CORYMBIA TORELLIANA HYBRIDS FOR HARDWOOD FORESTRY- WITHOUT THE WEEDINESS!

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INTRODUCTION

Corymbia torelliana hybrids have great potential for sustainable plantation forestry in many areas of tropical Australia. The species as a parent in hybrid breeding programs confers benefits such as resistance to *Ramularia* shoot blight, environmental plasticity, effective site capture and good rooting ability for clonal forestry.

C. torelliana occurs naturally in rainforests and rainforest margins in the wet tropics region of Far North Qld between Shiptons' Flat, near Cooktown and Mt Fox, near Ingham. The species has a tendency to become a weed where it is planted in areas outside of the wet tropics. Consequently, it is now listed as a noxious weed by many local councils between Grafton and Mackay and there are bans on selling, propagating and distributing the species.

C. torelliana has a unique seed dispersal syndrome that may contribute to its weediness in areas where it has been introduced. Seeds are dispersed by bees, sometimes up to 300 m from the parent tree (Wallace and Trueman 1995). Native stingless bees of the genus *Trigona* build their nests from plant resins, and *T. carbonaria* forages for resin inside the mature capsules of *C. torelliana.* When the bees forage for resin, *C. torelliana* seeds become attached to the resin droplets carried by bees. The bees eventually discard the seeds outside their nests. Seeds dispersed by bees are almost all viable, and abundant germination and establishment occurs around hives and wild nests. Some beekeepers claim that *C. torelliana* is harmful to stingless bees. Claims are that the seed "clogs" the nest and prevents bee movement, and that the resin from *C. torelliana,* when used in nest structures, tends to collapse, causing death of the colony. In spite of no scientific study on the weediness of *C. torelliana* or the effect on stingless bees*, C. torelliana* has been banned from new plantings and actively removed by local councils from amenity plantings.

In this study, we examined the interaction between stingless bees and *C. torelliana* and its hybrids in the natural range of *C. torelliana* in the Wet Tropics . Here we report the structure of hybrid capsules and their attractiveness to stingless bees.

METHODS

We examined capsule structure and attractiveness to bees of an amenity planting of *C. torelliana*, *C. citriodora* subsp. *citriodora* and hybrids of the two species near Walkamin, Qld. All hybrids were full sibling F1's, of reproductive age. We examined the structure of the capsules to determine characteristics that may influence seed dispersal by bees. This included whether resin was present, whether the column had collapsed, the external and internal size and length /width ratio of the capsule, the placement of seeds in resin, and the weight of the seeds.

C. *torelliana, C. citriodora* subsp. *citriodora* and hybrids were examined for 10 days over 3 fruiting seasons between 2002 and 2005 to determine whether bees foraged for resin on the capsules and whether bees subsequently dispersed seeds. All observations were carried out between 09.30 and 16.30 H during sunny weather conducive to bee activity. Each tree was initially examined to determine the maturity of the capsules. Where trees had capsules showing signs of opening, e.g. mottled green/brown in colour, valves opening, the capsule clusters were examined for 5 minutes for bee activity using Zeiss 8 X 30 binoculars.

Observations on all trees were repeated every 2-4 days over 2-3 weeks in 2004 and 2005. In preliminary observations we found that bees foraged on hybrid capsules that had been chewed and discarded by red tailed black cockatoos. Where trees had capsules that had been discarded on the ground we conducted further observations of bee activity on the ground for a 5 minute period.

RESULTS AND DISCUSSION

In ten days of observations, there were no bee visits to capsules on trees of any hybrids or to *C. citriodora* subsp. *citriodora*. In contrast, at the same site, there were on average 2.75 bee visits per 5 minutes to the *C. torelliana* capsules (Table 1). Bees frequently visited broken hybrid capsules on the ground to collect resin from the wound tissue (Table 1). Bees were observed dispersing chaff from these capsules but seed dispersal by stingless bees from these capsules was not observed.

Table 1. Attractiveness of *C. citriodora* subsp. *citriodora, C. torelliana* and hybrids to stingless bees.

Species	Location of capsules	Mean bee visits (se)	No. of trees	No. of obs.
C. citriodora subsp. *citriodora*	Tree	0	6	45
C. torelliana	Tree	2.75 (0.48)	4	32
Hybrids	Tree	0	25	167
Hybrids	Ground	3.24 (0.74)	7	29

All hybrid capsules contained some resin. However, they did not have the other characteristics of *C. torelliana* that are necessary for bee dispersal. For example, in many cases the central column had not collapsed sufficiently to allow bees to enter the capsules. Seeds were often much larger than those of *C. torelliana* and were not presented in resin inside the capsule.

KEY FINDINGS:

- **Bees were not attracted to hybrid capsules** at this site unless they had been damaged by red tailed black cockatoos. Seed dispersal of the hybrids by stingless bees at this site was not observed.
- **Hybrid capsule structure did not allow bees to disperse seeds**.
- **Weed risk of *C. torelliana* hybrids can be managed with careful checking.**

REFERENCES

Wallace, H.M. and Trueman, S.J. 1995. Dispersal of *Eucalyptus torelliana* seeds by the resin-collecting stingless bee, *Trigona carbonaria*. Oecologia 104(1):12-16.