RESULTS OF TRIALS FOR REPLACING SERRATED TUSSOCK WITH WEED-FREE KANGAROO GRASS IN DEGRADED NATIVE WESTERN PLAINS GRASSLANDS

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Abstract Investigations to clarify which processes most effectively remove weeds and restore *Themeda triandra* (Forrsk.) (kangaroo grass), have been undertaken on three hectares of western (basalt) plains native grassland situated in the grounds of Victoria University of Technology (St. Albans), 15 km west of central Melbourne. This grassland site is underlain by shallow red basaltic clays, and the native grassland remnant has been progressively invaders by *Nassella trichotoma* (Nees) (serrated tussock). Evasion has probably been enhanced by periodic soil disturbance. The site is also under pressure from invasion by thistles and other weeds colonizing earthworks adjacent to the site.

Multiple trials using small randomized plots have been undertaken that examine the effectiveness in situ of the herbicides atrazine (as Nutrazine), glyphosate (as Roundup) and tetrapion (as Frenock) for controlling *N. trichotoma* and other exotics, and the most appropriate protocol for replacing serrated tussock with *T. triandra* using thatches of seed bearing hay. Results over three years show that the herbicides tested may differ in their appropriateness for controlling weeds in native grassland remnants. Using atrazine or glyphosate may lead to more favourable outcomes for both weed control and *T. triandra* restoration and re-instatement than using tetrapion in at least some situations. The season of applications of the herbicides has also been found to be important. Application of label-strength atrazine or glyphosate at backpack rates gave 100% kill of mature serrated tussock plants at most times of the year. However spraying late autumn (May) to winter (July) had the advantage that no other weeds established on-site for at least three months, whereas spaying at other times of the year (February, September) resulted in large-scale invasion by a variety of weeds common to the western basalt plains.

Trials designed to examine the effectiveness of restoring *T. triandra* to the site have focused on the commonly used method of:

1. clearing weeds using fire and/or herbicides,
2. thatching with seed-bearing *T. triandra* hay,
3. burning to remove residual weeds and promote *T. triandra* growth.

This method applied in various ways to plots where *N. trichotoma*-dominated areas had been cleared with atrazine or glyphosate. Results show that successful establishment of dense, weed-free *T. triandra* swards is possible. The results also suggest that the thickness of *T. triandra* thatch laid down during reinstatement, the number and quality of the seed in the hay, the herbicide used for weed removal prior to *T. triandra* thatching, the timing of herbicide spray, thatching removal of thatch and whether or not the thatch is burnt or physically removed, all interact to determine the success of establishing weed-free *Themeda*.