

Invasive cacti – a threat to the rangelands of Australia

Chuk, M.

Chair, Australian Invasive Cacti Network, Desert Channels Queensland Inc. PO Box 601, Longreach, QLD 4730, Email: mike.chuk@dcq.org.au

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Abstract

Invasive cacti have been identified by the natural resource management community as a major threat to the biodiversity and primary production values of the rangelands of Australia. A number of species of cacti (principally members of the *Opuntia* and *Cylindropuntia*) have serious infestations in semi arid and arid areas of all mainland states. These weeds have proven difficult and very costly to control using chemicals and currently have few effective biological controls. The Rangelands NRM Alliance has identified the threat that invasive cacti pose and has supported the formation of the Australian Invasive Cacti Network. The network objective is to raise awareness of the threats posed by this group of weeds and provides a conduit for the exchange of information on taxonomy, biology and best practice control techniques.

Introduction

Australia is a land with no native occurrence of the Cactaceae – a family of plants almost exclusively from the New World. They are well adapted to growing in arid environments, surviving long periods of dormancy in dry times and capable of responding very quickly to rainfall.

Cacti possess advantages most useful in arid Australia, such as CAM photosynthesis that allows most of the stomata to be closed during the day, reducing water loss. They have thick leathery pads and stems which store water, often protected by spines that deter predators - of which there are few in Australia. Typically cacti have extensive shallow root systems,

which can respond to rain within a few hours. They are able to grow across a wide range of soil types and topography.

Cacti reportedly arrived with the First Fleet when Captain Arthur Phillip collected a number of plants from Brazil infested with cochineal insects (*Dactylopius coccus*) in the hope of establishing a dye industry in the new colony. Prickly pear (*Opuntia stricta*) was introduced for stock fodder in the Parramatta district in the early 1800's and was recorded as being taken from Sydney to Warwick, Queensland in 1848 for use as a fruiting and hedge plant (North West Weeds, 2010).

By 1925 prickly pear was estimated to have spread over 25 million hectares and spreading at a rate of over one thousand hectares per day. An assortment of control techniques were tried, including injecting poison and drifting fumes from vats of boiling arsenic. Prickly pear became a national problem and the Commonwealth Prickly Pear Board was formed. The search for an effective or biological control agent led to the introduction of the *Cactoblastis* moth from South America in 1926, which rapidly reduced the infestation (North West Weeds, 2010).

Unfortunately not all *Opuntias* are effectively controlled by *Cactoblastis* nor is the moth effective in cooler or drier environments. Cochineal insects can be effective but need to be of the right biotype to control the cacti and may be restricted in their ability to spread between areas of cactus.

Cacti were some of the first ornamental plants transported to remote homesteads and mine sites in the outback. When people moved on the cacti were abandoned in dumps and soon became weeds. The plants remained unnoticed or were thought to be quaint oddities not worth eradicating.

There are now a number of cacti identified as weed problems across the rangelands of Australia. The key weed genera are *Opuntia* – the pear cacti and the closely related *Cylindropuntia*, along with a variety of other species including *Harrisia*. These cacti are declared weeds and prohibited imports in some states but not declared as serious weeds in

others. This highlights the need for a national approach to risk assessment and investment in control of this group of weeds.

Concerned by the increasing efforts being devoted to the control of invasive cacti and recent reports about the infestations of cacti in the Goldfields area of Western Australia (Wilcox and Fitzgerald 2009), the Rangelands NRM Alliance (which represents 13 regional NRM bodies of the rangelands), surveyed its members in 2009 to ascertain the situation with invasive cacti across the rangelands of Australia. The survey showed that invasive cacti, in particular the Opuntioids (*Opuntia* and *Cylindropuntia*), pose real challenges to primary production and biodiversity at sites in all mainland states. In several regions, where there were extensive infestations, the cost of ongoing chemical control often exceeds the value of the land.

The survey revealed significant infestations including the extremely spiny Hudson pear (*Cylindropuntia rosea*), which infests 60,000 ha in the Lightning Ridge area of NSW, with other serious infestations of Hudson pear in the Goldfields region of Western Australia. Wheel cactus (*Opuntia robusta*) is a serious weed in the Wimmera of Victoria and is found along the Murray and in the Flinders Ranges of South Australia. Devil's rope cacti, (*Cylindropuntia imbricata*) is a problem in the lower Darling in western NSW and coral cactus (*Cylindropuntia fulgida var mammilata*) has isolated but serious infestations in western NSW and western Queensland, along with significant infestations in the Goldfields area of WA. Other locally significant infestations include Snake Cactus (*Cylindropuntia spinosior*) and jumping choya (*Cylindropuntia prolifera*) in western Queensland.

The potential for the spread of cacti can be seen in the potential area (biocline) that each species could possibly occupy. For a number of species this is a substantial part of arid and semi arid Australia (Australian Weeds Committee, 2010). Cacti spread vegetatively and by seeds, which can remain viable for long periods. In some species, which rarely flower, such as coral cactus, it is the detached segments which are the main means of spread. Even quite small plants produce grape sized segments, which can be transported by livestock, wildlife or are spread by water and on vehicle tyres. To make things worse these segments easily blend into stone scatter or are concealed in leaf litter under trees and shrubs, making complete eradication very difficult.

The rangelands are vulnerable to invasion by such pests, particularly where land values are low, numbers of people working the land are few and resources at their disposal are limited. There are large tracts of land that are rarely visited due to thick scrub or difficult terrain where cacti can spread unnoticed. Old homestead dumps and mine sites are common places where cacti flourish.



Wheel cactus (Opuntia robusta) north east of Terowie, Upper north of SA- photo Kym Haebich

Control of invasive cacti by conventional chemical and mechanical control techniques requires repeated treatment over a number of years. Chemical control can be by injection of herbicide such as glyphosate which works well in some Opuntias, whilst *Cylindropuntias* typically require overall spraying with either an Access/diesel mix or water based chemicals such as Garlon. As mentioned earlier there is limited or no currently effective biological control for most cacti in the rangelands, though there may be potential for cochineal insects to be useful with further research.

The first National Invasive Cacti Forum was held in Adelaide in early December 2009. It brought together representatives from the pest management community, scientists and biosecurity agency staff. Information was presented on invasive cacti from most states of Australia along with information on taxonomy and biocontrol research both within Australia and South Africa (where similar species of invasive cacti are a serious problem). One of the outcomes of the forum was the agreement to form a national body, the Australian Invasive Cacti Network, to raise awareness of cacti as a significant threat to biodiversity and production along with providing a forum for exchange of information on the taxonomy, biology and control of invasive cacti (Chuk 2010).

The challenge now is for the network to work effectively with biosecurity agencies, research institutions, natural resource management groups and land managers to ensure that Australia's rangelands are protected from the scourge of invasive cacti.

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