Weeds of the Burdekin Rangelands:

Managing rubber vine

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Table 1 Preventing new weeds from establishing

Summary of key processes: what do we know?

What are the key bio-physical processes and at what scale do they operate?	What factors regulate them, in order of importance? Are they 'manageable'?	Do we have enough data to set benchmarks? Do these vary with landtypes and/or seasons?
Seed production	Rainfall and temperature—these climatic factors may influence when and how much seed of is produced by rubber vine; the processes involved are not manageable. Biological control agents—seed production has not been specifically targeted, but agents that defoliate rubber vine impact seed production quite heavily; now that the agents are established, little can be done to manage their abundance or effectiveness.	Two agents (a moth and a rust fungus) are well-established and widespread. Biocontrol agents' effectiveness varies with season. The rust, in particular requires high humidity to do well.
Dispersal	Wind—this is the species' main dispersal mechanism; not manageable. Water—seeds of rubber vine can be spread downstream, but this is probably a minor means of dispersal; the process cannot be managed.	The importance of this process will vary with seasonal conditions. It is probably especially important in flood times; seeds can survive immersion of the pod in salt water.
Germination	Seed-bank age structure—this cannot be managed. Soil moisture and temperature—these will determine when germination will occur; in Burdekin Rangelands, germination will mostly take place between December and March; germination cannot be managed.	Seed-banks of rubber vine are short-lived. If seed production is curtailed for 12 months, seed-bank will be depleted to very low levels. Climatic forecasting may be of benefit in identifying times when germination and establishment are more likely to occur.
Plant growth and survival	Climate—in the Burdekin Rangelands, seedlings are very likely to die during their first dry season after emergence; this process cannot be managed. Biocontrol agents—now that agents are established, their impacts cannot be managed.	Two biocontrol agents result in frequent, often severe defoliation that dramatically reduced plant vigour and may be causing some mortality. There are not imposts on other land-management practices.

Table 1 Preventing new weeds from establishing (cont.)

Summary of key processes: what do we know?

What are the key biophysical processes and at what scale do they operate?	What factors regulate them, in order of importance? Are they 'manageable'?	Do we have enough data to set benchmarks? Do these vary with landtypes and/or seasons?
Plant growth and survival (cont.)	Competition—small seedlings may be susceptible to competition from established herbaceous species; the herbaceous layer is manageable.	Maintaining healthy perennial grass pastures as a means of weed management is consistent with sound land management.
	Fire—rubber vine is very susceptible to prescribed burning.	Burning for control of rubber vine will impinge on forage supplies especially where it is necessary to destock beforehand to facilitate fuel accumulation and afterwards to allow desirable species to recover. It will also require construction /maintenance of firebreaks.
	Chemical and mechanical treatment—both chemical and mechanical treatments are available.	Chemical and mechanical control techniques are expensive. Herbicide techniques (eg basal bark spraying, cut stump applications) must be applied to individual plants. The efficiency of these methods will rely on targeting outlying infestations, small infestations, those that are likely to be serious seed sources, and infestations in key areas of a property or conservation reserve etc. Because most infestations are in riparian zones, there are restrictions on the use of herbicides.

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Table 2 Key processes for management

Management Options		
Based on current scientific understanding, what management options are available to achieve the objective? How can we monitor their effectiveness?	What confidence do we currently have in these options?	Do the options conflict or interact with other management objectives? Will trade-offs be needed?
Monitor areas downwind or downstream from major seed sources. This will help detect incipient infestations and allow intervention early in the invasion process.	Success in this action will be limited only by capacity to find and identify small infestations of young plants.	This will require a capacity to identify seedlings and juveniles of these species. Monitoring can be time-consuming. It can be carried out in conjunction with other activities (e.g. mustering) but will require targeting particular locations.
Burn to control rubber vine. Fire may be either during the mid-late dry season using mainly grass fuels or during dry spells in the wet season. For heavy infestations, two fires over three years will be effective in reducing density. For lighter infestations, one fire every 5-10 years will generally be sufficient. In general, riparian areas should not be burnt frequently.	This method of control is very effective; it does rely on the availability of either grass and/or litter fuel.	Burning for control of rubber vine will impinge on forage supplies especially where it is necessary to destock beforehand to facilitate fuel accumulation and afterwards to allow desirable species to recover. It may require construction/maintenance of firebreaks. Prescribed burning should be integrated with chemical and/or mechanical techniques.
Use appropriate chemical and mechanical control techniques.	Reliable chemical and mechanical control techniques are available for rubber vine.	Chemical and mechanical control techniques are expensive. Herbicide techniques (e.g. basal bark spraying, cut stump applications) must be applied to individual plants. So must most mechanical techniques, especially in riparian areas. The efficiency of these methods will rely on targeting outlying and small infestations, those that are likely to be serious seed sources, and infestations in key areas of a property or conservation reserve etc.
Biological control.	Established agents are severely damaging plants and in many areas have apparently greatly reduced seed output. Little can be done to further increase their effects.	Land managers should NOT be complacent about active control of rubber vine infestations just because rust and caterpillars are damaging plants.
Maintain healthy perennial grass layer.	Reliable strategies are available for the Burdekin Rangelands.	Maintaining healthy perennial grass pastures as a means of weed management is consistent with sound land management.