



Small signs of fire in the butongrass

For many types of Australian habitats, the effect of bushfires on vertebrate fauna is fairly well understood. The effect of fires on invertebrate species, however, is still largely a mystery.

Penny Greenslade, a researcher with CSIRO Entomology, says fire affects invertebrates in different ways. For example, it might be beneficial for ants, but for other soil fauna such as Collembola, it may have a negative impact.

Greenslade and colleagues from the Tasmanian Parks and Wildlife Service have studied the effect of fire on invertebrates in the butongrass moorland of the Tasmanian Wilderness World Heritage Area.

Butongrass (*Gymnoschoenus sphaerocephalus*) moorland covers one million hectares of Tasmania, half of it in the World Heritage Area. It is highly flammable and so susceptible to wild fires. The vegetation is regularly burnt, both for fuel reduction and for environmental management reasons such as to encourage the production of grass seeds, which provide food for the rare orange-bellied parrot.

While research has been carried out on the effect of fire on vegetation and vertebrates in this environment, no studies have previously been made of its effect on invertebrates.

Greenslade and her colleagues examined the effect of fire on invertebrate biodiversity with the aim of contributing to

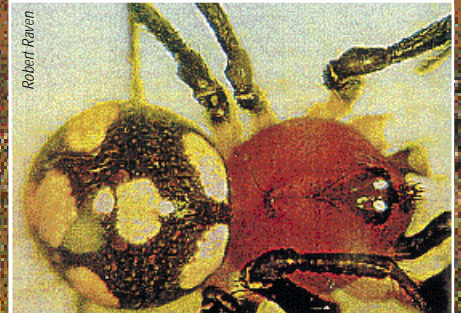
the use of fire as a management tool, as well as improving management of the fauna.

They collected invertebrates in late summer from 25 butongrass moorland sites of different ages in the World Heritage Area. These sites ranged in age from one month to 64 years since the last fire and were at three locations, at altitudes of 40, 350, and 700 metres above sea level.

Using sweep nets to sample the invertebrates, the researchers collected more than 8000 specimens from which they later identified more than 250 species.

They found that species richness and abundance was significantly lower on sites which had been burnt within the past five years and significantly higher on sites where burning had not occurred for 10 to 20 years. The rate of increase in abundance and species richness dropped off on older sites (over 25 years).

Some groups of invertebrates are common and sufficiently sensitive to fire to act as indicator taxa. The most common groups collected in the butongrass moorland were Collembola, Araneae and aquatic insects. The study showed that the abundance of one species of Collembola on a site was a better indicator of time since fire than plant biomass, although these animals did not occur at all localities sampled and only responded to time since fire at the lowest altitude.



Robert Raven



Georgina Davis

Main picture: Butongrass moorland covers one million hectares of Tasmania, and is highly susceptible to wild fires.

Inset top: A male of a new genus of comb-footed spiders (Theridiidae) found in the butongrass.

Above: A species of *Rastriopes* which is a sensitive indicator of time since fire in the butongrass. Populations are destroyed by fire, then recolonise, slowly increasing as the vegetation matures.

The results suggest that to protect invertebrate biodiversity, the minimum interval between controlled burns in Butongrass moorland should be five years and the optimum interval between burns appears to be about 20 years.

These results will be incorporated into fire management plans for Butongrass moorland in Tasmania. More information is still needed on the effect of repeated fires every five to 10 years, of differing fire intensities and of autumn versus winter burns as well as studies on ground, soil and leaf litter faunas.

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