SERRATED TUSSOCK -
A THREAT TO VICTORIAN AGRICULTURE

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INTRODUCTION

Serrated Tussock, *Stipa trichotoma*, belongs to the Poaceae grass Family and. is a perennial, drought resistant species that is native to the pampas grasslands of Argentina and Uruguay. Serrated Tussock is a proclaimed noxious weed in Victoria and has been described as potentially causing greater reductions in carrying capacity than any other plant in Australia (Parsons and Cuthbertson, 1992). It is thought to have been introduced into Australia in the early 1900's but was not recorded in Australia until 1935 and was first recorded in Victoria in 1954. It now occupies more than 700,000 ha in NSW and 100,000 ha in Victoria and has the potential to infest more than 4.2 million ha (Figure 1).

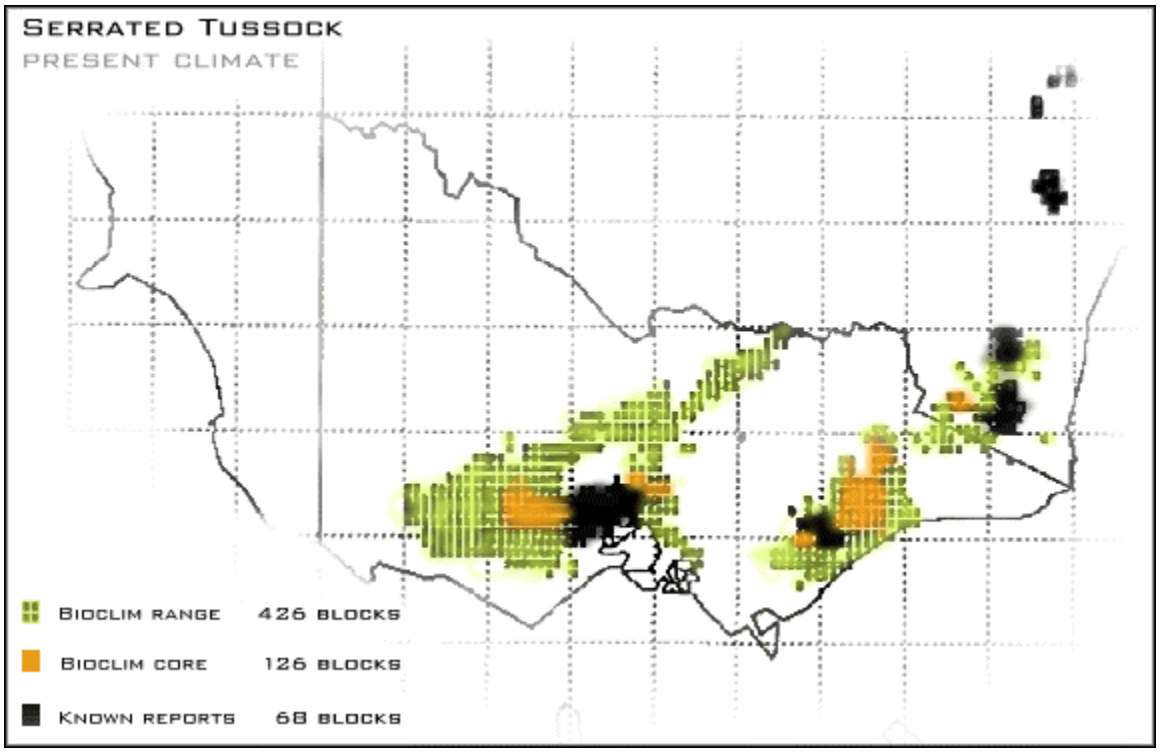

Figure 1. Bioclim Map of Serrated Tussock in Victoria. Each pixel represents approximately 10,000 ha.

Serrated Tussock has a fibre content of 86% and a protein content as low as 4%. This makes the plant indigestible and often fibre balls (undigested tussock leaves) lodge in the intestines of grazing stock, leading to poor condition and may eventually lead to starvation and stock deaths. Selective non-grazing by stock increases Serrated Tussock pasture competitiveness.

Serrated Tussock grows to a height of approximately 50cm and a diameter of 25cm at the base. Mature plants have drooping leaves that may extend plant diameter to 75 cm. A single plant can produce as many as 100,000 seeds and these can lie dormant in the soil for as long as 15 years. One hectare of dense Serrated

Tussock has been estimated to produce over 2 tonnes of seed per year.

FUTURE RESEARCH DIRECTIONS

A recent study by Inland Agricultural Pty Ltd suggests that Victoria could save $36 million/year by limiting Serrated Tussock spread to around 200,000 ha. To achieve this result will require a coordinated research programme to identify new methodologies/technologies to combat this weed. To do this will require the Department of Conservation and Natural Resources (DCNR), Agriculture Victoria (AgVic), Councils, Landcare groups and Industry (Wool and Meat) to work together with set targets and objectives.

Some directions for such future research are outlined below.

COOPERATING AGENCIES AND AREAS OF RESEARCH

1. **Mapping Infestations and Quantifying Soil/Weather/Potential Spread**
    - Conduct soil tests over serrated tussock range (Ag Vic + DCNR + Landcare Groups)
    - Obtain weather records (Ag Vic + DCNR)
    - Map Current Serrated Tussock Infestations (DCNR + Ag Vic + Landcare Groups)
    - Conduct BIOCLIM analysis to map current and predicted infestations of Serrated Tussock. (KTRI).
    - Development of a map clearly defining current distribution with viable control options for each of 5-6 categories identified. (Ag Vic + DCNR)
2. **Pasture/Revegetation Trials to try and Regenerate and Prevent Future Infestations - Agriculture Victoria (Agriculturally Rich/Productive Land)**
    - To conduct pasture trials looking at Phalaris, Caucasian clover, Al tolerant phalaris, Consul Lovegrass etc. Such

trials may identify suitable management practices and pasture species to replace Serrated Tussock and prevent land from being reinfested.
    - To set up five demonstration blocks in key areas with "best bet" control methods.
    - To establish reliable pasture recommendations for each of the land categories identified in point 1.
3. **Pasture/Revegetation Trials to try and Regenerate and Prevent Future Infestations - Department of Conservation and Natural Resources (Agriculturally Poor/Crown Land/Parks etc)**
    - To conduct pasture species trials and pasture management trials in low rainfall, low soil fertility areas and trial Consul Lovegrass and native grass species if available.
    - To trial revegetation techniques (native bush) to smother Serrated Tussock on Crown land.
4. **To investigate if repeated applications of low dosage rates of Frenock can aid pasture establishment by killing Serrated Tussock seedlings. Dr Malcolm Campbell (NSW Agriculture) has shown that rates as low as 0.1-0.2 Lt/ha can kill Serrated Tussock seedlings. This could be used to great advantage when establishing new pastures.**
    - Both DCNR and AgVic to trial this technique
5. **To liaise, co-operate and contribute to investigations on the use of low dosage rates of glyphosate to prevent flowering. Same as Reg Hill (Agriculture Victoria) is doing with Bent Grass in Central Victoria. Lisa Millar from Agriculture Victoria is presently conducting such trials.**
    - AgVic to continue trials
6. **To conduct spray trials utilising glyphosate with a range of adjuvants to try and discover improved formulations to control Serrated Tussock. To also trial new chemical formations as they become available. (KTRI)**
    - KTRI has a state of the art Track Sprayer, enabling such "pot experiments" to be conducted. Any new developments/discoveries would then be tested in largescale field trials. Such research is critical as there is some doubt as to whether Frenock will remain available for use against Serrated Tussock.. There is only a very small world market and its commercial viability could end if ICI Japan decided that the market was uneconomic.
7. **To set in place trials to investigate the impact of agroforestry/reforestation on containing/rehabilitating Serrated Tussock infestations. (DCNR Area Staff)**
    - This is a very long term programme (15-50 years).
    - Identify suitable species (Pines/Eucalypts/Other native species).

8. **To investigate if fire can be used as an integrated management tool to improve herbicide effectiveness/pasture establishment.**
9. **To Investigate Biological Control Of Serrated Tussock.**
    - NSW Agriculture has recently had Serrated Tussock declared as a target for biological control. A plant pathologist has recently spent several weeks in Argentina investigating what pathogens attack it in its country of origin. It was found that a Bascidiomycete fungus was causing considerable damage. Initial host specificity trials are planned as well as a more detailed follow up survey in Argentina. The Keith Turnbull Research Institute has the facilities and staff to become involved in such a project.
10. **KTRI are hopeful that they will have a Phd student working on Serrated Tussock in 1996-99.**
    - Conduct a literature review of current/past Serrated Tussock research.
    - Conduct a survey of pathogens that currently attack Serrated Tussock (if any) in Australia with a view to future biological control programmes.
    - To investigate the genetic makeup of the weed and find out if there are different strains in Australia.
    - To conduct some baseline ecological/biology work on the weed to look at how temperature/moisture/light/soil type affects seed germination and seedling survival.

CONCLUSION

Serrated Tussock poses a huge threat to Agriculture in Victoria with current infestations of more than 100,000 ha potentially spreading to infest more than 4 million ha. A joint proposal is being put together to obtain funds from DCNR, AgVic, Wool and Meat to fund research critical to producing new technologies to help combat and reduce future costs of this weed to Victoria.

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