

Episode 30: Love Life of the Mountain Brushtail Possum

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VOICEOVER

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ERIC VAN BEMMEL

Hello, Eric van Bemmell here from the Up Close podcast production team. As we enter the summer holidays here in the southern hemisphere, Melbourne University Up Close presents a special summer season of science. A mini-season of three specially produced fortnightly episodes, each featuring a young scientist in brief conversation on their specialised area of research. In this episode, the second of our summer season, we join Up Close science host, Dr Shane Huntington, as he speaks with behavioural ecologist, Dr Jenny Martin of the Department of Zoology here at Melbourne University, Australia. Dr Martin!s research looks at how ecological change impacts on the mating behaviour of Australian brushtail possums.

JENNY MARTIN

So, my research is all about trying to understand how a particular species that we have chosen !V because it can essentially act as a model species !V it is a type of possum, so we are talking about a two and half to four kilogram animal, picture a very robust domestic cat that kind of size, it is a marsupial so females have pouches, they live in trees, they sleep in hollows that form in old trees. And, what I am interested in is how these animals have been influenced by things like clearing of habitat for farming, chopping down trees, selective logging, those sort of things. Because as soon as humans go in and change the environment in a way that suits us, of course, we are having an influence on the animals that share that environment with us.

SHANE HUNTINGTON

Right. And you have chosen the mountain brushtail possum, I believe.

JENNY MARTIN

That is correct.

SHANE HUNTINGTON

Specifically, this possum is special because!

JENNY MARTIN

Well, I could wax lyrical about what a wonderful animal it is, but essentially we chose it because, initially very little was known about it, which is always a good angle in to get funding. Here we have this lovely animal that is easy to catch, easy to study, very little is known about it, but also because it does occur in habitats that are quite fragmented. So, it occurs in a strip in eastern Australia, from somewhere down the bottom near Melbourne in a strip up the Great Dividing Range, so our main mountain range in this part of Australia and a lot of those areas are prime farming areas. So a lot of area has been cleared for farming. A lot of influence on the environment. And we saw this species as a great opportunity to try and look at, !Dwell, what does this animal do in different types of habitat and is it influenced by things like clearing and other influences on the habitat?!

SHANE HUNTINGTON

Now, where else do we find this particular possum, just in Australia?

JENNY MARTIN

Yes, only in Australia. It has a very close relative which certainly our Australian listeners may know and also our New Zealand listeners, which is the common brushtail possum !V the bane of many suburban gardeners. So, this is a close relative, but it is a different species. And the species I am interested in !V the mountain brushtail possum !V which is also known as a bobuck, it only occurs in !Dless disturbed habitat!, I guess you would say. So, we don't find it in any cities. And, as I said, if you don't know very much about a species, but it is easy to work on !V these guys love peanut butter !V so they are very easy to get into traps. Once you have an animal in the hand you can do things like measure it, take DNA samples from it, work out how old it is, put a radio collar on it, all the sorts of tools that we use to collect information about our animals.

SHANE HUNTINGTON

Now, we are talking about environmental effects on the behaviours, so, in this particular animal, what sort of behavioural changes have you been looking for, and what sort of behavioural changes have you found?

JENNY MARTIN

We were really interested in their social and their mating behaviour. So we wanted to understand which individuals were interacting with other individuals, what sort of an area, each individual used, which we call a !Dhome range|. Your home range would include your home, your work place, everywhere you travel in between. So the whole area you use. We wanted to look at how big those home ranges were in different types of habitat, so, how much area do you have to cover to get what you

need and also, how many other individuals do you interact with in that home range.

SHANE HUNTINGTON

So, in terms of need, do you mean food, where they sleep, other animals that they would breed with?

JENNY MARTIN

Exactly. Mates, food and shelter. You've knocked it on the head, exactly.

SHANE HUNTINGTON

And when we affect their environment, how do these things change?

JENNY MARTIN

Well, the initial study that was completed a couple of years ago was based on just two populations. One was living in a nice patch of intact forest, but which had been selectively logged. So, some of the big old trees had been taken out, which therefore meant there weren't very many hollows for these animals to sleep in which is what they do during the day. They're nocturnal animals. And then, just a kilometer away, there were nice strips of habitat, nice strips of forest, beside the roads. Because, of course, when we make roads we tend to leave nice patches of trees on either side because it looks pretty. And this particular habitat is a totally different shape, very thin, very narrow patch of forest, but it had never been logged or as far as we know, for at least a hundred years, so, lots and lots of big, old trees. The other thing that was different about the two sites was this particular animal feeds almost exclusively on one type of tree, which is called a silver wattle tree, lovely yellow flowers, some people may know. And this particular tree grows very well in disturbed areas. So it grew in different places depending on those two types of habitat. And to cut a long story short, what we found was that at one site, the population was essentially monogamous. So you had pairs of animals that occupied exactly the same home range. Mostly they mated with each other, there was a bit of sneaky stuff going on, on the side, now and then, which we could tell by our genetic work. But essentially these pairs that lasted through time, so, six, seven, eight, ten years. These pairs that actually stayed together which, without giving you a big rant about theory, is very rare among mammals. It doesn't happen very often. But picture, just a kilometer or a kilometer and a half away, along the roadsides where resources were much more abundant, had never been logged, we found that the animals were doing something quite different in comparison to that forest population. Females had very small home ranges and one male could easily cover the area of multiple females. And that population, we call polygynous. Which is just the technical term for one male mating with multiple females.

SHANE HUNTINGTON

So, the males effectively had what you would call a large sexual footprint.

JENNY MARTIN

Yeah, so, quite different situations going on very close to one another. And we counted all the trees, we mapped all the vegetation, we spent multiple years

following them around. And we pretty much worked out that in this case it seemed it had come down to, !QDhow far does a female have to travel to get access to both shelter and food, and if you live in a place where those resources are abundant and close together, female doesn't travel far, male has got it easy. And if a female does have to travel along way because those resources have been disturbed, then a male we presume is much better off just sticking with one female and at least being assured of fathering her young, because these animals have only one young each year. It is not as if you can have multiple litters each year.

SHANE HUNTINGTON

And with the population dynamics of the two groups, was one population increasing relative to the other, or were they more or less the same and they had just adapted to the two different environments?

JENNY MARTIN

Hard to answer. I think things were just rolling along nicely in both places, but !V of course, Australia is having a very serious drought, for the last however many years as many people would know, and we have noticed some quite big changes to our long term study populations over that time and it is almost impossible to know whether to attribute that to drought, or whether to attribute that to something else that might be going on, and since that original study with those two populations, we've started studying an additional four populations to try and get a better handle on some of those differences that might be resulting in these different behaviours that we are seeing. And, it seems like there are other issues as well. One of the main issues seems to be for a male, how many other male competitors do you have living around you. Because if you live in a nice patch of forest, where there are other males on all sides, who are going to be ready to jump in and compete with you for access your female when she is fertile, then maybe you are better off sticking with her irrespective of whether she travels over a large or a small distance. Whereas if you live along these very thin, linear strips that humans have created and you really only have one male competitor at either end of your home range, you've probably got it a lot easier. Because you don't have males coming in from all sides and trying to work out what is going on. So I think the trees is part of the story, but it is certainly a more complex story than we originally thought.

SHANE HUNTINGTON

These possums obviously are nocturnal, how do you go about, going out there and tagging them and monitoring them !V is this literally you up there in a tree in the middle of the night? How do you do that?

JENNY MARTIN

You get used to having very little sleep, would be my first point. We basically set our traps at dusk, with nice apple and peanut butter and we can leave them. We come back before dawn, because we don't want our animals sitting out in light and then we do !V what we call our processing, which sounds like we are making sausages !V but, all the things we do, the weighing, the measuring, the tissue sampling, the radio collaring, that sort of stuff, we can do during the daytime, because we do sedate the

animals just for a brief amount of time to be able to do that. In terms of actually collecting data and what they're doing and how they're behaving, you just have to forfeit sleep. You are radio tracking both during the day and the night, because during the day you are interested in which trees are they sleeping in, and who are they sharing hollows with. So you go out there and find all your animals each day and record exactly where they are and what they are doing. And then at night, it is a matter of finding them all again and seeing where they are and who they are with. Certainly a very time consuming and labour intensive type of work, but very rewarding too.

SHANE HUNTINGTON

Dr Jenny Martin, thank you very much for being part of our summer edition of Up Close.

JENNY MARTIN

Thank you very much, Shane.

ERIC VAN BEMMEL

That was Up Close science host, Dr Shane Huntington talking with behavioural ecologist, Dr Jenny Martin. Melbourne University Up Close is brought to you by the Marketing and Communications Division in association with Asia Institute of the University of Melbourne, Australia. Relevant links, a full transcript, and more information on this episode can be found on our website at upclose.unimelb.edu.au. We also invite you to leave your comments or feedback on this or any episode of Up Close. Simply click on the "Add new comment" link at the bottom of the episode page. This program was produced by Kelvin Param and myself, Eric van Bommel, audio recording is by Craig McArthur and the theme music is performed by Sergio Ercole. Melbourne University Up Close is created by Eric van Bommel and Kelvin Param. Until next time, thanks for joining us. Goodbye.

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