IPMG Industry Pest Management Group

Sustainable, adaptive forest health management

Gonipterus spp. Biogeography - Update

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Aim

To confirm distinguishing morphological characteristics of the two main eucalypt weevil species (*Gonipterus* spp.) affecting bluegum plantation in Western Australia and to ascertain the current extent of their distribution.

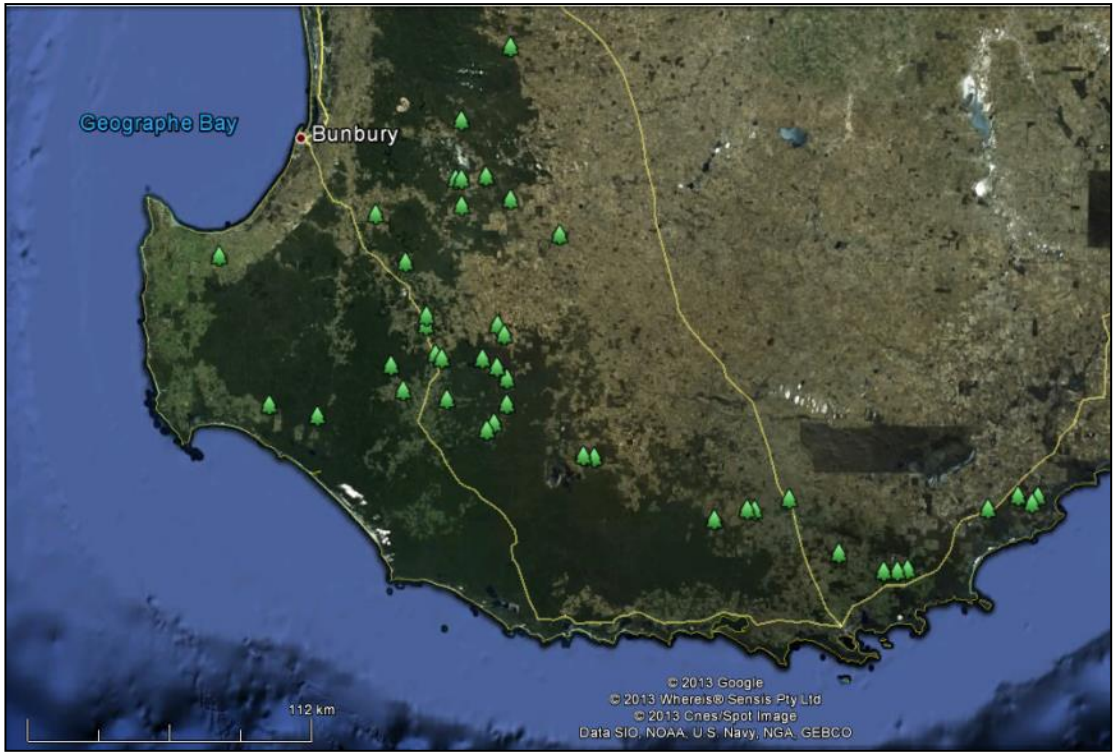
Background

Collections undertaken in 2005 identified what seemed to be morphologically different *Gonipterus scutellatus* specimen. Subsequent work on this species involving re-examination of type specimens and molecular analysis of Australia-wide and world-wide collections revealed that what was previous thought to be the single species *Gonipterus scutellatus* was in fact made up of up to 10 morphologically similar species.
In Western Australia 2 main species were identified *Gonipterus platensis* and an as yet undescribed *Gonipterus* sp. nov. 2.
In 2006 *Gonipterus* sp. n.2 was known from a single sample at a plantation near Donnybrook, subsequently this species has been observed from Donnybrook to south of Manjimup and west to the Scott River region near Augusta. This species is thought to be responsible for the extensive damage occurring since 2008 in the Donnybrook to Manjimup region. However some confusion still exists as to how best distinguish the two species present in WA. This is hampering:

1. the mapping of the distribution of the various species
2. clarifying the phenology of the new species *Gonipterus* sp. n.2

Methods

1. A collection of >250 specimens covering the full extent of the WA estate was undertaken.
2. The morphology of 73 sub-samples was assessed and preliminary IDs were made.
3. The sub-samples were then sent to Murdoch University for DNA extraction and analysis.

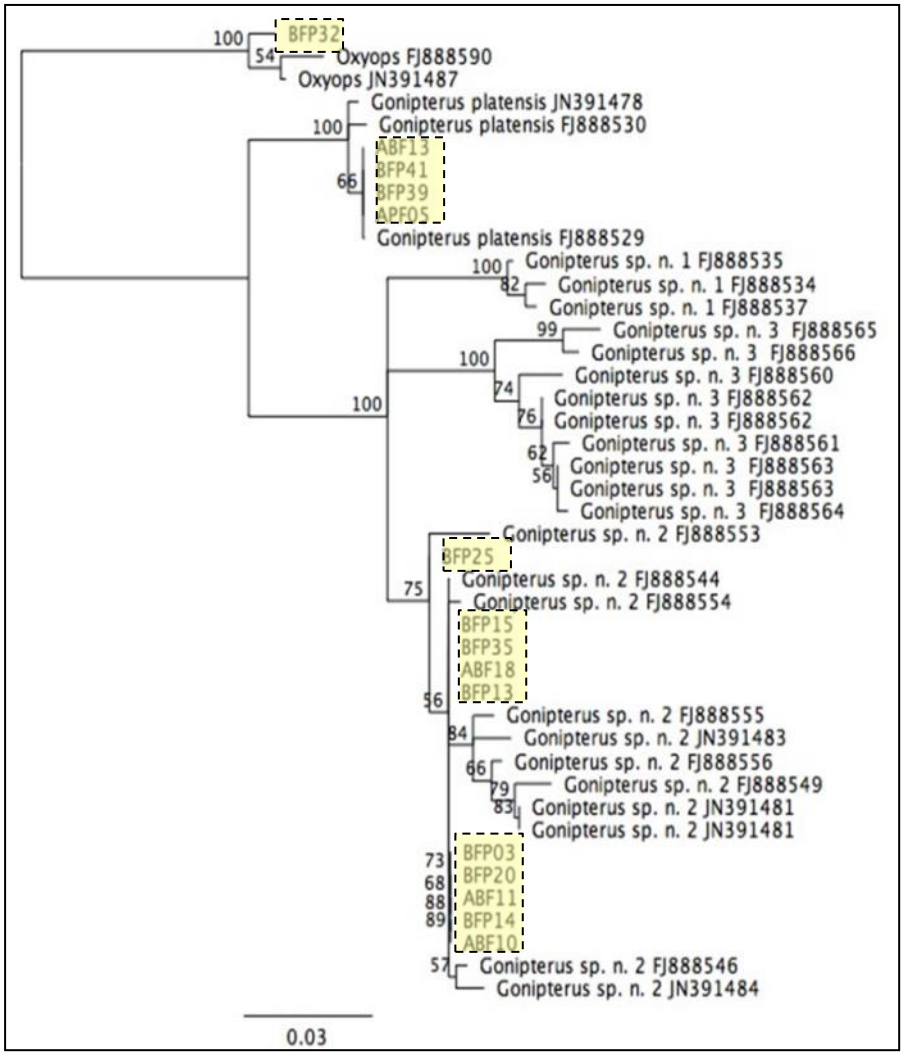


Results

- The presence or absence of a white patch and a clearly defined black X pattern were identified as the most consistent differentiating characteristic between species

Left: *Gonipterus platensis*, **Right**: *Gonipterus* sp. n2

- 11 out of 73 samples did not amplify correctly
- There was a 95% (59/62) correspondence between morphological IDs and subsequent molecular identification
- There is little variation between *Gonipterus platensis* samples. This suggests a single or very few introduction events.
- There are large variations between *Gonipterus* sp. n2 samples. This suggest multiple introductions.



"Relationship" tree, samples highlighted yellow are IPMG samples.

Discussion

- Initial damage caused by *Gonipterus* sp. n2 may simply be "classic invasion biology" and settle down with time. This seems to have been the case with *G. platensis* in WA (see historical distribution presentation)
- *Gonipterus* sp. n2 population variability is worrisome as it may enable it to be more adaptable to the various climatic conditions found across the southwest currently and in the future as the climate changes.
- A study from South Africa indicates that *Eucalyptus smithii* may be the preferred host of *Gonipterus* sp. n2; both for feeding and reproduction. There is some anecdotal evidence of this in WA.

Yellow arrows indicate "healthier" *Eucalyptus globulus* trees, red arrow indicates badly damaged *Eucalyptus smithii*.

Further work

1. Morphologically assess all the remaining samples and map out confirmed/known distribution of the 2 species
2. Collect samples from any *E. smithii* plantings in the Great Southern (ABP, APFL, PFOlsen?)

Suggestions

- WORKSHOP & TRAINING – next spring?
- ADULT WEEVIL THRESHOLDS?? – traps, knockdown sprays, occupied trees, lower canopy….
- REARING INSECTS – need facilities (AgDept, Murdoch, SWTAFE, Edith Cowan) – would enable
    i. Separation of larval stages and their characterisation to allow a phenology study
    ii. Obtaining data on physiological requirements/limits
    iii. Identifying any existing parasitoids/parasites
- DRAWING A LINE
    – "inter-regional" biosecurity?
    – should we attempt intensive monitoring along the Muir highway? a spray or shield program?
- POISONING THE WELL - An *E. smithii* spraying program? Destroying a preferred reproductive source?

THANK YOU!

- Diane White and Treena Burgess for DNA isolation, sequencing and analysis
- For funding and operational support: