



## Introducing *Eadya daenerys* “mother of dragons”

The possibility of cryptic *Eadya* species (multiple species that look identical) spurred a collaborative project between biocontrol scientists at Scion, the University of Tasmania and evolutionary biologists at the University of Central Florida. The collaboration resulted in a four year molecular phylogenetic study (Peixoto et al. 2018)<sup>1</sup>.

This study revealed that *Eadya paropsidis*, our proposed biocontrol agent to manage eucalyptus tortoise beetle, is actually a different species! After careful examination, our actual species can now be separated by both physical characteristics, and genetic analysis (CO1, CytB, 28S) from *E. paropsidis*.



Figure 1: *Eadya daenerys* (Ridenbaugh, R.D.)<sup>2</sup>.

Our agent has now been described as *Eadya daenerys* (Ridenbaugh et al, 2018)<sup>2</sup>. Every adult female *Eadya* that has been collected and brought into containment in New Zealand so far has been examined and found to be *Eadya daenerys*. The New Zealand EPA has accepted this name change, so the introduction approval process should not be affected. The parasitoid is named from the Game of Thrones character “mother of dragons” Daenerys ‘Stormborn’ Targaryen. Hopefully *E. daenerys* will be just as effective at smiting its enemies!

Toni Withers (Scion)

<sup>1</sup>Peixoto, L., Allen, G.R., Ridenbaugh, R.D., Quarrell, S.R., Withers, T.M., & Sharanowski, B.J. (2018). When taxonomy and biological control researchers unite: species delimitation of *Eadya* parasitoids (Braconidae) and consequences for biological control of invasive paropsine pests of *Eucalyptus*. *PLoS One*, Accepted.

<sup>2</sup>Ridenbaugh, R.D., Barbeau, E., & Sharanowski, B.J. (2018). Description of four new species of *Eadya* (Hymenoptera: Braconidae), parasitoids of the eucalyptus tortoise beetle (*Paropsis charydis*) and other *Eucalyptus* defoliating leaf beetles. *Journal of Hymenopteran Research*, 64: 141-175.

## Myrtle rust help: from New Caledonia to New Zealand

Armed with experience of myrtle rust tracking in New Caledonia, I (Julia Soewarto) recently joined the Forest Protection team at Scion as a Postdoc. Before joining Scion, I completed a PhD on myrtle rust in New Caledonia, which combined ecology, genetics and plant pathology. My PhD research concentrated on identifying the host and geographic ranges of myrtle rust in New Caledonia, as well as assessing the level of genetic diversity in the pathogen population. I also evaluated native and exotic Myrtaceae for their susceptibility to myrtle rust and worked on plant selection for resistance using a RNA-sequencing approach.



Figure 2: Myrtle rust on a native *Eugenia* sp. in New Caledonia.

The main results of my work showed that myrtle rust significantly threatens New Caledonia’s biodiversity, with at least 67 endemic host species identified (26% of the known species of Myrtaceae in NC). The disease has been found in six different types of native ecosystem, ranging from ultramafic maquis to rainforest, and including the highly endangered sclerophyll forest. Nurseries were also severely impacted by the disease from the first year of its incursion. Therefore myrtle rust is considered as a significant threat to New Caledonian ecosystems and the Myrtaceae-related economy.



Figure 3: Julia Soewarto (right) searching for myrtle rust in New Caledonia.

The population genetic study revealed that only one single genotype of *Austropuccinia psidii* (cause of myrtle rust) was introduced to New Caledonia and it occurs across a wide host range. However, it is essential to carry out population genetic surveillance in future to identify the appearance of mutations or the introduction of potentially more virulent or aggressive genotypes of *A. psidii*.

A three-year disease monitoring trial with 35 cultivated species of Myrtaceae showed variations in disease susceptibility between individuals. This suggests that some level of genetic resistance to myrtle rust may exist among species of Myrtaceae in New Caledonia. This shows the potential to select for resistance in future breeding programmes.

Finally, RNA-sequencing of the response to infection by three species of Myrtaceae identified several interesting genes linked to plant defence systems. These results are the first step to a marker-assisted selection process that would help to identify resistant host genotypes and provide a means of maintaining production of Myrtaceae in nurseries.

In New Zealand, my Postdoc research will involve the surveillance of myrtle rust in infected areas, plant host testing for susceptibility level to the disease, and improving disease management through development of biological control tools.

Julia Soewarto (Scion)



## John Bain 1946-2018

John arrived at the Forest Research Institute in Rotorua in the late 1960s after obtaining a BSc (Zoology) at Victoria University and spending a brief stint with the Marine Department measuring crayfish. He settled into the Entomology Section with his primary focus on quarantine border interceptions, particularly wood boring insects, which led to him becoming a world expert in the identification of cerambycid larvae. John then spent several years earning a Master of

Forestry degree at the University of Michigan, where he broadened his entomology knowledge, strengthened the University rugby team and developed an intense disdain for Budweiser beer.

After returning to New Zealand in the 1970s John continued describing forest insects and worked on biological control projects and pest risk analysis. He made a very significant contribution to the successful eradication of white spotted tussock moth and painted apple moth, and to the almost successful Dutch elm disease eradication campaign. It is perhaps the white spotted tussock moth eradication project which is his lasting operational research legacy. His untiring efforts in the field, designing and supervising population monitoring using caged female insects, a seven day a week operation, was critical to its success.

John served on the refereeing committee and was editor of Forest Health News for many years, setting a high standard for publications and doing an excellent job of disseminating biosecurity knowledge on new or interesting finds and other forest health topics.

The latter part of John's career was spent on pest risk analyses and diagnostics. It was in diagnostics where John excelled, especially by imparting his considerable knowledge on identification of forest insects to his colleagues. His mentoring and training also included advice on biological control, general entomology, taxonomy and science in general.

It was not only his Scion colleagues who benefitted and appreciated John's advice. Tributes from people external to Scion include "Such a great guy was John. Ever grateful for all the help he gave me and many others over the years", "I too had the benefit of his wisdom all through my career", "I really enjoyed his sense of humour at meetings as well as the great contribution he made to forest entomology".

John was recognised as having a quick wit and a vast armoury of hilarious stories and everyone who worked with him will recall John's way with words and sense of humour. John will be remembered for that, and his vast contribution to forest entomology and biosecurity in New Zealand.

*Lindsay Bulman (Scion)  
and Gordon Hosking*