

## When the going gets tough: Sleepy lizards' personality affect the way they use space

Animal movement affects various ecological processes such as disease spread, nutrient recycling and biological invasion. Hence, understanding how animals use space (and why) is important for both basic ecological science and for applied aspects such as effective conservation, coping with invasive species and disease control. A large open question in this field is the role of variation among individuals in many of these questions. Especially, while we know that some individuals may act as super-spreaders that disproportionately contribute to disease spread, we still don't know to predict well who will be these super-spreader.



Fig. 1. A threat display of a sleepy lizard (*Tiliqua rugosa*). Its GPS pack can be seen on the background

Scholars of animal behavior have long recognized that individuals from various taxonomic groups show remarkable and consistent variation in their behaviors across many context. For instance, some individuals tend to be bolder than others, and some tend to be consistently more aggressive. Such differences are often referred to as animal personalities or behavioral types (BTs) and are known to affect ecology and evolution. In great tits for example, more exploratory individuals (the tendency of the bird to move around the aviary) are known to disperse for longer distances. Yet, we still have very limited knowledge on how BTs differ in their space use in other contexts. Further, although BT-dependent space use is plausible, empirical examples of this phenomena are rare (in particular in cases in which the BT is estimated independently of movement) and its dynamics haven't been explored.

We studied these questions in a population of sleepy lizards (*Tiliqua rugosa*) at Southern Australia.

Since these lizards are the main host for two ticks species this system represents a model system for host-parasite interactions and allows exploring how host behavior (the lizard) affects parasite transmission. We combined data on lizards' movement from GPS tracking and on their BT (from independent, repeated bioassays) with detailed information on their habitat (from a ground survey).

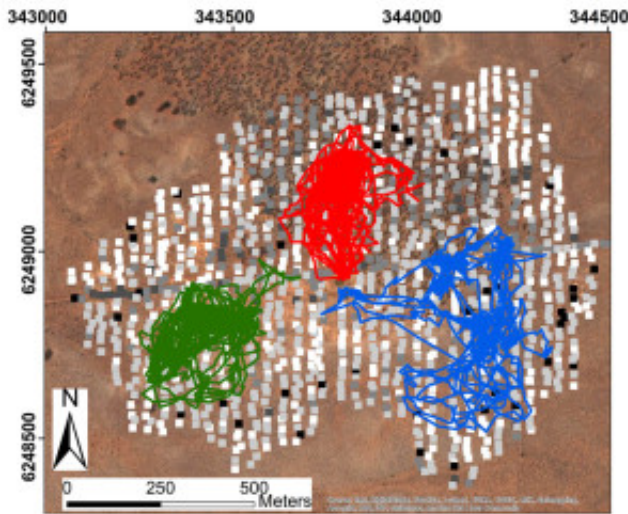


Fig. 2. An aerial photo of the study site with locations of ground survey quadrats in grey-scale colors reflecting their refuge rank (black being the highest) and three examples of lizard tracks.

We found that lizards used locations with favorable ecological resources (e.g. refuge and food) more intensively than other locations, and that these resources were more important later in the season, when dry summer conditions reduced food availability and forced lizards to avoid thermal stress. More interestingly, we found that lizard's BT affected their space use through interactions with the response to these ecological resources. Less aggressive individuals responded more strongly to variation in local resources, con-specific activity, and seasonal conditions. Aggressive lizards, in contrast, were overall less responsive, and used the periphery of their home range more intensively.

These results can help us understand individual variation in space use, and how these differences affect ecological processes like social interactions, disease spread and the emergent of super-spreaders. Insights into the reasons for this variation can also help managers to improve reintroduction programs by adjusting the release time & location of individuals according to their expected space use. The next step for this line of study is to see if we can trace the effects of BT-dependent space use on parasite transmission data, and if the dynamics we found generalize to other study systems.

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## **Publication**

[When the going gets tough: behavioural type-dependent space use in the sleepy lizard changes as the season dries.](#)

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