Devil's Claw
Controlling the Invasion of the Brazilian Caatinga by Cryptostegia madagascariensis with Natural Enemies

Partnership

Prepared by
Robert W. Barreto (Universidade Federal de Viçosa), Dick Shaw (CAB International), Harry C. Evans (CAB International and UFV), Katia de Lima Nachet (EMBRAPA Meio Ambiente) Oriel E. Bonilla and Istvan Major (Universidade Estadual do Ceará), Francisco Cláudio L. de Freitas (Universidade Federal Rural do Semi-Árido), Dartanhã José Soares (EMBRAPA Algodão)
Concept Note

- Cryptostegia madagascariensis (common name: devil’s claw) is a woody vine from Madagascar which has become a devastating invader in the semi-arid region of N.E Brazil especially in the unique Caatinga ecosystem after its introduction as an ornamental.

![Figure 1 – Two carnauba palms and associated riverine vegetation dominated by devil's claws.](image)

- The vine threatens endemic biodiversity smothering vast areas of intact forest and forming impenetrable masses that can kill trees and prevent animal and human movement; as well as depleting scarce water resources. It produces a large seed bank and abundant toxic latex rendering its control through standard methods extremely difficult, as well as hazardous.

- Besides major environmental damage, infestations by devil’s claw are progressively destroying the natural stands of carnauba (Copernicia prunifera) and consequently threatening a valuable natural resource. For over a century by rural populations have been sustainably harvesting carnauba leaves and extracting wax for processing by local industry. Extensive areas infested with devil’s claw have already been abandoned by harvesters. This industry worth US$120m/yr and the many industrial applications of the wax are also under threat, since this palm is the sole source of this wax.

- The carnauba palm is an iconic species known locally as the “tree of life” and the symbol plant of both the states of Ceará and Rio Grande do Norte and on their respective coats of arms. Also endangered and typical of the Caatinga is the three-banded armadillo, chosen as the mascot for 2014’s Football World Cup in Brazil under the name Fuleco – A combination of the Portuguese words for football and ecology.

![Figure 2 – Fuleco – the three-banded armadillo, mascot of 2014’s Football World Cup.](image)
This invasion is still at an early stage and the weed has yet to reach its full extent. **If no action is taken, both a valuable resource and a unique ecosystem will be lost to the region, to Brazil and to the world.**

- Classical biological control (CBC) has the potential to offer effective and sustainable management of invasive alien weeds such as Devil’s claw. It involves the deliberate release of **safe and highly specialized** natural enemies from the native range of the target weed. The aim is to reduce the abundance of the weed in its introduced range below an ecological or economic threshold. CBC has a proven track record of success and represents a **highly effective** and **cost-efficient** approach to control.

- A closely related species of devils’ claw (*C. grandiflora* or rubber-vine) has successfully been controlled using CBC in Australia. A rust fungus from Madagascar, *Maravalia cryptostegiae*, was evaluated by CABI in their quarantine and once safety had been proven, was released into the invaded area in Australia (~40,000 km²). Its introduction resulted in complete and rapid control of rubber-vine allowing native species and entire ecosystems and agricultural industries to recover, as well halting further spread. This collaborative project is now heralded as a highly successful example of classical biological control of an exotic weed with a Benefit: Cost ratio of 108:1 for the agricultural systems alone.

- Another isolate of this rust fungus has been found in Madagascar that will infect devil’s claw. Evidence suggests that it is also safe, specific, damaging and highly likely to have the same impact on devil’s claw in Brazil, as the rubber-vine rust isolate has had on its host in Australia.

- The fact that a related weed species has been controlled so successfully elsewhere, and that much of the relevant research has already been carried out, is a great advantage, both scientifically and economically. CBC offers a cheap and environmentally safe solution to the imminent threats posed by this alien invader to the unique Caatinga ecosystem – including the carnauba palm, the three-banded armadillo and other iconic species – to the livelihoods of a large rural population of the impoverished North-east region, to the carnauba wax industry and to the natural landscapes of north-eastern Brazil.