National Case Studies Manual

Parkinsonia

Natural Heritage Trust
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Queensland Government
Natural Resources, Mines and Energy

National Prickle Bush Management Group

Northern Territory Government

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Parkinsonia

Approaches to the management of parkinsonia (*Parkinsonia aculeata*) in Australia

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Note: Owing to machinery of government changes in Queensland, the former Department of Natural Resources became the Department of Natural Resources and Mines in 2001. In early 2004 it became the Department of Natural Resources, Mines and Energy. This name will be used throughout this publication.

Foreword

Parkinsonia is one of Australia's worst weeds. It already infests nearly a million hectares and threatens the agricultural and environmental value of over three-quarters of the Australian mainland.

This manual provides a timely review of our existing knowledge of parkinsonia management, in addition to presenting a variety of case studies drawn from the geographic range of the weed.

While knowledge gaps still exist, much can be learnt from the experience of those who have grappled with the challenge of combating this weed. The achievements of these people provide both inspiration and a realistic appreciation of the challenges involved.

The National Prickle Bush Management Group recognises that it is only through the combined efforts, diligence and commitment of all affected landholders, community and catchment groups, agencies and others that we will effectively gain ground on this weed.

I recommend this manual to all landholders affected by parkinsonia and suggest that those at risk of parkinsonia invasion make good use of the combined knowledge and experience contained in this book.

Further, I commend all those who have been responsible, both directly and indirectly, for its production.

Louise Moloney
Chairperson
National Prickle Bush Management Group

Contents

Introduction

Parkinsonia—a weed of national significance

Parkinsonia (*Parkinsonia aculeata*) is an exotic plant that has been recognised as a weed of national significance (WONS) because of its invasiveness and its ecological, economic and social impacts.

Parkinsonia can form dense, and often impenetrable, thorny thickets along watercourses, bore drains, floodplains and grasslands. This makes land inaccessible for people and animals, restricts stock access to drinking water, decreases the amount of pasture available, and excludes native vegetation. It can also make mustering virtually impossible. Some infestations in the Gulf of Carpentaria region and the Fitzroy catchment in central Queensland are now up to several kilometres across.

Flood-prone country is particularly susceptible to invasion by parkinsonia. Dense infestations in these areas can destroy wildlife habitat, provide a harbour for feral animals such as pigs, contribute to soil erosion, and exclude native plants and animals.

Introduced to Australia in the late nineteenth century, parkinsonia is now present on almost one million hectares of the Australian mainland. Yet this is only a small fraction of the total area at risk of invasion.

> The national vision—Parkinsonia is confined and its impact reduced to a minimum.

A national approach

To tackle the current and potential threat of parkinsonia, in 2001 a national strategy was launched with the following vision:

> Parkinsonia is confined and its impact reduced to a minimum.

The strategy, based largely upon national management zones, aims to deliver four desired outcomes:

1. Parkinsonia management is coordinated and maintained at a national level.
2. Zone A infestations (containment zone) are reduced.
3. Zone B infestations (active control zone) are minimised.
4. Zone C infestations (eradication zone) are eradicated and new introductions of parkinsonia are prevented.

The strategy, documented in the national WONS Parkinsonia Strategic Plan, is being led by the National Prickle Bush Management Group (NPBMG). Comprised of agency and community representatives across Australia, the group is responsible for overseeing and monitoring the implementation of the national strategies for three weeds of national significance: parkinsonia, mesquite and prickly acacia.

In the period 2001–04, the Commonwealth Government provided funding for addressing weeds of national significance through the National Weeds Program (Natural Heritage Trust). This funding has been available to community groups for strategic control activities for parkinsonia and the development of best practice methodologies. Some of the case studies included in the manual have referred to this funding.

Use of this manual

Although research into parkinsonia ecology and management commenced in the 1980s, most data available to scientists are relatively new, and still incomplete. However, our efforts to date have provided a preliminary information base that is of use to all land managers working against this weed.

This manual incorporates a summary of our present understanding of parkinsonia ecology and management. This technical information is supported by a variety of case studies drawn from areas that represent the Australian geographic range of this weed.

This manual is intended to present the combined experience and expertise of many landholders, community groups, agency staff and others who have been and still are tackling the parkinsonia problem. It represents an opportunity for land managers to further equip themselves with the skills and knowledge to achieve their individual and collective goals.

Nathan March

Members of the National Prickle Bush Management Group at a meeting in Karratha, WA. From left to right: Nathan March (National Coordinator, Department of Natural Resources, Mines and Energy, Qld), Noel Wilson (Department of Agriculture, WA), Dr Rieks van Klinken (CSIRO), Dr Shane Campbell (Department of Natural Resources, Mines and Energy, Qld), Louise Moloney (Chairperson), David Barton (Pilbara Mesquite Management Committee), Phil Maher (Department of Natural Resources, Mines and Energy, Qld), Peter Gray (Department of Agriculture, NSW), Damian Collopy (Department of Agriculture, WA) and Alice Beilby (Department of Infrastructure, Planning and Environment, NT). Absent: Nora Brandli (Desert Channels Queensland) and Jenny White (Australian Agricultural Company)

Nathan March

▲ Parkinsonia is an invasive weed causing ecological, economic and social impacts

Section 1

Parkinsonia—ecology and threat

Parkinsonia—ecology and threat

Michele Deveze and Nathan March with Rieks van Klinken

Description

Parkinsonia is a many branched, spreading shrub or small tree with a deep taproot and an extensive surface root system. While it can grow up to 10 metres high, it usually grows to between 2 and 8 metres. Young parkinsonia plants are usually single thorny stems, and typically continue growing as a single-trunked plant. Stem damage can result in a multi-stemmed bushy plant.

Young plants have a pale to dark green hairless stem that gets darker and rougher with age. Its slender zig-zag branches are pale to dark green, hairless and photosynthetic, and armed with very sharp, 7–12 mm long spines growing from the leaf nodes. Its distinctive leaves are pale green and have a short, spine-tipped stalk. The leaf branches are 20–40 cm in length and flattened, with small, oblong leaflets up to 3 mm long arranged along each edge.

The fragrant flowers are up to 20 mm in diameter, five-petalled, and predominantly yellow. The top petal either has orange spots or turns completely orange. Each flower grows on a long, slender, drooping stalk arising from leaf joints in groups of 8 to 12. The seeds are oval, hard, olive green to brown, 8–15 mm long and 3–4 mm wide. They are typically produced in 5–10 cm long, pencil-like, light brown leathery pods, which are constricted between the 1 to 3 seeds they usually contain. Pods can, however, contain up to 9 seeds.

Parkinsonia is most likely to be mistaken for other thorny shrubs and trees such as prickly acacia *(Acacia nilotica)*, mesquite *(Prosopis* spp.) and mimosa bush or needlebush *(Acacia farnesiana)*. Prickly acacia and mesquite are also weeds of national significance.

To differentiate parkinsonia from other prickle bushes, look for tiny oblong leaflets on a flattened leaf stalk; the other species have fernlike or pinnate leaves.

Nathan March

▲ Parkinsonia infestation

Nathan March

▲ Plant form

Nathan March

▲ Pods

Nathan March

▲ Leaves

NRM&E

▲ Flowers

Nathan March

▶ Young plants characteristically have single thorny stems

Distinguishing between the 'prickle bushes'

Parkinsonia may be confused with other prickle bushes such as mesquite (*Prosopis* spp.), prickly acacia (*Acacia nilotica*), mimosa bush (*acacia farnesiana*) and mimosa (*Mimosa pigra*). These plants, with the exception of mimosa bush, are also weeds of national significance.

It is possible to tell the difference between the prickle bushes by examining the flowers and pods. If neither of these is available, they can be distinguished by their tree shape, leaves, bark or branches. However, as this can be difficult, a local weeds officer should be consulted.

The major differences between the prickle bushes are listed in Table 1.

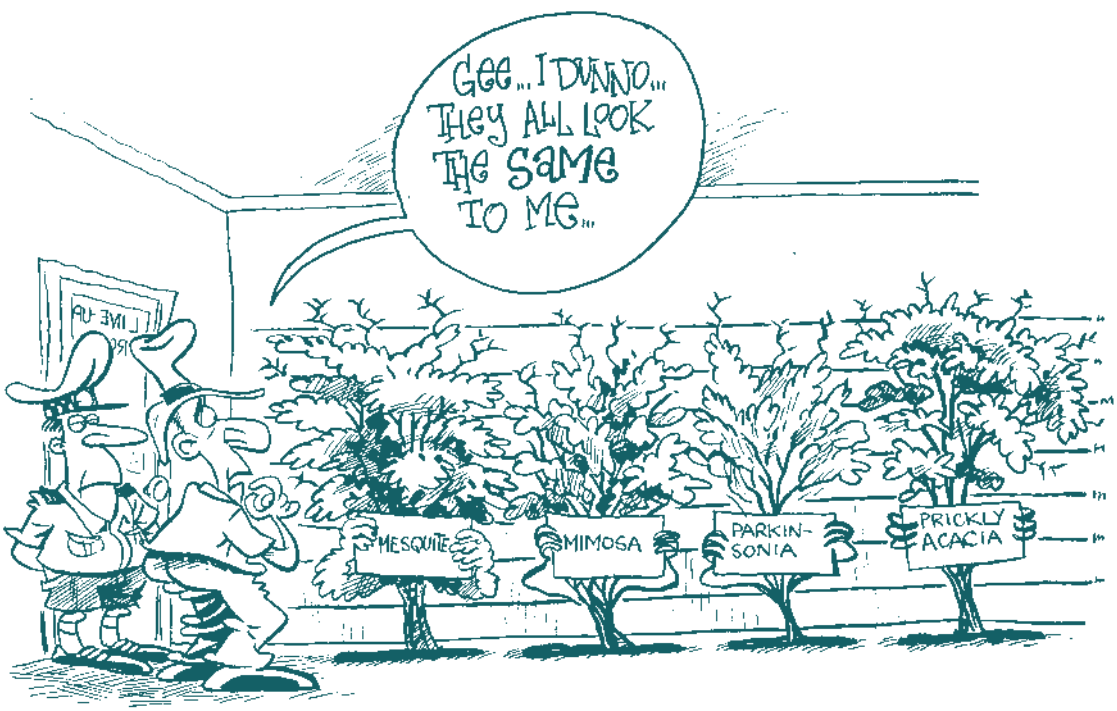


Table 1 Differences between prickle bushes

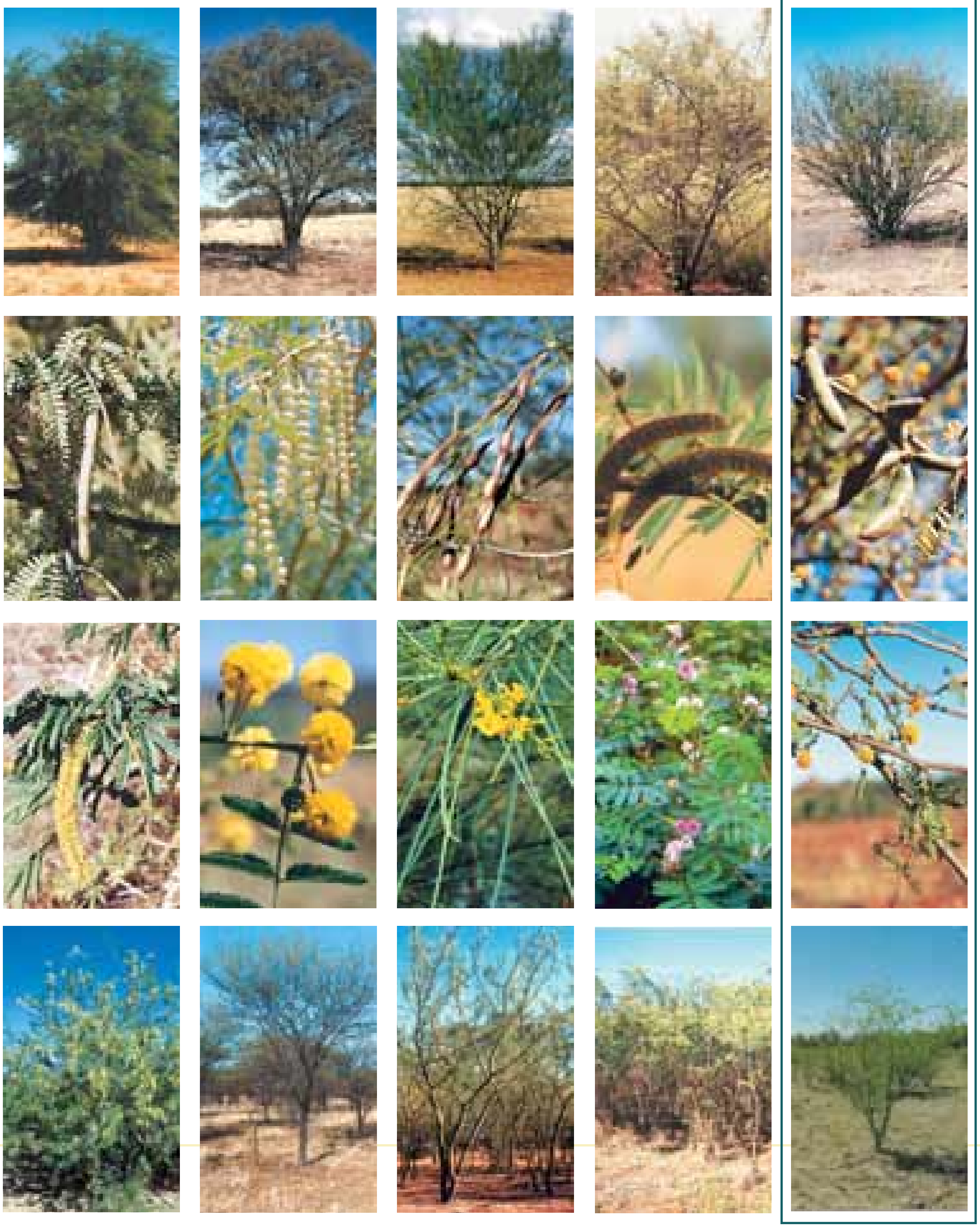
	Mesquite *Prosopis* spp.	**Prickly acacia** *Acacia nilotica*	**Parkinsonia** *Parkinsonia aculeata*	**Mimosa** *Mimosa pigra*	**Mimosa bush** *Acacia farnesiana*
Pod shape	Up to 20 cm long; slight constrictions between seeds; straight or slightly curved	Up to 23 cm long; constrictions between seeds	Up to 10 cm long; thin constrictions between seeds; straight	3–8 cm long; one-seeded, bristled segments, which fall away from the pod leaving a skeletal outline	Cigar-shaped; up to 6 cm long; slightly curved
Pod colour, hairiness	Straw-coloured, sometimes purple; no hairs	Blue-grey; fine hairs	Straw-coloured; no hairs	Brown when mature; covered with dense bristles	Brown to black; no hairs
Flowers	Cylindrical, greenish-yellow spike, 5–8 cm long	Ball-shaped, golden yellow, about 1 cm across	Five petals, mainly yellow, one with an orange spot	Round, fluffy, pink or mauve balls, 1–2 cm across	Ball-shaped, golden yellow, about 1 cm across
Leaves	Fernlike; 1–4 pairs; often with a gap between leaves	Fernlike; 4–10 pairs; often overlapping	Long, flattened leaf stalk with tiny oblong leaflets along each side	Central leaf stalk prickly; 20–25 cm long. Each leaf contains about 15 opposite segments, 5 cm long and divided into pairs of leaflets that fold up when touched or injured	Fernlike; 2–4 pairs; with a gap between leaves
Leaflets	6–18 pairs	10–25 pairs			8–18 pairs

Table 1 Differences between prickle bushes (continued)

	Mesquite *Prosopis* spp.	**Prickly acacia** *Acacia nilotica*	**Parkinsonia** *Parkinsonia aculeata*	**Mimosa** *Mimosa pigra*	**Mimosa bush** *Acacia farnesiana*
Tree shape	Variable—either a multi-stemmed shrub to 5 m, or a spreading tree to 15 m	Spreading tree to 10 m	Small tree or shrub usually to 5 m	Multi-branched shrub to 5 m	Usually rounded shrub to 3 m
Bark	Rough, grey; smooth dark red or green on small branches	Tinge of orange and/or green on saplings; dark and rough on mature trees	Smooth and green; straw-coloured and lightly textured at base of older trees	Stems green at first; becoming woody; initially covered with thick hairs	Grey, with prominent white spots
Branch shape	Zigzagged	More or less straight	Slightly zigzagged	More or less straight	Zigzagged

Different features of the prickle bushes

Mesquite	Prickly acacia	Parkinsonia	Mimosa	Mimosa bush



Life cycle

Parkinsonia is fast growing and can flower as early as the summer of its second year of growth. Although most flowering occurs in spring or summer, it can occur opportunistically at any time of the year.

Parkinsonia produces large numbers of seed pods and seeds. Most pods mature in early to late summer and fall from the tree where they decay away, leaving the seeds behind. Parkinsonia seeds have a thick and extremely hard coat and can remain viable in the soil for many years before responding to favourable conditions and germinating. Seeds require wet soil conditions for several days to stimulate germination. Mass germination events may occur following rainfall, and will result in dense thorny thickets if not rapidly controlled.

Nathan March

▲ Pods are easily spread by the movement of water

Habitat and distribution

Parkinsonia is native to Central America, northern South America, the Caribbean and tropical southern United States. It was introduced to Australia in the late nineteenth century as an ornamental plant and as a shade tree for planting around bores, dams and homesteads. Parkinsonia is adapted to growing under an extremely wide range of climatic and soil conditions but is most frequently found around creeks, river levees, bores and dams, and on black soil plains. Once parkinsonia plants are established, they withstand heat and drought well.

Parkinsonia pods float and seed can therefore be easily spread by water, particularly during floods. Seeds can also be spread in mud sticking to machinery, animals and footwear. The pods are relatively unpalatable to domestic, wild and feral animals, although these animals have been known to eat and disperse seeds, especially in drought conditions when more palatable foods are limited. There is little doubt that parkinsonia will continue to spread along watercourses, bore drains and floodplains, as well as adjoining areas throughout the sub-humid, semi-arid and arid environments of north Australia.

Parkinsonia seeds have a thick and extremely hard coat and can remain viable in the soil for many years

Parkinsonia currently infests approximately 1 million ha of land, and is established (mainly along watercourses) in thickets throughout northern Australia. This includes the Pilbara and Kimberley in Western Australia, and much of the Northern Territory and Queensland. Isolated occurrences also occur in South Australia and New South Wales.

Parkinsonia has the potential to invade more than three quarters of mainland Australia including the Gulf region, Channel Country, Mitchell Grass Downs, Lake Eyre Basin, western New South Wales, northern South Australia, Barkly Tablelands and the Kimberley and Pilbara. Special effort is being made to prevent the weed's spread into Cape York, the Lake Eyre and Murray–Darling basins in Queensland, and the blue-bush swamps of the Barkly Tablelands.

Parkinsonia has the potential to invade more than three quarters of mainland Australia

Parkinsonia pods float so seed can easily be spread by water

Figure 1 Distribution of parkinsonia in Australia, 2003

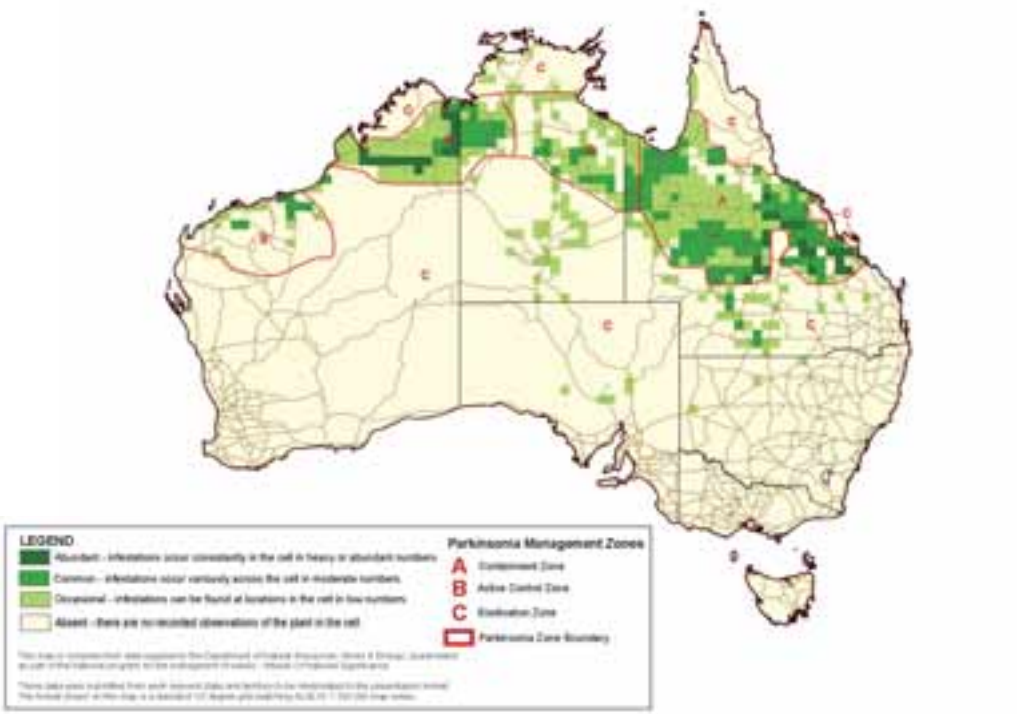
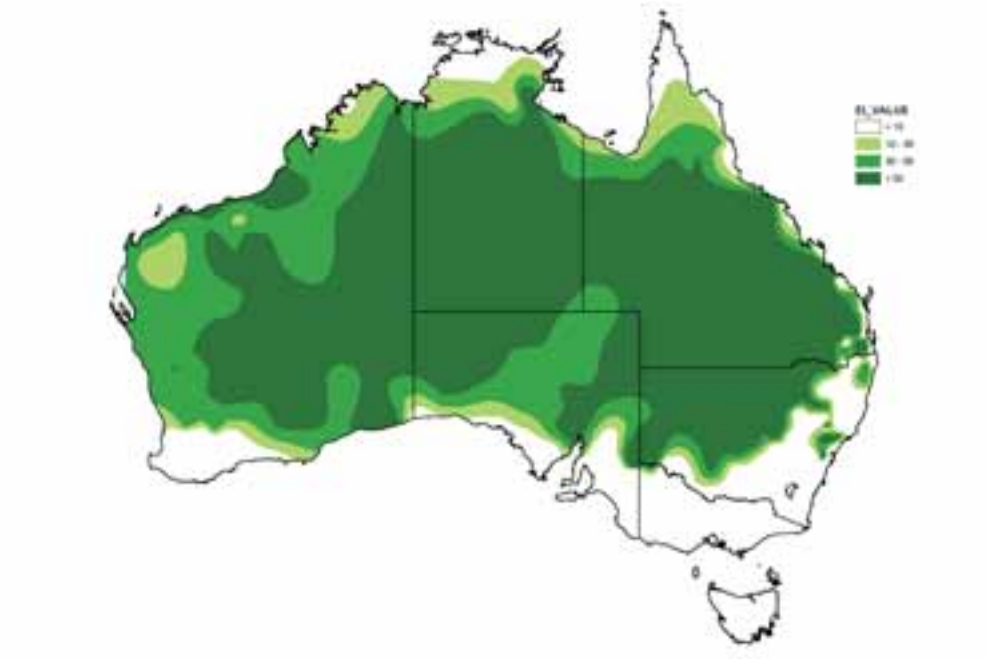


Figure 2 Potential distribution of parkinsonia in Australia



Data is splined from a CLIMEX Climate Prediction. EI = Ecoclimatic Index. EI<10 Potential for permanent population very low, EI>50 potential for permanent population very high.