Canine rabies in Australia: Modelling spread through the landscape

Introduction
Canine rabies, a fatal viral zoonosis, is now less than 300 kilometres from Australia’s mainland. It continues to spread eastwards through the Indonesian archipelago.

To respond to this imminent threat, we need to model how rabies will spread through Australian ecosystems, to develop effective rabies management plans. This will improve our chances of minimising reaction times and containing outbreaks.

Aims
To quantify contact rates, abundance, population turnover and dog bite frequency, in order to inform models of canine rabies spread. This is essential for identifying critical control points.

Methods & results
Movement data

Figure 1 - GPS tracking data for male (n = 3) and female (n = 3) wild dogs

Contact rates

Wild dogs
Estimated using camera trap data
Range: 0.08 to 0.36 contacts per camera trap night

Community dogs
Estimated using GPS tracking data (n=20) in an indigenous island community, Tiwi Islands, NT
5.24 contacts per collared dog per day

Recreational hunter survey (n =440)
• 54% usually hunt once a week
• 51% have encountered wild dogs while hunting
• 92% of hunting dogs have never fought
• Hunters have lost 23% of dogs
  • Most recovered after short periods of time

Figure 3 – Wild dogs with young at Bundjalung NP (left) and Yuraygir NP (right)

Estimating wild dog abundance
Individuals identified using camera trap data (2,327 camera trap nights)
Varies: 7 to 26 individual dogs per site (n = 8)

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Figure 4 – Pairs of wild dogs, Sherwood Nature Reserve

Figure 5 – Usual distance travelled by recreational hunters to hunt with their dogs

Survey of domestic dog ownership and behaviour (n=180)
• 64% own a dog
• 68% registered
• 87% microchipped
• 32% of respondents had been bitten by a dog
  • 14% reported the bite

Figure 6 – Hunting dogs, Bundjalung NP

Figure 7 – Free roaming domestic dogs

Conclusion
Data presented here is the first step in quantifying important rabies transmission pathways. The next step will be to incorporate this information into rabies models to predict its spread through the Australian landscape.

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