *S. neseri* (named after him) and the releases in South Africa are the first releases of this parasitoid outside Australia, for use as a biocontrol agent.

Of some relief, there is also the potential to use biological control for recent pest arrivals such as *T. peregrinus* and *G. brimblecombei*, as well as for the anticipated arrival of *O. eucalypti* and *O. maskelli*. Limitations to biological control include the identification of suitable agents, knowledge of biology and host specificity, bureaucratic hurdles, and the potential incompatibility between the biocontrol agent and the insect host genotype and/or the environment.

Continued research is required for all these management approaches in order to ensure their successful implementation. Where possible, a combination of strategies should be used to compensate for potential shortcomings of the individual strategies, and new management approaches such as mating disruption should be investigated. In addition, early detection by means of effective monitoring tools as well as awareness campaigns is essential for the successful management of forestry pests. EN