FACT SHEET

Salinity and yate woodlands

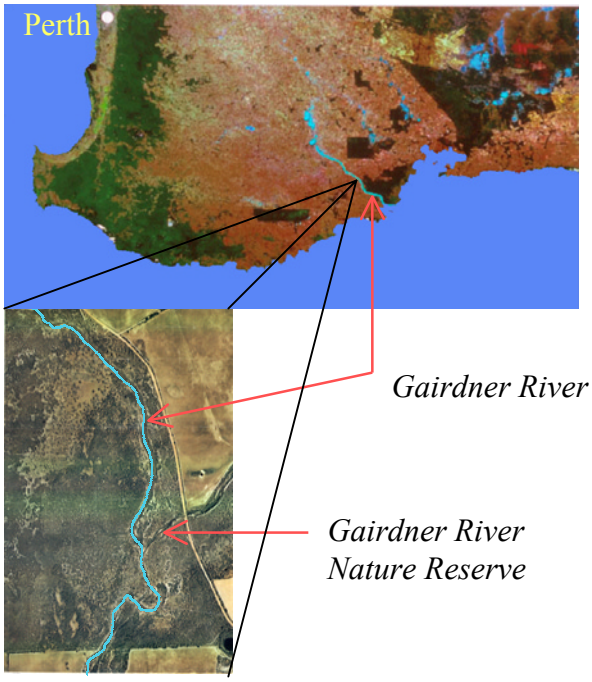
Michelle Carey, Murdoch University, Perth, Western Australia

National DRYLAND SALINITY Program

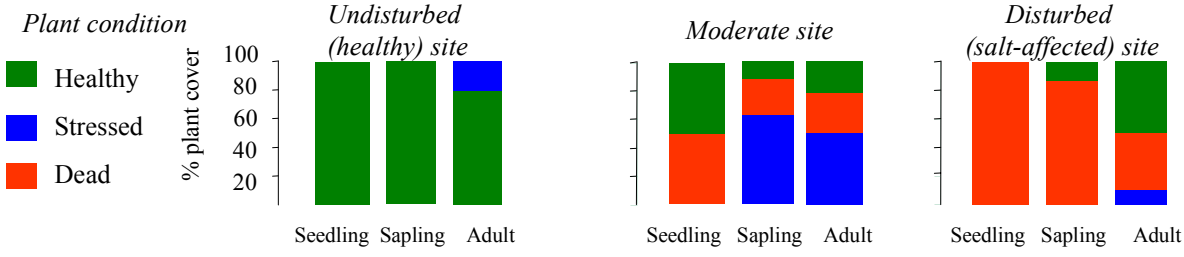
Since early 1999 I have been investigating the effects of salinity on yate (*Eucalyptus occidentalis*) woodlands in the south-west of Western Australia. Yate habitat generally lies between the higher rainfall wandoo (*Eucalyptus wandoo*) woodlands and the drier salmon gum (*E. salmonophloia*) woodlands between Albany and Esperance.

They tend to occupy the lower parts of the landscape along drainage lines and swamps and are particularly vulnerable to rising watertables.

Sites along the Gairdner River Nature Reserve north of Jerramungup have been the main focus of the research. The Gairdner River is naturally saline and the yate trees, melaleuca shrubs and sedges grow in shallow soils above a hypersaline watertable, in many places twice as salty as the ocean.

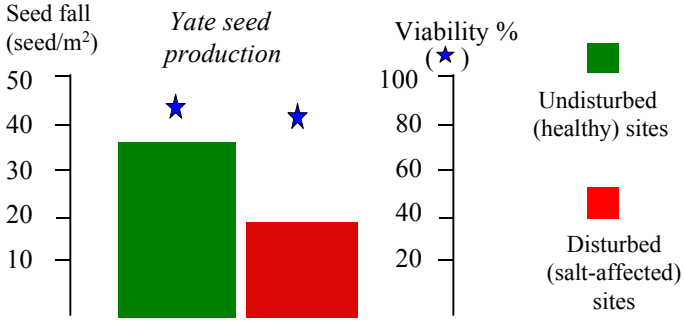


Early investigations at these naturally saline sites showed that at all stages of development from seedlings to adults, plant health declined sharply with disturbance from secondary salinity.

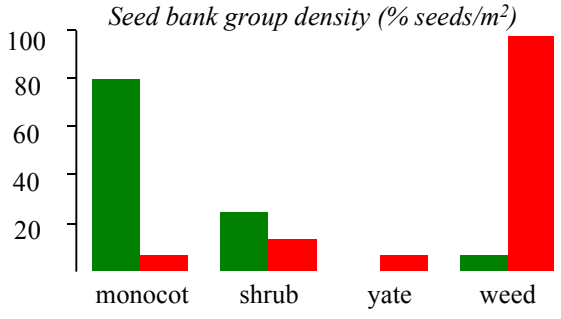


At undisturbed healthy sites, yate trees thrive in shallow, naturally salty soils but become stressed in areas affected by salinity from nearby agricultural land. Yates are unable to persist in these altered landscapes and are replaced by salt-tolerant sedges and shrubs.

Yate trees in soils affected by secondary salinity produce less seed each year than trees in undisturbed woodlands, but the seed viability is no different between sites. The study has found that secondary salinity depresses seed quantity but not quality.



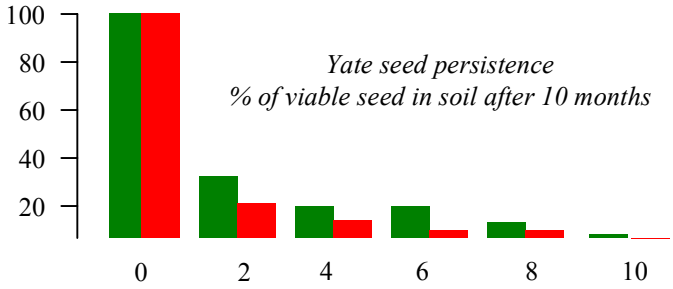
Yates do not seem to produce a persistent, long-term soil seed bank at healthy or salt-affected sites. Seeds of native sedges and grasses (moncotyledons) and shrubs are found in high numbers at healthy sites, but decline significantly at salt-affected sites. Weed seed is currently low at healthy sites but is dominating the seed bank at salt-affected sites.

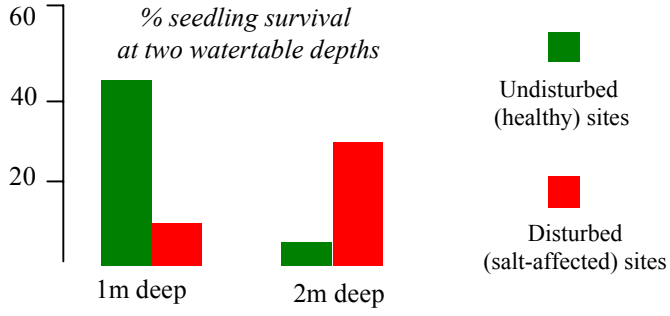


Salinity and yate woodlands
(continued)

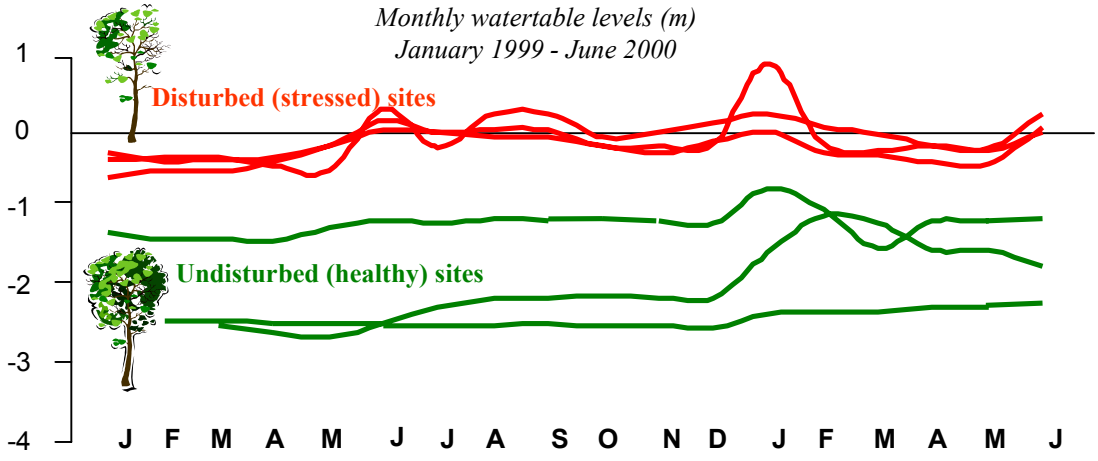
The yate seed only remains viable in the soil for up to 10 months although its viability drops significantly after two months. This may contribute to its low soil seed bank.

In recent trials I found that seedling survival at healthy sites with watertables around 1 metre deep exceeded 40% compared with around 10% at sites with secondary salinity, and 5% above 2-metre watertables. Recruitment success is also higher at sites with greater micro-relief. Small swales and mounds on the soil surface channel excess water away and protect seedlings from changes in watertable levels.





Adult yates prefer a fluctuating watertable, no shallower than 1 metre below the surface. The difference in watertable regimes between three healthy sites and three sites affected by secondary salinity is graphed below. It was also found that particular soils in yate woodlands are more susceptible to waterlogging and had higher plant mortality.



Bushland management messages from this research

- Yate woodlands once thrived in shallow salty soils with a fluctuating watertable. Secondary salinity has resulted in watertables remaining at consistently high levels and adversely affecting recruitment and survival.

- Plants are recruiting in new locations in the landscape. Some species are moving away from the drainage lines and new species are replacing them. For successful land management, the preferred soil profile and water regime for species from key groups in potential colonisation of yate woodland must be considered.

- Young seedlings are more successful at establishing in shallow watertables with an uneven soil surface.

- To restore remnant yate bushland where canopy cover is poor, fencing alone may not be adequate. Seed production is low and seed viability drops to 20% after two months in the soil.

Further information

Contact Michelle Carey on telephone (08) 9360 6077, email mcarey@central.murdoch.edu.au or call NDSP Communications Coordinator Georgina Wilson on (08) 9368 3889. Web-site is http://www.ndsp.gov.au. A final report will be available about September 2002.

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