Semi-arid Rangelands: Managing Grazing Pressure

Produced for the CRC for Premium Quality Wool undergraduate program by; Dr. Brad Crook, The University of New England.
Rangelands: the grazing process

1. species selection

- ephemerals
- more palatable perennials
- reserve species (lower palatability)
- species that are rarely / never eaten

- differential periods of rest from grazing:
  - favours low palatability species
  - discourages high palatability species

Rangelands: the grazing process
2. spatial distribution of grazing pressure

• non-uniform grazing pressure:
  – high pressure: areas with palatable species and low tree / shrub density
  – low pressure: areas with species of low palatability species and mod. / high tree and shrub densities

• location of water supply:
  – declining pressure with increased distance from water, but relatively uniform within 3 km of water
  – high dependency on water in saltbush communities
## Impact of Grazing on Community Composition and Productivity

<table>
<thead>
<tr>
<th>Community</th>
<th>Nature of change</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saltbush (<em>A. vesicaria</em>) shrubland, NSW</td>
<td><em>A. vesicaria</em> replaced by <em>Sclerolaena spp</em> or grasses</td>
<td>No change in animal production, increased susceptibility to erosion</td>
</tr>
<tr>
<td>Mitchell (<em>Astrebla</em>) grassland, Qld.</td>
<td>Reduction in <em>Aristida spp</em>, increase in ephemerals</td>
<td>Increased animal production, less seed in wool.</td>
</tr>
<tr>
<td>Hummock (<em>Triodia pungens</em>) grasslands, WA</td>
<td><em>Eragrostis spp</em> and <em>Eriachne spp</em> lost and replaced by <em>T. pungens</em></td>
<td>Carrying capacity halved</td>
</tr>
<tr>
<td>Mulga (<em>Acacia aneura</em>) woodland, WA</td>
<td>Increased component of <em>Aristida spp</em></td>
<td>Reduced animal production</td>
</tr>
<tr>
<td>Poplar Box (<em>Eucalyptus populnea</em>) woodland</td>
<td>Replacement of perennial grasses by shrubs</td>
<td>Reduced animal production, increased susceptibility to erosion, reduced soil moisture status</td>
</tr>
</tbody>
</table>

Total Grazing Pressure

- Grazing pressure exerted on rangeland pastures is derived from:
  - livestock: sheep and cattle
  - feral animals: rabbits and goats
  - native mammalian herbivores: kangaroos

- Diet selectivity relative to sheep:
  - cattle: less selective, eating more of dominant species (grass or saltbush) and less of smaller grasses, medics and forbs
  - goats: more browse (≥ 2m) so more of palatable trees and shrubs BUT obtain most of forage needs from same herbage species as sheep and similar selectivity
  - kangaroos: more grass and less browse and forbs
  - rabbits: green feed & certain woody shrub / tree seedlings
The influence of kangaroos on sheep productivity in the semi-arid woodlands of western NSW

- Mulga woodland, 170 km n/west of Cobar:
  - free of inedible shrub
  - containing a wide variety of perennial grasses

- Merino wether hoggets:
  - 20-25 kg, 6 mths age
  - new group each year for three years

- Kangaroos:
  - mainly western greys + few reds

- Stocking rates:
  - sheep only: 0.3 to 0.8 sheep per hectare
  - equal no.s of sheep & kangaroos: 0.2 to 0.53 sheep per ha
Clean fleece weight, weight gain and sheep stocking rate, with (■) and without (●) 15 kg / ha kangaroo.

Adapted from: Wilson (1991)
Conclusions

- kangaroos competed directly with sheep, with both animal species consuming the same forage species

- relative effect of kangaroo grazing:
  - on forage removal:
    - 1 kangaroo = 0.75 sheep, of equal weight
  - on sheep production
    - 1 kangaroo = 0.6 sheep, of equal weight

- effects of kangaroo grazing diminished when feed was abundant

- sheep productivity in drier times would be increased by controlling kangaroo numbers
The characteristics of some major woody plants in the semi-arid woodlands

<table>
<thead>
<tr>
<th>Species</th>
<th>Forage value</th>
<th>Response to normal grazing pressure</th>
<th>Response to immed. effect of fire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrow-leaf hopbush (Dodonaea attenuata)</td>
<td>V. low</td>
<td>Increase</td>
<td>Decrease</td>
</tr>
<tr>
<td>Green turkey-bush (Eremophila gilesii)</td>
<td>Nil</td>
<td>Increase</td>
<td>Decrease</td>
</tr>
<tr>
<td>Budda (Eremophila mitchellii)</td>
<td>Nil</td>
<td>Increase</td>
<td>Sl. decrease</td>
</tr>
<tr>
<td>Turpentine (Eremophila sturtii)</td>
<td>Nil</td>
<td>Increase</td>
<td>Sl. decrease</td>
</tr>
<tr>
<td>Poplar Box (Eucalyptus populnea)</td>
<td>Nil</td>
<td>Stable</td>
<td>Stable</td>
</tr>
</tbody>
</table>

Source: Harrington et al. (1984)
• a successful burn requires at least 80 g/m² of grass mass as fuel:
  – grazing pressure influences ability to achieve adequate fuel supply
  – rainfall pattern needed for this amount may occur only 1 in 20 years
  – lack of management experience and confidence in use of prescribed fire
Five principles of grazing management of rangelands

- “conservative” stocking
- an appropriate distribution of grazing pressure
- strategically timed spelling
- early destocking in dry times
- management of total grazing pressure