

Evaluation of weed control strategies -a simulation study of *nassella trichotoma*, serrated tussock

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Nassella trichotoma (Nees) Arech., serrated tussock, is a serious weed of tablelands pastures in southeastern Australia. The spread of the species in an area of the central tablelands of New South Wales (formerly Turon Shire) was predicted to a reasonable level of accuracy (1). An economic evaluation of the various methods for control available to local government was undertaken using the spread model and discounted cash flow analysis.

Methods

Infestations were ranked as heavy, medium and light. Strategies available:

- Do nothing (opportunity costs: of *N. trichotoma*, \$22 ha⁻¹, heavy infestation).
- Control "light" infestations only using herbicide (i.e., restrict spread) (costs: \$200 to \$2,800 per farm).
- Control "heavy" and "medium" infestations by pasture improvement over (say) a ten-year period (costs: \$120 ha⁻¹). This, and strategies 4 and 5, generate additional income.
- 2 plus 3.
- An ideal (but impractical) solution: control all infestations in one year.

Using the simulation model (2) untreated *N. trichotoma* populations were allowed to increase and spread in each strategy. The five strategies were compared after 12 years and thence into perpetuity (10% discount rate).

Results and Discussion

Table 1. Cost and returns for each strategy (\$A, millions)

Strategy:	1	2	3	4	5
Costs	10.2	3.2	0.9	0.9	1.1
Returns:	Nil	Nil	1.6	1.5	2.5
Benefit-Cost Ratios:	-	-	1.7:1	1.7:1	2.3:1
Internal Rates of Return:	-	-	19.3%	19.2%	26.3%

The analysis demonstrated the long-term high cost of the apparently cheapest strategy, 2 : spraying light infestations. This is because of the high total opportunity cost of existing heavy infestations. The economic value of long term control by pasture improvement was demonstrated. The fact that this method protected areas from re-invasion and produced income highlighted the net social benefit of this approach to control.

1. Auld, B.A. and Coote, B.G. 1981. *Protection Ecology*, 271-277.

2. Auld, B.A. and Coote, B.G. 1980. *Oikos* 34: 287-292.