Possums & Pines

Bruce Warburton
Landcare Research, Lincoln
Relevant Research

Theses

M. Clout. 1977: Ecology of the possum in \textit{P. radiata} plantations (Kinleith)  PhD.

A. Keber, 1988: An enquiry into the economic significance of possum damage in an exotic forest (Tauhara) PhD.

B. Warburton. 1977: Ecology of the brushtail possum in an exotic forest (Ashley) MSc.

Papers:

Warburton, B. 1978: Foods of the Australian brush-tailed possum in an exotic forest (pine pollen cones major component of diet in late winter)
Relevant Research

Reports:

Griffiths, A. 1985: Economics of wild animal control/management in production forests.
Coleman, M. Coleman, J.D. 2003: Fate of possums following clear-felling of exotic forest. Landcare Research contract report for AHB.
Various forest health reports.
Predicting damage

Clout: Damage primarily in young stands in winter and spring – response to poor nutrition.

Keber: Damage associated with slash disposal.

Damage includes:

- Crown barking
- Basal barking
- Broken leaders
- Broken laterals

Damage is patchy both in space and over time – therefore difficult to predict.

Forest Health reports – current problem ????
Predicting damage
What is needed?

<table>
<thead>
<tr>
<th>Actual</th>
<th>Need for control</th>
<th>No need for control</th>
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<tbody>
<tr>
<td>Need for control</td>
<td></td>
<td></td>
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<tr>
<td>No need for control</td>
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Survey

<table>
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<th>Actual</th>
<th>Need for control</th>
<th>No need for control</th>
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### Predicting damage

#### Actual

<table>
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<tr>
<th>Survey or knowledge</th>
<th>Need for control</th>
<th>No need for control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need for control</td>
<td>Carry out control when necessary</td>
<td>Carry out control when not necessary</td>
</tr>
<tr>
<td>No need for control</td>
<td>Do not carry out control when necessary</td>
<td>Do not carry out control when not necessary</td>
</tr>
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</table>
Relationship between Pest Density and Impact

Linear relationship: Less pests means less impact
Relationship between Pest Density and Impact

Thresholds (e.g. Bovine Tb, fuchsia, kereru)

Control $$ wasted
Relationship between Pest Density and Impact

Pest density vs Percentage impact graph with specific annotation 'Control $\$$ wasted' and 'kamahi canopy'.
Possum control options

Aerial

• 1080 AHB–funded control related to bovine Tb
• $50mill spent on Tb-related possum control (includes production forests).
• AHB funded control will decline as approach Tb freedom in 2013

Ground

• Large pool of contractors available
• Feratox (cyanide) products
• Cholecalciferol products
• Anticoagulants
• Traps (leghold and kill)
• Best-practice information at: http://possumdss.landcarereresearch.co.nz
Highly hazardous chemicals

- Sodium cyanide (not potassium cyanide used in Feratox)
- Brodifacoum (can be used for human health reasons)
- Warfarin (can be used to control some exotic animals)

Temporary exemptions:
- 1080 for control of exotic pest in NZ and Australia

Need to find non-toxic alternatives???
• Possum as vectors of fungal diseases ?????

• Alternative management actions might provide greater benefit-to-cost ratios than possum control (e.g. Slash management, herbicides, fertiliser use) ?????

• Stocking rates are much lower now than the 1970 & 80s – less ability to thin out damaged stock.

• Questions?????
Economics
Cost-benefits of possum control

Griffiths 1985

Damage detected

Damage considerable?

No → Review in subsequent years

Yes → Confirm with survey and data analysis

Minimal past damage

Minimal present damage

STOP

Summarise past and present damage
Economics

Expected benefit from reducing damage (B)

Cost of possum control (C)

B > C?

No

STOP

Yes

Undertake control

Assumptions:
- Damage is proportional to density of possums
- Damage is homogenous
- Next years damage comparable to past years