Review of PeerJ Manuscript 104845v1: Thermal ecology of Mexican garter snake: temporal and spatial variations

Specific comments

Abstract

Line 27: In the sentence "*The patterns were obtained from seminatural experiment in the field with a sampling point strategy to analyze temporal and spatial variations in Tb."*
Should this be "point sampling"?

Lines 28-29: *Our results show that T. eques presented differences in Tb between grassland and forest, principally in late spring and early summer during the early rise and late plateau phases,…*
What are "early rise" and "late plateau" phases? While described in the methods, these phases should also be explained in the abstract.

Lines 34-35, 65, etc.: *Our results also shown that T. eques presented daily and seasonal warming patterns like those of other northern Garter snakes.*
"Gartersnake" should be one word; e.g., following Crother 2008.

Introduction

Line 65: "The garter snake species (*Thamnophis*)…"
This should be written as "The gartersnakes (*Thamnophis* spp.)" or "The genus *Thamnophis*…"

Lines 76-80*: "In these environments, Mexican garter snakes require vegetative cover because snakes rarely move more than 15 meters from permanent water with lush vegetation (Greenwald, 2003), such as willow trees (Salix sp.), riparian deciduous trees that lose their leaves from late fall to early winter (Saska et al., 2010)."*
This is incorrect*; T. eques* moves more than 15 m from wetlands, even in the active season, in the southwestern U.S. It's clear from the introduction that the authors are not familiar with more recently published literature and MS theses which detail habitat use by this species in the U.S., e.g. Iain Emmons and Jason Myrand (MS theses) and Tiffany Sprague (MS thesis, published in part as):

Sprague, Tiffany A; Bateman, Heather L 2018. Influence of seasonality and gestation on habitat selection by northern Mexican gartersnakes (*Thamnophis eques megalops*). PLoS One; San Francisco Vol. 13, Issue 1 (Jan 2018): e0191829. DOI:10.1371/journal.pone.0191829.

Unfortunately, a large part of the conceptual basis for this study appears to be based on work on other species of gartersnakes; it would be much more accurate to include literature from *T. eques*. This manuscript gives the erroneous impression that it is the first to explore habitat and thermal ecology in *T. eques*, which is incorrect.

Methods

Warming trials- a sample size of 6 individuals (3F.3M) is very small. Additional information is needed to evaluate the results of this experiment:

1) Was each individual tested in both types of habitat? This is unclear.
2) I presume that individuals were tested (Tb measured) repeatedly over the course of 6 months, but what was the interval of Tb measurements- every day?
3) Were the air and substrate temperatures also measured every day over 6 months?
4) How and where were air and substrate temperatures measured? If air temperature was measured above 1-1.5 m in height, it may not be relevant to *T. eques*, who are primarily (but not exclusively) ground-dwellers. Vegetative "canopy" height for ground dwelling snakes can therefore be quite close to the ground. If air and substrate temperature were measured in full sun, they may also not be relevant to most snakes, who in warmer latitudes may only bask in full sun for limited periods. More often, this species may bask partially concealed by overhanging vegetation, so substrate temperature taken in part shade/part sun is a better reflection of actual snake use of habitat.

When, exactly, did the willows lose their leaves; was this measured? Were results different before/after those dates? Were other trees or shrubs present that did not lose their leaves?
Lines 120-122: *Snakes were individually housed in glass tanks (51 x 26 x 28 cm) containing water dishes and clay shelters, at an ambient room temperature of 20 25 °C and a natural light dark photoperiod.*
This sentence has spacing and formatting issues. It's also not clear how often the snakes were in indoor tanks and how often they were in the outdoor enclosures.

Lines 144-145: "*and from 0800 to 1230 h, we recorded the cloacal, substrate and air temperature every 30 min, maintaining individual monitoring."*
How was cloacal temperature measured? If the snakes were captured every 30 minutes, this would affect their behavior and change their thermoregulation patterns, thus affecting Tb.

Line 147: *Analysis*
Should be Analyses (plural).

Results
Were there sex differences in Tb profiles between very much smaller males and larger females?

Line 186-187: *We did not find significant differences in Tb between forests and grasslands at 0900, 1000 187 and 1130 cm-1*.
Is there a mistake at the end of this sentence?

Discussion
The discussion suffers from lack of consideration of habitat studies on *T. eques* in the U.S.; it is incomplete and focuses unnecessarily on habitat use in other species as a proxy. With this conceptual basis missing, it was hard to evaluate the import and implications of the current study's results.

Lines 243-245: *Rosen (1991) reported that T. eques is the Garter Snake with the lowest Tb (28 °C) in a snake community in Arizona, United States. He noted that T. eques prefers cooler environments despite the availability of warmer areas.*

This statement should be interpreted cautiously. Rosen's older data is not supported by our more recent research on the species in the U.S. while it may have described one snake community, it does not seem to be broadly applicable to the species across its range in the U.S.

Lines 253-254: *This pattern is also present in T. sirtalis and T. elegans (Gibson & 254 Falls, 1979; Lillyhite, 1987; Peterson et al., 1993)…*
Lilywhite is spelled incorrectly.

Lines 270-271: *The forest surrounds the waterbody and offers a greater availability of prey (terrestrial and aquatic) …*
Please cite studies from MX and the US on prey use by the species. Refer to Emmons et al. 2016 for prey use in Arizona, US.

Conclusions
Lines 309-311: *A better understanding of the relationships between individual strategies and seasonal changes within environments will lead to increasingly efficient conservative plans for T. eques and similar species.*
This is a weak statement as is. What do you mean by "increasingly efficient" conservation plans? Is the species considered to be of conservation concern in MX? I didn't see that information in the introduction. Given that *T. eques* is listed as a federally threatened species in the U.S., how could this study inform conservation plans across its range in the US and in MX?

Figures
Overall, these were good, but perhaps over-simplified. Please provide more details in the figure legends so that we can evaluate your figures.

Figure 1: *Forest enclosed* and *Grassland enclosed* annotations.
Use "enclosure".

Figure 2: I'm unclear what this figure is showing. Are these median Tbs averaged for both females and males over the course of 6 months? Are there sex differences between males and females in Tb? Shouldn't the seasons (summer, with leaves on willows) and fall (no leaves on willows) be separated?

Figure 3: Again, are you saying there's no sex difference in Tb? In general, this figure doesn't seem as useful as Figure 4.
Also, it would be useful to see Ta and Ts plotted on Figure 4, or in a separate figure for each enclosure.

Figure 5: There might be a better way to show these differences?

Raw Data
The data given seems to be a summary rather than "raw data". I'm not sure what the temperature values given are- are these median temperatures across all 6 individuals (both sexes) across every day of the month? It'd be hard to replicate the findings given that we're not sure how the data were summarized.