



Ecoacoustics for feral pigs (*Sus scrofa*) monitoring increases detection probability and improves surveillance

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ABSTRACT

Invasive species are a major threat to biodiversity worldwide, with significant impacts in protected areas and agriculture. While eradication and containment prevent new incursions, monitoring invasive established species and their impacts is important to design and implement control measures. Feral pigs (*Sus scrofa*) are the third greatest threat to native fauna in Australia, and monitoring is context dependent being often constrained by costs and scalability limitations. In this study the use of acoustic monitoring for feral pig monitoring was tested and compared to unbaited camera traps. The acoustic data was scanned with a custom-build deep-learning recogniser leveraging from BirdNET and image data was manually scanned. The results were used in a multi-season occupancy model to determine detection probability of each method and the influence of the environment in detections. Later detections from both methods were combined to investigate occupancy in relation to environmental variables. The results show little spatio-temporal overlap between image and sound detections, highlighting the complementarity of methods. Results of the occupancy model indicate that images and sound detections alone have different detection probability, influenced by different environmental factors. Combining monitoring methods can provide complementary information on the same species: while acoustics can have a larger detection radius, camera trap can provide individual identification. The use of new technologies for conservation should be leveraged, but there are still improvements to be made in accessibility. Passive sensing tools and technological advances in analysis algorithms can help to increase monitoring coverage and assist in data driven land management for conservation.