Does colour patch size influence the home range size of *Sceloporus jarrovii* lizards?

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1) Introduction

- Many studies have been conducted on possible factors that influence the home range (HR) size of lizards. For example, research demonstrates relations between HR and aggressiveness [1], resource availability, and the risk of predation [4].
- However, little is known about the possible effects of colour patch size, which is a common indicator of social dominance in many lizards [5].
- **Therefore, the object of this study is to determine whether the size of the coloured ventral and throat patches of *S. jarrovii* lizards influences the HR size of individuals.**
- Male and female *S. jarrovii* lizards present quantitative dimorphism in patch colouring – female ventral patches tend to be much lighter and have less black pigmentation altogether than their male counterparts [2]. Also, HR size tends to be larger for males than for females, possibility because of differences in dietary needs related to relative size or differing interests [4]. For these reasons, this study considers the sexes separately.

2) Methodology

- The photos of 88 individuals (45 males and 43 females) were analysed using the software program ImageJ. In general, the total coloured area and the total blue area of one region (left ventral, right ventral or throat) were measured, then the total black area obtained by subtraction.
- The home ranges were determined through minimum convex polygon analysis in QGIS of the lizards with 3 or more sightings. This data was made available through Lucy Patterson's thesis [3,6].
- The data was submitted to covariance analysis. Home range size was compared to the total coloured area (TCA) of the lizards, taking into account the difference between sexes.

3) Results

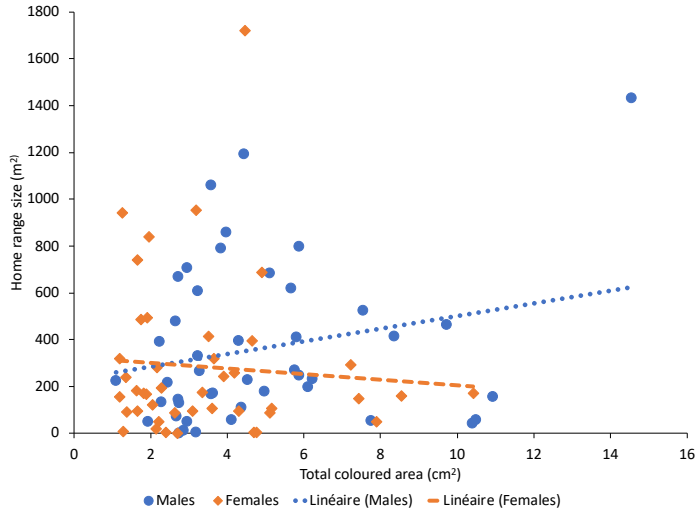

Figure 1: The variation between the total coloured area (cm^2) and the home range size (m^2) of male and female *Sceloporus jarrovii* lizards. The males are represented by blue circles with a blue dotted trendline ($r^2 = 0.0517$) and had a sample size of 45 individuals. The females are represented by orange diamonds with an orange dashed trendline ($r^2 = 0.0061$) and had a sample size of 43 individuals.

- The results of the analysis demonstrated **no significant effect of TCA** on HR size ($F_{1,84} = 0.26$; $p = 0.61$) **and no significant effect of sex** on HR size ($F_{1,84} = 0.85$; $p = 0.36$). **No significant interaction between TCA and sex** was found ($F_{1,84} = 1.73$; $p = 0.19$).

Fig. 2: Juvenile male *S. jarrovii* lizard (BF188).

Fig. 3: Juvenile male *S. jarrovii* lizard (BF56).

Fig. 4: Adult female *S. jarrovii* lizard (BF157).

4) Conclusion

- According to the results, the size of the coloured ventral and throat patches of *S. jarrovii* (both together and separately) does not influence the HR size of individuals in any way.
- These results have many possible implications. One interpretation is that colour patches do not factor into territory-enforcement interactions, and rather have more important roles in social communication or purely intrasexual competitions. Another is that the influence of colour patch size is overshadowed by other factors – such as the intensity of colour in the patches, of which a large range was observed in the sample.
- In future, research should be conducted on the influence of the colour intensity of the patches on HR size. According to Cox et al [2], the hue, saturation, and brightness of colour patches in *S. jarrovii* are sensitive to testosterone levels. Since testosterone is linked with aggression and combat capabilities, it is reasonable to predict that colour patch intensity influences HR size through enforcement of territory.
- I recommend that a study with similar method and purpose to this one be redone as well, because there were many possible sources of error that could have affected these results. For instance, it would be beneficial to have a verification system for the TCA data in order to minimise data collection errors and biases.

References

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7. Credit to Lucy Patterson for the lizard photos.

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