Forest Health News

SCION forests · products · innovation

No. 253, January/February 2015 ISSN 1175-9755

## NEW POTENTIAL BIOLOGICAL CONTROL AGENT ARRIVES IN CONTAINMENT

In December, Forest Protection entomologists received an exciting present: a live shipment of the "new to New Zealand" organism, *Eadya paropsidis*. Farm Forester Dean Satchell worked alongside Geoff Allen and Vin Patel from the University of Tasmania and hunted for *Eadya* in three *Eucalyptus nitens* plantations in Tasmania. They were successful in catching and importing 75 live female parasitic wasps into Scion's Containment Facility. *Eadya paropsidis* is a 10 mm-long black braconid wasp with a bright orange head. This parasitoid is being considered for biological control of the eucalyptus tortoise beetle *Paropsis charybdis* in New Zealand, due to the damage this pest continues to wreak upon eucalypts, particularly *E. nitens*, along with other valued species such as *E. bosistoana* and *E. quadrangulata*. While some growers may choose to suffer the reduced growth of repeatedly damaged trees, large plantation owners often manage the pest with aerial pesticide applications.

Research on *E. paropsidis* has revealed this parasitoid specifically hunts on eucalypts foliage for tortoise beetle larvae within the genera *Paropsis* and *Paropsisterna* (Coleoptera: Chrysomelidae). Adult wasps sting young larvae and lay their eggs inside them (see photo below). Any larval life stage can be attacked, but the wasp is most successful attacking second instar larvae.

***Eadya paropsidis* female stalks its prey and delivers one egg into the *Paropsis* larva's body. Photo: S. Kirk, Scion.**

The parasitoid larva develops to maturity within the body of each host larva, which takes about 20 days, killing the host in the process. It then bursts out and pupates within the soil. After hibernating as a pupa for the rest of the year the resultant adult emerges the following spring.

**Twenty days after parasitoid attack the resultant *Eadya paropsidis* larva bursts out from the host remains. Photo: S. Kirk, Scion.**

The entomology team working in Scion's containment facility now have about 1200 *P. charybdis* larvae that are producing parasitoid pupae. The next challenge will be to try and induce the new generation of parasitoids to emerge from hibernation in spring. They will attempt to trick the *E. paropsidis* into thinking the high security laboratory they are safely locked within, is actually the outdoors by simulating winter conditions. If successful, then next summer assessing its host specificity against a range of New Zealand native and beneficial beetles can begin. Safety testing is the key component of any biological control project, and only the safest of new organisms will ever be approved by the EPA (Environmental Protection Authority) for release. This project has been funded through a Sustainable Farming Fund grant, Scion MBIE Core Funding, the NZ Farm Forestry Association, South Wood Export Ltd, Future Forests Research Diversified Species, Carter Holt Harvey, and the Forest Owners Association. The project team are waiting nervously to find out if an SFF bid to support this project will be successful.

*Toni Withers*

*Newsletter of the Scion Forest Protection team. Edited by Nicolas Meurisse and Lindsay Bulman, Scion, Private Bag 3020, Rotorua 3046, New Zealand. Email: nicolas.meurisse@scionresearch.com Website: http://www.scionresearch.com/biosecurity*

## SCREENING FOR RESISTANCE TO PHYTOPHTHORA

*Phytophthora* is a genus of soil or airborne plant pathogens that infect a vast range of plant species worldwide. In New Zealand, three examples are red needle cast on radiata pine (caused by *Phytophthora pluvialis*), kauri dieback (caused by *Phytophthora* taxon *Agathis*) and crown rot in apples (caused by *Phytophthora cactorum*). Scion's Healthy trees healthy future programme is aiming to identify and improve our understanding of the mechanisms underlying resistance to *Phytophthora* infection in each of those host species.

A first step to identify resistance mechanisms to *Phytophthora* in radiata pine, is to recognize trees that perform well when exposed to the pathogen. Last year, the pathology team have been screening material in the nursery for resistance to *P. pluvialis*. The first group of plants to be tested has consisted of the Radiata Pine Breeding Company's (RPBC) Elites, a structured population comprising 63 full-sib families from crosses between 55 unique parents. These industry-relevant families have been planted in trials across 6-7 sites in New Zealand, including some Dothistroma needle blight prone sites. These trials are also part of the RPBC and Scion's Genomic Selection Partnership programme, thus providing a valuable opportunity to draw together all the genetic, health and wood quality information for these families.

**Needle fascicles collection at Rotorua Scion's radiata pine nursery.**

To date, we have screened at least 6 individuals from each family using the detached needle assay method. This involved taking fascicles from plants to the laboratory, where they were inoculated then incubated for two weeks to allow lesions to develop. A team then carefully measured all the needles and recorded how many lesions were present and what their length was. This was an intensive task, with a single experiment capturing information from nearly 15 000 needles.

**Scion's pathology team at work, carefully recording numbers of lesions on radiata pine needles.**

Over the last year we have screened over 400 different genotypes, which translates to nearly a quarter of a million needles measured. We have seen noticeable differences in the way trees respond to infection, with some trees developing severe lesions, while other trees remained largely unaffected with only occasional small lesions developing. The lesion measurements collected allowed us to make comparisons and identify which trees are more resistant or susceptible to red needle cast. Early results indicate that some of these differences are genetically controlled, which gives the RPBC an opportunity to breed for resistance and preferentially deploy this material on disease-prone sites.

Now that we have identified resistant and susceptible genotypes, we hope to start understanding what makes these trees respond differently. These trees are now being analysed using other techniques being developed in the HTHF programme, and clonal propagation is underway to generate sufficient material for screening. In addition, inoculations of radiata pines with *P. kernoviae* and *P. cactorum* are planned to determine if resistance to one species of *Phytophthora* could translate to cross-resistance to multiple *Phytophthora* species.

For more information and to keep updated on the HTHF programme, including our work on kauri dieback and crown rot in apples, you can sign up for our quarterly newsletter at http://www.healthytrees.co.nz.

*Nari Williams and Natalie Graham*

Printed by Scion Digital Print Centre, Rotorua (07 343 5711)