

Studies of animal browsing problems in the establishment of eucalypt and blackwood plantations

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Abstract

Animal browsing of newly established eucalypt and blackwood plantations is a major concern for forest managers. Although studies on aspects of the problem have been conducted over many years, management of browsing animals still relies heavily on the use of 1080 baits to reduce animal numbers in affected areas.

Work conducted during the Intensive Forest Management Program gathered data on the impacts of browsing animals on newly established seedlings, evaluated different types of plant protectors and the use of repellent substances, and investigated the behavioural ecology of wallabies. Although some progress was made in each of these fields, considerable research and development work is required before improved pest management strategies can be implemented regularly and reliably at an operational scale.

Introduction

Aspects of animal browsing, addressed in several previous studies in Tasmania, have directed attention to several possibilities as alternatives to fencing or to direct poisoning using 1080 (sodium monofluoroacetate). The Intensive Forest Management (IFM) project aimed to continue work on aspects of the browsing problem, including impacts on tree growth, behavioural ecology, plant protection devices and repellents.

Impacts of browsing on survival and growth

Studies on *Eucalyptus regnans* and *E. nitens* seedlings have shown that severe defoliation results in significantly reduced survival and long-term growth (Neilsen and Pataczek 1991; Wilkinson and Neilsen 1995). Such levels of defoliation commonly occur in Tasmania from browsing by native animals (Gilbert 1961; Statham 1983; Smith 1993; Neilsen and Wilkinson 1995).

Growth losses due to early browsing have been recognised as a serious problem and have been a major factor limiting successful establishment of eucalypt and blackwood plantations in Tasmania (Mollison 1960; Allen 1992; Neilsen and Brown 1996). The animals responsible for most of the damage are the Bennetts wallaby, the Tasmanian pademelon and the common brushtail possum (all native species) and the introduced rabbit (Statham 1983; Neilsen 1990).

A study of 586 ha of *E. nitens* and *E. regnans* plantations, undertaken to evaluate the long-term effects of early browsing damage, showed that 63% of unprotected areas had failed due to browsing. This represented a loss of \$387 000 on the \$614 520 spent on establishment of those areas (Wilkinson and Neilsen 1995).

Behavioural ecology of wallabies

A study site was located on the West Tamar. Trapping of Bennetts wallaby and the

Tasmanian pademelon was undertaken using a large cage trap, fence-line funnel traps and a tranquilliser rifle. Animals were tagged using Trovan injectible transponders for identification after recapture. A number of animals were fitted with radio-transmitters.

Radio tracking was carried out using hand-held antennae and two 12 m towers. Monthly 24-hour tracking sessions were run, together with weekly day-sessions and some additional sessions. The SAS radio-tracking analysis program was used to analyse the data.

The tracking program, together with more than 150 hours of observation and trapping data, showed that the smaller wallaby species (pademelons) camp during the day in gullies and thick scrub-covered areas relatively close to their feeding grounds. They emerged at twilight, began feeding at the edge of a clear area and gradually worked their way further out into the pasture. By an hour or an hour and a half after dark, the maximum number of animals were present. After four hours after dark, they began grazing back towards the bush and most were gone after six hours. During rainy weather, they tended to remain under cover and move less distance.

Bennetts wallabies tended to camp further away from feeding areas. They would generally move greater distances than the pademelons—well out into the middle of open pasture areas—and would remain out longer.

Main findings drawn from the results and observations are that wallabies do not exhibit any strong territorial tendencies, and bush areas, particularly those adjacent to farmland, support large fluid populations that provide a reservoir of animals ready to invade plantation sites and re-populate such areas after elimination measures. The work showed that there was broadscale movement of wallaby populations out of and into the plantation area.

Work on behavioural ecology proved difficult, with animals being lost to shooters and, in one case, killed by a car. The information

indicated that control of animal numbers (and damage) to an acceptable level would require ongoing monitoring.

Evaluation of repellent substances

Several repellent substances from various sources were screened on eucalypt seedlings, using captive populations of the two wallaby species.

Repellents included:

- Predatory odours, both natural and artificial, including big cats (e.g. lion);
- Oils from distasteful native plants (e.g. *Zieria* sp.);
- Commercial repellents; and
- Various distasteful and strong-smelling chemicals.

Several methods of applying and attaching the repellent substances to the seedlings were investigated.

Substances tested proved to have some repellent properties but, under the browsing pressure imposed, proved little more effective than those used previously. The fixing of repellents to seedlings and the retention of the repellent on the seedlings in Tasmania's environment proved most difficult. With growth, the repellents were diluted.

Evaluation of a bait-feeding station

A bait-feeding station, based on a New Zealand design, for selectively feeding possums was evaluated. The results indicated that feeder stations were very promising in providing a means of controlling target species.

Browsing protection

Protectors were evaluated in a series of trials. Those tested included normal 200 mm diameter grow-tubes which required a number

of stakes, narrow grow-tubes (65 mm diameter) which were established with one stake, and Tubex and KBC protectors made of coreflute, a twin-walled polypropylene material, which also required only one stake. Grow-tube[®] (ICI) is UV (ultra violet) stabilised polythene. However, the 1200 mm high x 65 mm diameter Grow-tube was not UV stabilised.

Grow-tubes and Tubex provided protection for blackwood seedlings from browsing, resulting in improved survival and growth. Unprotected blackwood seedlings continued to be browsed over three years. Their height did not increase and remained below 1 m due to the browsing. Protected seedlings were browsed when they grew above the protectors at about age one year, reducing height growth. Browsing lessened with

additional height growth and eventually seedlings grew above the browsing height.

The narrow grow-tube, with a cost of \$0.85/seedling, may well prove a cost-effective means of providing protection for seedlings in small plantation areas or for areas where stockings of around only 200 to 400 stems/ha are required.

Conclusion

The studies summarised here on aspects of animal browsing, while providing useful information, indicate that considerable research and development work is required before improved pest management strategies can be implemented regularly and reliably at an operational scale.

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