

The Biological Control Programme for *Cryptostegia grandiflora* in Australia

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Abstract

Cryptostegia grandiflora (Asclepiadaceae) from Madagascar is a vigorous perennial vine-like shrub first recorded in Queensland in 1913. It now infests more than 300,000 ha of grazing land and native plant communities in the North of the state and is seen as a potential threat to all of tropical Northern Australia. Research to find suitable herbicides is continuing, but the problem is too big for this approach and a biological control programme was initiated in 1985. A 2 year period of exploration has identified more than 20 insects in Madagascar, but of the initial seven species thought to be sufficiently specific only a maximum of three species might ultimately be released. Plant pathogens including the rust thought to be *Marvalia cryptostegia* are now being studied with the hope of achieving a permanent natural control system.

Introduction

Cryptostegia grandiflora R. Br. (Periplocoidea, Asclepiadaceae), rubber vine or Palay, from Madagascar, is a vigorous, twining perennial shrub first officially recorded in Queensland in 1913. It is a serious weed of rangeland and native plant communities in coastal and sub-coastal districts north of Rockhampton, and now infests an area in excess of 300,000 ha costing the cattle industry an estimated A\$5,000,000 p.a. (Fig. 1). Caltabiano (1973) estimated that there were 120,000 ha north of Bowen increasing in area at rate of 1 to 3% p.a.

It is most commonly found associated with streams and adjacent flood plains, where it chokes out pasture and native vegetation. Grazing animals are difficult or impossible to muster which prevents proper management, and has dire consequences in the event of the outbreak of an exotic animal disease. Rubber vine is equally damaging to natural ecosystems, where plants are smothered and killed, and the normal erosion accretion processes associated with streams is affected.

Rubber vine is a poisonous plant containing cardiac glycosides. Lethal doses range from 0.03 to 0.06% body weight of plant material for domestic herbivores (Everist 1974). Fortunately the plant is rarely eaten. It is a potential source of rubber, the latex produced being similar in quality to that of *Hevea* sp. (Euphorbiaceae), but no economic extraction method has been devised. Rubber vine is a declared noxious plant in Queensland and the Northern Territory.

Research into methods of control initially concentrated on chemical and mechanical methods. However, it was obvious that the problem was too big for this approach, and biological control agents were eagerly sought.

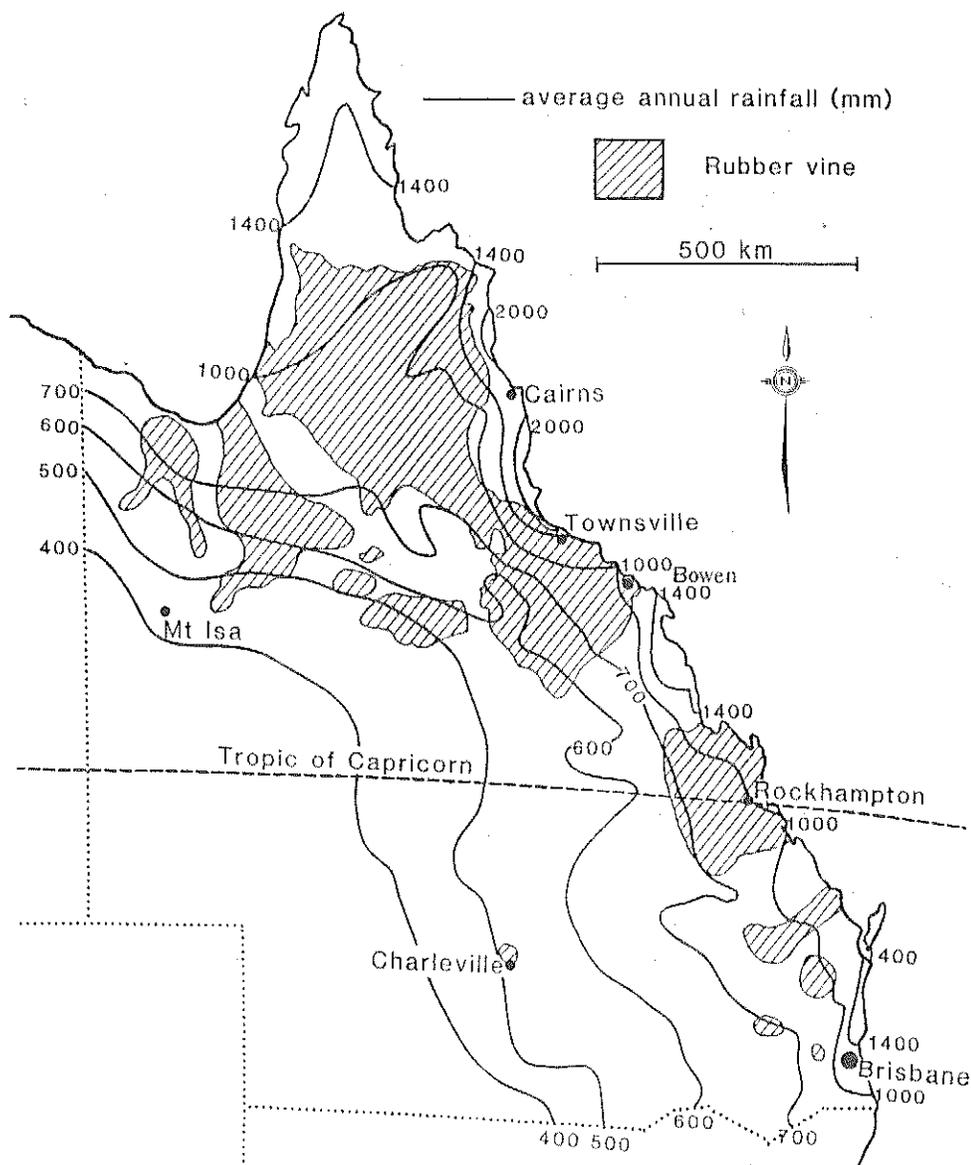


Figure 1. Distribution of rubber vine in Queensland.

Biological Control Programme

Insect Agents

After early difficulties were overcome, a collaborative agreement was reached between the Malagasy Government and Australia in 1984. In late 1985 exploration began in Madagascar

and more than 20 insect species have been recorded on *C. grandiflora* and related plants. However of the initial seven species thought to be sufficiently specific, it now seems that only three species might ultimately be released (McFadyen, R.E., pers. comm., 1988). The moth *Euclasta whalleyi* (Popescu-Gorj and Constantinescu) (Lepidoptera: Pyralidae) has been tested and is now being mass-reared and released. A leaf-feeding hawk moth, *Nephele densoi* (Lepidoptera: Sphingidae), and a gall-forming fly, *Scizomyia* sp. (Diptera: Cecidomyiidae), will be tested in quarantine shortly. The other insects rejected because of a lack of specificity include the scales *Hulaspis* sp. (Homoptera: Diaspididae), *Steatococcus* sp. (Homoptera: Margarodidae), and a leaf-feeding caterpillar (Lepidoptera: Lymantriidae) (Turnour, J.J., pers. comm., 1987).

Plant Pathogens

The use of the heteroecious macrocyclic rust *Hemeleia cryptostegia* V.- Bourg. (Teliosmycetes) was first proposed by C.I.B.C. in the early 1970s. However the consensus of opinion in Australia after review of a draft proposal on its use in 1979, was that its introduction could not be contemplated because of a lack of information about the unknown spermagonial and aecial stages in the genus.

C.I.B.C. were asked to further investigate the rust in 1987. A field survey in Madagascar by C.I.B.C. provided basic information on the host range of the rusts uredinial and telial stages, and four other pathogens, (*Phaeoisariopsis*, *Colletotrichum*, *Phomopsis* and *Pseudocercospora*) were collected (Evans, H., pers. comm., 1987).

The transfer of *H. cryptostegia* to the genus *Maravalia* by Ono (1984) is of prime importance. The genus *Maravalia* is a confirmed autoecious genus with no economic crop plants as hosts (Evans, H., unpubl. report, 1987). Preliminary host-specificity testing with urediniospores has shown *Maravalia cryptostegiae* (Cumm.) Ono, comb. nov. to be highly specific. Studies on the basidiospores, and the fate of the as yet undetected spermagonial and aecial stages are continuing.

References

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