

THE INVASION AND CONTROL OF *TAMARIX APHYLLA*
ON THE FINKE RIVER, CENTRAL AUSTRALIA

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Summary. The native ecology of the Finke River is being damaged by the wide scale invasion of Athel pine, *Tamarix aphylla*. A control programme has been implemented in the Finke and other rivers of central Australia and basal bark and stem injection chemical control trials are being conducted.

INTRODUCTION

Athel pine (*Tamarix aphylla*) is native to northern Africa, the Arabian Peninsula, Iran and India. It was introduced to Australia from California around 1930 as a shade and ornamental tree and was first planted in central Australia in the 1950s. Over the past 18 years Athel pine has become established along several hundred kilometres of the Finke River in the Northern Territory. Major flows in the Finke River in 1974 dispersed seed along its entire length, and the wet conditions that followed were ideal for seed establishment. Further floods in 1983 and 1984 enabled more Athel pine to establish, from seed and vegetable matter, probably from those trees established in the 1974 floods. A small infestation also exists in the Ross River east of Alice Springs. All infestations originated from trees planted around homesteads and communities for shade.

The presence of infestations of the tree over large areas is likely to have deleterious effects for the pastoral industry and conservation of the natural environment. Athel pines tolerate saline water and exude large quantities of salt through their leaves. They alter several ecosystem properties with subsequent effects on native flora and fauna. Few native herbs persist under the dense infestations and the number of birds and reptiles are reduced where native species have been displaced. Presence of the trees may alter the course of rivers and increase sedimentation rates (1).

The genus has also been studied in the United States of America (USA), where it is a major pest of deserts. *Tamarix* species cover over 500,000 ha of river systems and flood plains in the USA and has been associated with huge reductions in native animals and grasses. In the USA the genus is reported to have higher water usages than native species, desiccating springs, pools and perennial streams.

Athel pine has the potential to invade all central Australian river systems. It was therefore declared as a Class B noxious weed in 1988. The strategy for its control is:

- (i) to eradicate plants from homesteads by chemical and physical means in order to prevent invasion of non infested rivers;
- (ii) to eradicate small infestations already in river systems such as the Ross River and Palmer River; and
- (iii) to begin control in the Finke River working from the headwaters downstream and to prevent the spread of the tree further downstream from the lowest point of infestation.

Environmental weeds

In 1989 a screening trial was carried out to determine which herbicides and application methods would be effective in killing Athel pine. Stem injection with concentrated products of 2,4-D ester, triclopyr, fluroxypyr, 2,4-D amine plus picloram and triclopyr plus picloram gave 100% kills. Basal bark treatments of fluroxypyr and triclopyr mixed with diesel at 1:50 gave in excess of 80% kills (2).

The aims of the experiments described here are to further refine rates of application of herbicides by basal bark treatment and stem injection, to determine the growth stages at which basal bark treatment is effective, and to determine an appropriate cut spacing for stem injection.

METHODS

Athel pine often occurs in clumps. This is because young trees are pushed over by floodwaters and vertical branches appear to be separate stems or trees. This therefore presents difficulties in designing herbicide trials as the stems in clumps may well be connected. Some of the kill ratings of trees in the screening trial may have been ratings of vertical branches of the one tree. Because of this uncertainty the following experiment was designed to assess the kill of stems, rather than the kill of individual trees.

The experiments were conducted on New Crown Station in the Finke River system.

Experiment 1 - Basal Bark Treatments. Garlon 600 (600 g/L triclopyr) and Starane (300 g/L fluroxypyr), mixed in diesel, were applied to juvenile, intermediate and mature stems in a randomised block design with four replications. Each plot consisted of groups of 5 to 10 stems and each stem was sprayed to a height of 45 cm above ground level. The volume of herbicide applied per stem varied depending on its size.

The herbicide concentrations were 1:60, 1:100 and 1:120. There were two types of control: control (i) - diesel alone, and control (ii) - no treatment.

The diameter of stems were recorded at application. Visual observations are being made of herbicide symptoms, the defoliation response and regrowth. The number of dead stems is to be recorded 6, 12 and 18 months after herbicide application. Percentage kill data will be arcsin transformed and analysed as a herbicide rate x growth stage factorial analysis of variance to determine significant treatment effects.

Experiment 2 - Stem Injection. Estone 80 (800 g/L 2,4-D ethyl ester), Garlon (480 g/L triclopyr), Starane (300 g/L fluroxypyr) and Tordon TCH (100 g/L triclopyr plus 50 g/L picloram) were injected into mature stems at waist height in a randomised block design with four replications. Each plot consisted of groups of 5 to 10 stems. Two cut spacings were tested: 13 cm and 25 cm centres, with 2 mL of herbicide applied per cut.

The herbicide concentrations were 100%, 50% and 25% product and a water injection control.

Visual observations will be made of herbicide symptoms, the defoliation response and regrowth. The number of dead stems will be recorded at 6, 12 and 18 months after herbicide application. Percentage kill data will be arcsin transformed and analysed as a herbicide x rate x cut spacing factorial analysis of variance to determine significant treatment effects.

RESULTS

At the time of writing only the 6 month recordings had been made. Results will not be analysed until the 18 month recordings have been carried out (February 1994).

Past control has been carried out using Garlon 600 at 1:60 with diesel. This gives 100% stem kills. However, field observations from the trial indicate that Garlon 600 mixed with diesel at 1:100 will give greater than 95% kill for trees up to 150 mm diameter that have not developed a hard mature bark.

Starane does not appear to be as effective on immature stems at 1:60. No conclusions can yet be drawn from the stem injection trial.

DISCUSSION

The basal bark treatment of Athel pine in the Finke River is continuing. The Tjuwanpa Outstation Resource Centre and the Aputula Community have been funded by the Bureau of Rural Science, Australian Nature Conservation Agencies, Save the Bush and the National Landcare Programme to work in conjunction with the Northern Territory Department of Primary Industry and Fisheries to carry out this control.

Until trial results are more conclusive basal bark control will continue using Garlon 600 at 1:100 and 1:60 depending on tree size. Stem injection will continue using Tordon TCH at 2 mL per cut, with cuts at 13 cm spacings.

Athel Pine has been eradicated from the headwaters of the Finke River to the Stuart Highway, a distance of 200 km. It is anticipated that it will be totally eradicated from all central Australian rivers by 1998.

REFERENCES

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2. White, A. and Gracie, A. 1990. *Aust. Weeds Res. N'letter* 39, 75-76.