May 11th, 2018.

ECE-2018-01-00051

List of revisions

Dear Editor,

Thank you so much for the opportunity to revise this manuscript. We have carefully reviewed and addressed all suggested revisions and have listed the revision below in addition highlighting revisions within the text.

Warm regards

Dr. Westphal & collaborators

List of revisions

The main criticism of the reviewer is that your conclusions go beyond what can be supported by your results. I can see the reviewers' point - clearly it would be better evidence of facilitation if you had clearer comparisons of population fitness between habitats with more/less shrubs. However I would agree with you that your results certainly support the idea that shrubs are beneficial to the lizards - and that they spend more time under shrubs during the afternoon provides an obvious mechanism for why this would be. So I'm happy for you to respond to these comments as you see fit, as to whether you want to tone down your conclusions/make your limitations clearer.

**> Fantastic, thank you. We have added a clear statement and brief comment on the scope of the implications to this effect in the Discussion.**  
I do think the reviewer makes some good comments regarding lack of clarity over some of the assumptions in your methodology. E.g. I agree that it is not clear why 0.5m was set as 'the shrub association zone'. It does seem like it would be relatively easy to re-analyze your data with slightly different 'zones' (both larger and smaller radius) to provide readers with an idea of how this affects your results.

**> Thank you for this suggestion. We used a shrub-open model for the relocation sampling to emulate the plant ecology facilitation literature, and we hope speak directly to that readership. Pescador et al. (2004) in New Phytologist call this a two-phase model for simplifying deserts and highlight similar limitations (but also strengths). Ideally, the sampling would involve recording exact distances in the field that relocations were collected. The design of the experiment does not allow for this. However, we have now added a comment to this effect in the Discussion as well.**

@MIKE – your call here. If you want to get me shrub density data at 0.25 and also 1m away from shrubs, I can just add as columns to the individual.csv file and try too – however, happy to just to cite precedent and leave at 0.5m – your call.

Similarly, with regards to excluding the lizards who were located very few times, it would seem helpful to present the results with these individuals excluded, even if only to show this has now effect.  
  
**> Absolutely good point. We apologize for the confusion. All conventional statistics were done using all relocation data. However, home range statistics need a minimum for 5 relocations per individual to effectively model distribution to only these statistics used 27of the 30 lizards. We have now more cleaned explained this on line 148 (i.e. at the beginning of the Results section).**  
Finally, one editorial point regarding your Data Accessibility statement. It's great that you have uploaded your data into GitHub. However to be fully in compliance with our data policy can I also ask that you also deposit this information in a permanent repository such as Dryad or FigShare; as information in GitHub can continue to be edited post-publication of your paper, it does not meet our requirements of a 'long-term and stable' repository. Note that with Dryad, we will both cover the costs of this and provide an easy way to deposit your data there upon acceptance of your paper.

**> The data are now published on Figshare and cited directly within the paper. We also published the final code from GitHub to Zenodo and cite within the publication as well.**

Reviewer(s)' Comments to Author:  
  
Reviewer: 1  
  
Comments to the Author  
Dear Authors:    
  
Your paper is fairly well written and you show use of shrubs by the lizard, mostly for thermoregulation. While one can reasonably concluded some benefit of the shrub to the lizard, showing use is not the same as showing increased individual fitness (or a proxy) or some population parameter such as increased density. In my opinion that is needed to show facilitation at this point.  This is particularly the case as your paper is arguing for the importance of shrubs to desert management and restoration.   
  
I provide additional specific comments below. I hope you find my comments useful.  
  
Comments:  
  
Introduction  
Lines 64-65, PDF page 5 (Doc. p 4): The claim that novel aspects to their use of telemetry and facilitation study. I thought the idea rather trivial, that a lizard used a shrub as a component of habitat, particularly for thermoregulation.  
  
Methods  
Lines 90, PDF p 6 (Doc. p 5): The authors describe a shrub species on which they are focusing as a “foundation species”, but are there other shrubs in this system? If so, why were these not assessed?  
Lines 125-126, PDF p 7 (Doc. p 6) (and elsewhere): Given telemetry and direct observations, why was a buffer of 0.5 meters around a shrub used as a “shrub association zone”. How was this justified? Directly under the canopy or in the shade of the canopy is a more direct measure. I wonder if the statistical patterns described between the lizard and shrub would hold up if a more stringent interpretation of “shrub association” were used.  
Line 139-140, PDF p 8 (Doc. p 7): The authors state that a large number of randomly chosen shrubs were used to calculate an average radius for shrubs in the study area. State the number of shrubs assessed and let the reader decided whether the assessment was sufficient. Also again at this point the authors note the 0.5 m addition to shrub association.  
  
Results  
Lines 148-153, PDF p 8 (Doc. p 7): Table S2 shows several lizards that were located very few times (< 13). Relative to lizards found more often, their homeranges are exceedingly small as are their shrub associations. The lizards with limited locational data should have been excluded from analyses.  
Line 150-151, PDF p 8 (Doc. p 7): The authors state that the home ranges (MCPs) of lizards generally did not overlap. Figure 1, however, indicates substantial overlap. The authors should describe this overlap in terms of male and female homeranges.  
Line 155, PDF p 9 (Doc. p 8): The authors state that lizard observations differed significantly between habitat types. The only habitat types assessed were associated or not associated with shrub; the authors should be more specific here.  
Line 156-157, PDF p 9 (Doc. p 8): The switch to “days” observed under shrub or in the open is not intuitive and this measurement needs to be clearly explained in terms of the data and how it was calculated.  
Line 162-163, PDF p 9 (Doc p 8): The authors state that “Lizards were observed cooling under shrubs more than other habitat types”, but the only other habitat type measured was out in the open.  
Line 165-166, PDF p 9 (Doc p 8): The reference to predator avoidance is not convincing. How were raptors and ravens assessed in terms of their “threat” to the lizards?  
  
Discussion  
Line 218-229, PDF p 11 (Doc p 10): The authors concludes would be much more convincing if they showed some actual benefit to individual fitness or to overall population parameters related to shrub use. None is presented. They note that these lizards can occur where the shrub is not present. A more realistic study comparing shrub use to increases in fitness or other population parameters (shrub vs no-shrub habitats) is really needed to show facilitation in my opinion.  
Conclusion  
PDF p 12 (Doc p 11): The authors claim to have documented a benefit to shrubs, but they really only showed use of shrubs. They then go on to state that their study was not intended to test whether the lizard required shrubs, but rather to ask whether shrubs provide benefits. They then state that they found evidence to support their hypothesis. True, but not overwhelming, convincing evidence. Use does not equate to increased individual fitness or values associated with population parameters.