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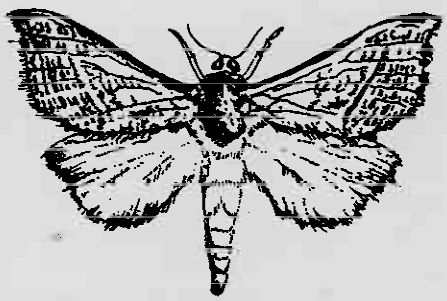
FIRE, *FRAUS* AND THE CORD RUSH

from a paper by Bert Main

LARGE tussocks of the cord rush, Ecdeiocolea monostachya, *are a familiar sight among shrubs throughout the northern agricultural area and the wheatbelt. They are so common and widespread that no-one considered that they may be in danger. However, some long-term observations by Prof. Bert Main have raised some very worrying points.*

The Web of Life is not at all simple – causes and effects interact together so that long-term results do not always match predictions – management needs care, even 'doing nothing' may not prevent local exinctions ...

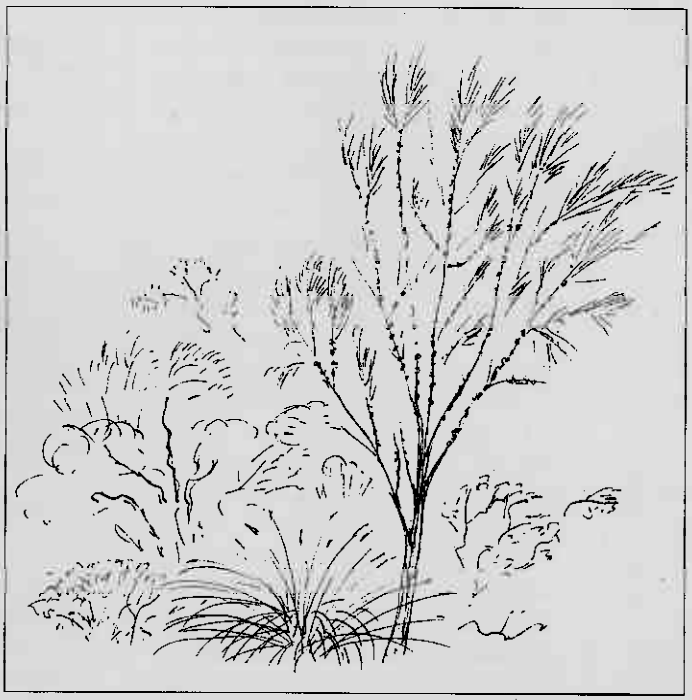


Ghost moth Fraus simulans

Life history

Cord rush forms a large, long-lived tussock. Seedlings have only been observed after fire.

The larvae of the ghost moth *Fraus simulans* create burrows up to 24cm deep within the tussock, from which they emerge to cut and feed on the leaf blades. Debris from feeding is webbed to form a large spacious vestibule at the burrow entrance and this is quite easy to see if you look carefully. Pupation takes place in March or April and, like other ghost moths, the pupal cases remain protruding from the upper surface of the vestibule after the adult has emerged, usually during rain in the first week in May. Mating follows and, at night, usually when light rain is falling, the female lays the eggs as she walks, flutters or flies close above the soil. After hatching, the larvae spend the first few stages of their life foraging among debris and leaf litter, before choosing a tussock in which to burrow. Within the burrow, the larvae are safe from summer heat, and also, if deep enough, from bushfires.



Cord rush with black tamma (Allocasuarina acutivalvis) *in the wodjil. From "Between Wodjil and Tor" by Barbara York Main.*

From 1967, Prof. Main has observed a number of sites where the plant and the moth occur, in order to try to understand its natural history – that is, the effect of the interrelationship between all the plants, animals and physical effects which occur at the site. In particular, he wanted to know what effect the herbiverous moth had on the survival rate of cord rush, the effect of fire on both, the ability of the moth to reinvade disturbed areas, and the effect of present management practices on the whole community.

The importance of this work is that it is long-term. Most studies of such detail – for a PhD for example – take three years and then end (or the funding runs

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Fire, Fraus *and the Cord Rush continued from page 1*

out!). In nature, this is not long enough to show real trends.

The results provide a fascinating insight into what is actually happening in our wheatbelt remnants.

Bungulla Nature Reserve (site 1)

Like most others, this central wheatbelt Nature Reserve is an island within cropland. In 1967, when the study started, the study site was a low heath dominated by cord rush and surrounded on all sites by a tall shrubland of black tamma, hakea, grevillea and wodjil (wattles), growing on sandy soils over lateritic clay. Since then the only disturbance has been due to the feeding activities of rabbits, kangaroos, echidnas - and locusts in 1990-91.

The cord rush and the moth are both favoured by the shade caused by the wattles, but grazing by an increased number of moth larvae eventually killed the cord rush. Drought and grazing killed seedling hakeas and grevilleas. The wattles aged and gradually died out. Black tamma seedlings survived in all the areas where plant death had left a space, and their needles smothered and killed ground vegetation, including cord rush. Thus the entire community on this site has changed to one dominated by black tamma – with important implications for other fauna.

Durokoppin Nature Reserve (site 2)

This site was on high ground, on sandy laterite, in a thicket dominated by tamma, wattle and grevillea, with a cord rush understorey. It was burnt with a low intensity patchy fire in the late summer of 1988.

Some of the tussocks survived the fire and a number of seedlings germinated in the first winter after it. They survived summer heat and water stress in the shade of still standing burnt shrubs. However,

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drought and grasshoppers eliminated much of the regrowth. Nine years after the fire, one young plant provided enough food (12 leaf blades) to support one moth larva through to adult, although none of the seedlings had yet flowered. Note that seedling recruitment did not replace fire-induced mortality of established tussocks – ie there are now fewer cord rush plants at this site.

Durokoppin Nature Reserve (site 3)

There were two study sites here, one within an area of regrowth in an area that had been cleared and cropped in the 1930s, and another on never-cleared land close by. The vegetation in both sites was typical kwongan on yellow sand, with woody pear over cord rush. The regrowth area was experimentally burnt in a very hot fire in the summer of 1989.

There was little change to the unburnt site, except that some of the shrubs died and black tamma invaded in small numbers.

Some tussocks survived the very hot burn, but very few cord rush seedlings germinated and none survived the summer. However germination and establishment of shrubs was good. Three years after the fire, pupal cases in regenerating tussocks showed that moths had re-colonised the area from the adjacent unburnt areas. Superficially the area looks excellent, but there are far fewer cord rushes than before.

East Yorkrakine Nature Reserve (site 4)

A gently sloping north-facing sandplain with similar, but sparser, vegetation to the other sites. A very hot experimental burn was conducted in the summer of 1991.

After 2 years, about 30% of the tussocks had survived the fire but none had flowered or set seed. Moths had also invaded from adjacent unburnt areas and started to re-use the regenerating tussocks. Three years after the fire, one reached adulthood. A very large number of seedlings germinated in the spring after the fire but, on the shadeless seedbed, by seven years later, all had died.

Conclusions

This study shows that cord rush regenerates after fire, but it needs to be a low intensity, patchy one and even then, regrowth is very slow. Large cord rush plants are thus likely to be as old, or older than the shrubs in the same community. The moth, *Fraus*, can invade burnt areas from adjacent unburnt ones but it takes a minimum of 9-10 years under favourable conditions before a seedling can support a moth larva to maturity. It is even longer before the seedlings themselves will set seed. To preserve both the moth and cord rush in a small reserve may be very difficult.

Thus one should not become complacent about biodiversity conservation. Even apparently common flora and fauna may not be safe. The risks faced by them will only become apparent when life history and other biological requirements are known.

Ecosystems are dynamic, not static, and we need as much long-term data as we can gather, to make decisions for the survival of biodiversity based based on the best possible information.

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