Weeds in the Burdekin Rangelands: **Disturbance**

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What is 'disturbance?'

In ecology, 'disturbance' is generally used as a technical term to describe the removal of vegetation—or other dominant life forms—from an area. Disturbance may be by means of grazing, fire or mechanical removal. Mechanical disturbance could be the consequence of a natural event such as a cyclone or a landslide or it may result from human activities.

It is generally acknowledged that weeds are more likely to establish where there has been disturbance (Fox 1991). Crop weeds illustrate this relationship well, in that many weeds in cropping situations are ruderals (a plant of waste or of disturbed places: abandoned fields, disturbed roadsides, vacant blocks etc.), that take advantage of low levels of competition. However, the acknowledged relationship between disturbance and the occurrence of weeds should be qualified.


Castor oil plant

Types and degrees of disturbance

There are different types and degrees of disturbance and weeds respond to these variations. Particular weeds may not respond in the same way to mechanical clearing, grazing and fire. Moreover, each of these disturbances removes vegetation in different ways and so differentially affects resource availability. Not all weeds respond to a particular type of disturbance in the same way.

This was illustrated in the comparison of the responses of chinee apple and rubber vine to fire— most chinee apple sprout after a late dry-season fire, whereas a large proportion of rubber vine under 2 m high, and 50 per cent of those over 2 m fail to do so (also see Information Sheet on this CD: *Weeds of the Burdekin Rangelands: Lifecycles*, for graphical figures).

Some disturbance regimes may actually reduce infestations of particular weeds. For example, rubber vine may have proliferated in recent decades as a result of a reduced intensity and frequency of disturbance by fire, suggesting that periodic fires may help keep rubber vine in check. Although the types and extent of disturbance vary greatly, all ecosystems experience disturbances, and these represent opportunities for new plants to establish.

This means that every ecosystem presents some opportunities for the establishment of weeds. It is likely that, for virtually any plant community, there exist plant species that could exploit the disturbance regime and become weeds.

Disturbance in the Burdekin

> *The important disturbances within the Burdekin Rangelands are those due to grazing, fire and tree clearing. In addition, in the mid-1990s, there was widespread death of eucalypts, notably Eucalyptus crebra, associated with a run of very dry years (Fensham and Hollman 1999).*

There is a least circumstantial evidence that exotic grasses are more likely to invade when and where native perennial tussock grasses have been reduced. The current prevalence of Indian couch within the Burdekin Rangelands is associated with a widespread decline in the condition of native perennial grass pastures and the increased stocking rates in recent decades. The proliferation of chinee apple may in part be linked to the clearing of the dominant eucalypts, though there are no quantitative data to confirm this. Especially in riparian zones, disturbance by rooting activity of feral pigs may present opportunities for weeds such as bellyache bush and castor oil plant to establish.

Habitat preferences of weeds

The habitat preferences of a weed and the availability of preferred habitat will strongly influence the rate at which it spreads. Important habitat characteristics include soil type and moisture and nutrient availability. Especially in lower rainfall zones, many weed species do best in wetter and more nutrient rich parts of the landscape. These zones include riparian areas and other areas that receive run-on. Such habitats often support the densest and most prolific infestations of weeds. Weed invasion can be expected to proceed most rapidly in riparian zones or other preferred habitats.

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Table 1 ***Habitat preferences of several prominent weeds of the Burdekin Rangelands***

Species	Habitat preferences
Castor oil plant	Common along water courses and disturbed areas
Chinee apple	In areas with an average annual rainfall of 470–1200mm; on wide variety of soil types including coarse-textured gravelly soil, deep alluvials, solodic and cracking clay soils; often in areas that have been severely disturbed, especially where native trees are cleared
Lantana	Wide variety of habitats ranging from dry hillsides to shaded gullies; range of soil types but does best on more fertile soils;
Parkinsonia	Variety of soil types but commonly on areas of heavy soils that are periodically flooded
Parthenium	Heavily grazed areas with average annual rainfall of 400–800mm; particularly common on alkaline clay loam soils
Rubber vine	Most common in the wet-dry tropics where average annual rainfall 400–1400mm; especially prevalent in riparian areas including along major rivers and minor creeks
Giant rat's tail grass	Occurs on wide range of soils; most likely to occur where average annual rainfall is above 700mm
Harrisia cactus	Most common in brigalow soils and softwood scrubs; shade tolerant
Bellyache bush	Most frequent in riparian habitats and on more fertile soils
Hymenachne	Wetlands

It is significant that areas that are the preferred habitats for many weed species are also the more productive parts of the landscape. This is because of the more favourable moisture and nutrient regimes that prevail there. Thus, high levels of disturbance due to grazing can coincide with the preferred habitats for weeds.

The habitat preferences of some prominent weeds of the Burdekin Rangelands are shown in Table 1, above.

References

Fox, M.D., (1991), 'Developing control strategies for environmental weeds,' *Plant Protection Quarterly*, v. 6, p. 109–110.

Fensham, R.J., & Holman, J.E., (1999), 'Temporal and spatial patterns in drought-related tree dieback in Australian savanna', *Journal of Applied Ecology*, 36:1035–1050.

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