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The Economic Cost of Tutsan (*Hypericum androsaemum* L.) to New Zealand

Geoff Burton Farm Business Management



Tutsan, *Hypericum androsaemum*.

THE ECONOMIC COST OF TUTSAN TO NEW ZEALAND

INTRODUCTION

Purpose of this report:

- This report is prepared for the Tutsan Action Group (TAG) based in Taumarunui, New Zealand.
- The purpose of this report is to attempt to quantify the current cost of tutsan to NZ and also the potential cost of tutsan to NZ.

Distribution of tutsan:

- Tutsan is spreading alarmingly throughout NZ, particularly in the North Island. Major infestations now exist across the Ruapehu, Waikato, Taranaki and Bay of Plenty regions but it is present from Kaitaia to Stewart Island. While tutsan has been present in NZ for at least 60 years, it appears to have spread at an accelerated rate in recent years. It is spread by wind, water, birds and machinery, initially along roadsides, rivers and bush margins, invading semi developed hill blocks, conservation areas, plantation forestry and, in increasing instances, managed pasture.
- Landcare Research identified 37 sites where tutsan was present, from November 2011 to March 2012. These range from Whangarei to Invercargill and were reasonably well spread throughout NZ. (Reference 1).

Control of tutsan:

- In its early stages, individual plants are easily controlled by pulling or spraying. Mature infestations are much more difficult to control and repeated spraying is necessary. Because tutsan tends to proliferate in inaccessible locations and is not palatable to animals including goats, effective total control is impractical. A biological control appears the only practical option to prevent the spread of tutsan and the associated increasing costs.

TAG projects:

- TAG, with the financial assistance of the Ministry for Primary Industries, Beef + Lamb New Zealand, Horizons Regional Council, Department of Conservation and over 100 farmers including corporate Maori and European farmers, has already raised \$400,000 cash and employed Landcare Research (NZ) in a 3-year NZ and international project. This will identify which biological agent(s) are controlling tutsan in its native ranges and assess whether they might be introduced to control tutsan in NZ. This project is nearing completion – with promising results at this stage. A further project is proposed which will establish the suitability of the identified agent(s) and, using approved procedures, introduce the agent(s) to tutsan populations in NZ. Further SFF assistance will be sought to complement a significant contribution from cash and in-kind contributions from farmers, foresters, councils, Landcare Research and the TAG Committee.
(Appendix D).

EXPLANATIONS REGARDING THIS REPORT

Estimate of area occupied by tutsan:

- Because the area of land occupied at various densities by tutsan in NZ is unknown and not able to be accurately quantified, this assessment cannot be precise. However, it is expected that the assessment of areas is conservative.
- An analysis of data provided from seven tutsan-affected farms in the Ruapehu district known to members of the TAG Committee, indicated that:
 - 889ha (40%) of the total farmable area of the seven farms was affected by tutsan.
 - 11% of the total farmable area was affected by heavy (80-100%) and 7% medium (20-80%) tutsan infestations.
 - The proportion of the farmable area significantly affected by tutsan on these farms, ranges from 12% to 100% with an average of 51% (Appendix A).
- Data received from Horizons RC and the Ruapehu DC indicate there are approximately 910 farm properties (not including forestry, lifestyle blocks or market gardens) in the Ruapehu district occupying a total area of 361,722 hectares – an average of 398 ha.
- The estimate of the economic cost of tutsan which follows, assumes that 2% of the 361,722 ha (ie 7,200 ha) is affected by tutsan in the Ruapehu district alone.

Rate of spread of tutsan in NZ:

- Ruapehu farmers, Horizons RC, Waikato RC, and a number of other Councils and DOC conservancies, report acceleration in the rate of spread of tutsan in recent years.
(Appendix C).

Tutsan control costs used:

- Actual and estimated costs have been provided by farmers, Regional and District Councils, DOC and forestry management companies.
(Appendices B & C).

Local Government and private organisations approached throughout NZ:

- The organisations from which a response was received regarding their concern about tutsan and their annual expenditure on tutsan control included:
 - Thirteen Regional and District Councils.
 - Seven DOC conservancies.
 - Four forest management companies.
 - KiwiRail.
 - NZ Biosecurity Institute.

A number of organisations, particularly Councils and forestry managers, include tutsan control costs in general weed control costs and are unable to identify specific tutsan control costs.

(Appendix C)

Lack of knowledge and awareness of tutsan:

- While researching, it became increasingly obvious that there is in general a very low level of knowledge about tutsan, its threat to farming, forestry and tourism and the opportunities to contain or control it.

A. ESTIMATE OF THE ECONOMIC COST OF TUTSAN TO NZ AT JUNE 2013:

1. Direct costs per annum (control, education and administration):

Sector	Est area affected by tutsan (ha)	Annual Operational Costs 2012			
		Containment & control \$/ha	Education & Admin	Total per annum	Total
a. Farming					
i) Area:					
Ruapehu District (2% of total farm area)	7,200				
- Waikato (WRC est)	500				
- Other NZ (est)	<u>5,000</u>				
Total NZ	12,700				
ii) Expenditure:					
- Initial spray (say 10% of above)	1,270	480		609,600	
- Spot spray (pasture, farm conservation lands, road sides say 40% of above)	5,080	75		<u>381,000</u>	
- No treatment – remaining 50%	<u>6,350</u>	-			
	12,700				990,600
b. Councils:					
Horizons (actual)				42,000	
Waikato RC "		4,000	15,000	19,000	
Ruapehu DC "				13,000	
Auckland RC "		10,000	10,000	<u>20,000</u>	
				94,000	
Other (est)				<u>25,000</u>	119,000
c. DoC:					
Whanganui (actual)				7,000	
Other (est)				<u>5,000</u>	12,000
d. Forestry: (est)				5,000	5,000
e. KiwiRail:		1km @ \$3,000			3,000
Total direct costs per annum (control, education and administration)					1,129,600

2. Indirect costs per annum (lost production):

Sector	Cost Detail	Per Annum	Total
a. Farming:			
- Lost production & profit: (3 su/ha fewer able to be carried on the affected farmable area)	*12,700ha x 3su/ha = 38,100su x \$30/su average profit foregone	1,143,000	1,143,000
b. Forestry:			?
c. Conservation / tourism:			?
Total indirect costs per annum (lost production)			1,143,000

3. Long term capital costs:

Sector	Cost Detail	Long Term	Total
a. Farming	Reduction in land value: i. Reduced value due to reduced su: 38,100su x average land value \$450/su ii. Reduced value on balance of farmed land on farms affected by tutsan **29,600ha x 10su/ha = 296,000su x \$50/su reduction	17,145,000 14,800,000	31,945,000
b. Forestry			?
c. Conservation / tourism			?
Total long term capital costs			31,945,000

Note: Of the farms affected by tutsan, the following assumptions are made:

*12,700 ha affected by tutsan is 30% of the total farmable area.

** 29,600 ha not affected by tutsan is 70% of the total farmable area.

42,300 ha is the total farmable area.

(With reference to Appendix A)

4. Summary of costs at June 2013:

a) Per annum:

- Total Direct control, education and administration costs	1,129,600
- Indirect production costs	1,143,000
Total direct and indirect costs per annum	<u>2,272,600</u>

b) Long term capital costs:

31,945,000

B. POTENTIAL FUTURE COSTS:

- These cannot be calculated with accuracy but could be many times the above June 2013 estimated costs. The extent of future costs would largely depend upon:
 - The rate of tutsan infestation of farm land, forestry, conservation lands, roadsides, railways, rivers and riparian strips.
 - Increasing awareness of the threat to farmland, forestry, tourism and local Government.
 - The introduction of tutsan into more local authorities' Regional Pest Management Strategies and enforcement of compliance requirements.
 - Increasing local Government education and advisory costs.
 - Reducing rural land values.
 - Reducing rural rates due to reducing rural land values.
- The cost to the forestry industry may be particularly substantial if local authorities begin enforcing existing or new tutsan control requirements. These could include border control (an existing Horizons RC requirement), total control (a proposed Waikato RC requirement) and cleaning of logs and machinery before moving from a tutsan infested forest. (Note: The Waitomo DC currently requires roadside mowing contractors to clean their machinery before moving from tutsan infested areas). Forestry land values may also be affected.

The three substantial central North Island forestry management companies contacted manage tens of thousands of hectares of CNI forest. All are aware of the presence of tutsan in CNI forests but not aware of the existing and proposed tutsan control requirements in the Horizons and Waikato RC RPMSs.

C. COST AND BENEFIT OF SUCCESSFUL BIO-CONTROL OF TUTSAN:

- The actual and (provisionally) proposed cost of the two TAG initiated projects which would successfully introduce a tutsan bio-control agent into NZ is \$1,175,333.
(Appendix D).
- This is 52% of the estimated \$2,272,600 current annual direct and indirect costs of tutsan. ie a payback period of 6 months.
- This is 3.7% of the estimated \$31,945,000 long term capital cost to farming alone.
(Appendix D)

D. CONCLUSION:

- The annual cost of tutsan to NZ at June 2013 is substantial.
- The future costs of tutsan to NZ could be very much greater.
- The benefit of successfully securing and releasing a bio-control agent for tutsan in NZ will far outweigh its cost.

References:

1. Landcare Research Ltd: "Survey of invertebrate and pathogenic fauna of tutsan (*Hypericum androsaemum*) and DNA analysis of New Zealand plant populations" by Elizabeth Rendell and Hugh Gourlay – July 2012

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Appendix A

THE ECONOMIC COST OF TUTSAN IN NEW ZEALAND

Proportion of land affected by tutsan on 7 Ruapehu farms @ July 2013

Location	Total farmable area ha	Area affected by tutsan (ha)					Total	Proportion of farm affected
		Heavy 80-100%	Medium 20-80%	Light 5-20%	Scattered 1-5%			
1. Ongarue	190	15	-	100	75	190	100%	
2. Ongarue	244	144	60	-	40	244	100%	
3. Otunui	300	20	20	20	40	100	33%	
4. Te Maire	240	60	20	20	-	100	42%	
5. Kaitieke	381	-	20	100	-	120	31%	
6. Otunui	750	-	20	50	20	90	12%	
7. Kaitieke	120	15	15	-	15	45	38%	
All farms total ha	2225	254	155	290	190	889	average 51%	
Proportion	100%	11%	7%	13%	9%	40%		

APPENDIX B

THE ECONOMIC COST OF TUTSAN TO NEW ZEALAND

Tutsan control costs 2012/2013

Entity	Location	Costs detailed		Actual or estimated
1. Waikato Regional Council	Waikato	Cost benefit analysis from the proposed Waikato Regional Pest Management Plan 2013-2023	\$800/ha	Estimated
2. Farmer	Taumarunui	a) Initial spray: - helicopter (400 litre/ha) - 7 litre Brushkiller/ha - 2 litre penetrant/ha	\$250 \$161 <u>\$40</u> \$451/ha	Actual
		b) Repeat spray every 3 yrs - labour \$30/hr est	\$75-150/ha	Actual/estimated
		c) Scattered, emerging plants est	\$20-30/ha	Actual/estimated
3. Corporate farmer	Taumarunui	Annual helicopter spray - initial and follow up	\$350/ha	Actual
4. KiwiRail	Head office	\$3,000/km		Actual/estimated
5. DOC	Whanganui	Spot spraying (difficult terrain)	\$80-200/ha	Actual/estimated

APPENDIX C

THE ECONOMIC COST OF TUTSAN TO NEW ZEALAND

Responses from organisations contacted regarding the costs of tutsan control –

June-August 2013:

Councils:

1. **Horizons RC:** Spent \$42,000 in 2012. Heavily involved in TAG projects with significant in kind and cash contribution. Experienced in tutsan habits and control.
2. **Waikato RC:** Spent \$19,000 in 2012. Currently spending 9 days/year on control. Tutsan will become a 'total control plant' in the new RPMS due late 2013. They estimate tutsan currently occupies 500ha with estimated control costs for the 500ha \$400,000pa for 10 years plus \$15,000pa monitoring, enforcement and education = total \$4,150,000. A potential habitat range of 360,000ha including 260,000 of pastoral land.
3. **Taranaki DC (via DOC):** Becoming more prevalent.
4. **Tasman RC:** Not in their RPMS. Considered the responsibility of the landowner.
5. **Environment Canterbury:** Nil spent. 'Not a pest in Canterbury though it is present in Christchurch'.
6. **Bay of Plenty RC:** Nil spent. Just 'a bit of advice'.
7. **Northland RC:** Nil spent.
8. **Auckland RC:** spent \$20,000 pa. Is low incidence but a medium threat species in the Auckland region.
9. **Ruapehu DC:** Spent \$13,000 in 2012. Significant financial support to TAG projects.
10. **Hawkes Bay RC:** Nil spent.
11. **Greater Wellington RC:** Nil spent. Not aware of the heavy infestations on the hills around Wellington in the 1950's as reported to TAG by a MAF advisory iofficer of that era.
12. **Otago RC:** Nil spent. Isolated infestations in and around Dunedin only. Not aware of the heavy infestations in the hills around the Taiere Plains in the 1950's as reported to TAG by a MAF advisory officer of that era.

13. **Environment Southland:** Nil spent. Is a 'risk assessment plant' on the mainland in their RPMS. Is an 'eradication plant' on Stewart Island where all control is carried out by DOC.

14. **Southland DC:** Nil spent. Handled by the Regional Council.

DoC Conservancies:

1. **Whanganui:** significant involvement in TAG projects with in kind and cash contributions. Concerned at the increasing spread and cost to control tutsan spreading along the Whanganui River valley, especially since 2005.
2. **Hokitika:** Nil spending on tutsan at present but 'not to say that we should not be'.
3. **Waikato area:** Isolated patches.
4. **Northland area:** Isolated patches.
5. **Kauri Coast area:** Isolated patches.
6. **Coromandel:** More serious infestations.
7. **Stewart Island/Rakiura:** No budget at present. Pulling plants out by hand. Marking tutsan populations with GPS co-ordinates. Keeping an eye on it.

Forestry organisations:

1. **NZ Forest Managers Turangi:** Tutsan control expenditure included with that of other weeds sprayed. Tutsan in recent cut over forest in Taneatua and is controlled along roadsides and forest margins in other forests. Requested to go on TAG emailing database.
2. **Greenplan Forestry Management Te Kuiti:** (member of TAG). Nil spent at this stage. Tutsan present in at least four of their forests. Not aware of Horizons and Waikato RC control provisions/proposals.
3. **Hancock Forest Management Tokoroa:** Nil spent. Aware of tutsan but not concerned at this stage. Not aware of Horizons and Waikato RC control provisions/proposals. Requested to go on TAG emailing database.
4. **PF Olsen Ltd:** Spraying tutsan with other weeds (Ohope). Possibly \$1000-2000p/a. Will be more of a problem (and cost) in future if not controlled. Requested to go on TAG emailing database.

KiwiRail (HO):

Not a big problem at the moment but would cost \$3,000/km to spray and would spray annually.

NZ Biosecurity Institute (via DOC):

“7 regions recognise tutsan as a problem. In recent times tutsan appears to have begun to spread even more rapidly into pasture land, production forestry and conservation areas...”