Biological control of cat’s claw creeper (*Macfadyena unguis-cati*): the potential of the leaf-tying pyralid moth (*Hypocosmia pyrochroma*)

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**Summary** Cat’s claw creeper, *Macfadyena unguis-cati* (L.) Gentry (Bignoniaceae), a climbing woody vine native to tropical America, is an invasive weed in Queensland and New South Wales. Classical biological control is regarded as the most desirable option to manage this weed. Simulated herbivory studies have suggested that specialist leaf-feeding herbivores have the most potential as biocontrol agents. A specialist leaf-tying pyralid moth (*Hypocosmia pyrochroma* Jones) from Brazil and Argentina is currently being tested in quarantine for possible use as a biological control agent. The larvae of this moth can severely damage foliage resulting in reduced plant growth and subterranean tuber production. Host-specificity test results to date are encouraging, confirming the earlier South African results. An application to release this agent is being lodged in Australia.

**Keywords** *Macfadyena unguis-cati*, cat’s claw creeper, *Hypocosmia pyrochroma*, leaf-tying moth, host-specificity.

**INTRODUCTION**

Cat’s claw creeper, a climbing woody vine native to tropical America, is a major environmental weed in Queensland and New South Wales (Batianoff and Butler 2003, Dhileepan *et al.* 2005). Cat’s claw creeper poses a significant threat to biodiversity in riparian and rainforest communities (Vivian-Smith and Panetta 2004). Mechanical and chemical control options, although available, are expensive and largely ineffective. Classical biological control is considered the most desirable management option for this weed. Surveys in Brazil, Argentina, Paraguay, Venezuela and Trinidad resulted in the identification of several potential agents (Sparks 1999).

The leaf-tying moth, native to Brazil and Argentina, was first imported to South Africa (Williams 2003). This paper reports preliminary findings on the host specificity and suitability of this moth for the biocontrol of cat’s claw creeper in Australia.

**LIFE CYCLE**

Adults of the leaf-tying moths are brownish-orange in colour with white markings on the forewings. They start laying eggs two days after emergence. Eggs are laid on the underside of leaves and in crevices up the stems and are pale yellow to green in colour, and darken as they mature. The larvae have six instars (Williams 2003) and the larval stage lasts an average of 27 days. The first instar larvae are pale grey with a dark head capsule, turning dark brown with orange/brown markings as they mature toward the prepupal stage. Larvae pupate in the soil and emerge as adults after a pupation period of approximately 28 days. Under quarantine conditions 85% of pupae emerge as adults, on average. These observations are similar to those of Williams (2003).

The leaf-tying moth pupae undergo diapause from autumn (April/May) to spring (September/October). Results from preliminary trials to terminate the diapause in pupae using various temperature and photoperiod regimes were inconclusive and factors responsible for diapause induction are not known.

**HOST SPECIFICITY**

**Test plants** The test plant list originally developed for the cat’s claw leaf-feeding beetle *Charidotis auroguttata* Boheman (Coleoptera: Chrysomelidae), (Dhileepan *et al.* 2005) was revised for the leaf-tying moth, incorporating several additional species (Dhileepan *et al.* 2006).

**No-choice tests** No-choice larval feeding and survival studies were conducted using neonate larvae. Five repetitions were conducted for each plant species. No survival and development of neonate larvae occurred on any of the 37 test plant species tested other than the target weed.

**Choice tests** Multiple choice trials using adults with cat’s claw creeper and seven non-target plant species
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indicated that oviposition and development of emerging larvae only occurs on cat’s claw creeper. Similar trials using mature larvae (3rd instar) have begun and are also still in progress.

DAMAGE POTENTIAL
The damage potential of the leaf-tying moth on cat’s claw creeper is very promising, particularly when it is combined with the leaf-sucking tingid *Carvalhotingis visenda* (Drake & Hambleton), for which a release application has been lodged (Dhileepan et al. 2006). Leaf-tying moth larvae emerging from eggs laid in small upper leaves or stem crevices feed mainly on small leaves after emergence, gradually working their way down to the larger leaves. The leaf-sucking tingid, in contrast, feeds and lays eggs on older leaves, with the emerging nymphs confined to older leaves. The preference for different feeding niches highlights the ability of these two agents to avoid competition.

CONCLUSION
Preliminary results indicate that the specialist leaf-tying moth is a promising biocontrol agent for cat’s claw creeper. It is particularly damaging to foliage during the larval phase and previous studies have indicated that defoliation may be an important factor in reducing plant vigour (Raghu and Dhileepan 2005). An application will be lodged to relevant authorities in Australia for its release as soon as all relevant data has been gathered.

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REFERENCES