

Telemetry of sand lizards (*Lacerta agilis*) in vineyards –

Are methods established for terrestrial vertebrate risk assessments effective in recording higher tier data for reptiles?

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Introduction

Habitats bordering vineyards represent primary habitats for reptiles. This taxon can become exposed when foraging between vineyards, where pesticide application is frequent. EFSA (2018) suggests the sand lizard as a focal species to represent other lacertids living in agricultural land. However, the Scientific Opinion on pesticide risk assessment for amphibians and reptiles (EFSA 2018) highlights a gap in our knowledge of 'farmland ecology' of reptiles for environmental risk assessments. Currently, telemetry is a method supported by EFSA (2009) for birds and mammals monitoring. Continuous radio-tracking was subsequently performed during the summer 2018 to test its applicability for reptile monitoring.

Study area and methods

Two study sites were chosen in a vineyard dominated landscape in Southern Germany.

Individually marked and radio-tagged sand lizards were continuously radio-tracked from sunrise to sunset (i.e. 7:00-21:00), placing the observer at the border between the target crop and the non-crop habitats. The following was recorded with any signal or position change:

1. animal being active or non-active
2. visual contact, including more detailed behaviour record, if possible
3. habitat where the animal was located

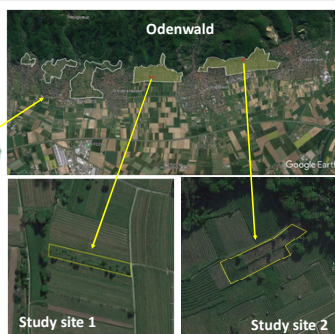
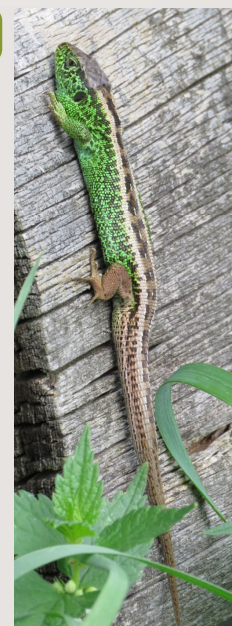


Figure 1. Example of telemetry session placing the observer at the border between the vineyard (target crop) and an old orchard.



Results

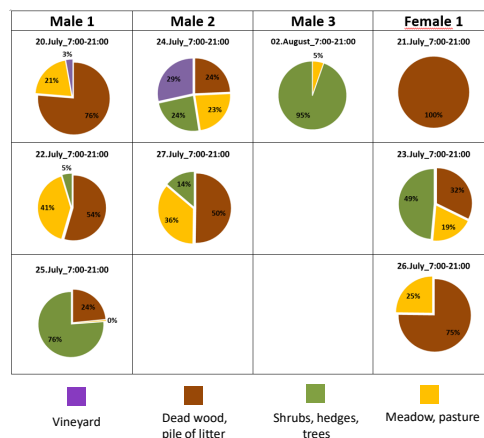
4 lizards (3 males and 1 female) were radio-tracked for 1-3 days in July-August 2018.

All individuals spent most of their time in the border areas between vineyards and other habitats.

Even in cases in which the recorded daily activity of the individual was consistent during both sessions, the possibility of seeing the individual and defining the actual behaviour more precisely was very low. Tracked individuals spent most of their time on the ground hidden by dense vegetation.

Visual contact was mainly restricted to positioning for thermoregulation on dead wood or pile of litter.

Habitat use of sand lizards during telemetry sessions



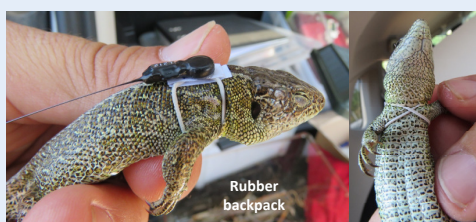
The tagging methodology

Sand lizards, exceeding a body weight of 10 g were chosen for tagging (tags used: Biotrack, PicoPic, Ag379, lifespan >5weeks, weight 0.41 g). We tested two different backpacks:

Patch backpack: The transmitter was attached on the back of the lizards, above the shoulder, and behind the head. A special waterproof, sterile, transparent film patch was used to fix the transmitter. Such backpack remains on the animal until exuviation, allowing 10-15 days of tracking in July.

Rubber backpack: Similar to backpacks used for bird tracking (Rappole and Tiptone, 1991). However, some lizards were able to wipe off the backpack within short-term.

The "patch backpack", a new method of tagging small lizards, turned out to be a reliable method of tagging small lizards. This method needs to be tested on a larger sample size.



Conclusions

- The data presented here demonstrates the possibility of recording PT values (i.e. portion of diet from treated area) for lizards foraging on farmland, which are equivalent to those collected for birds and mammals also. As proposed by EFSA (2018), such data can be used for higher tier refinement of sand lizard environmental risk assessments. An assumption would be that, as in birds and mammals, the time active animals spend in the treated area is equivalent to the proportion of diet taken from the treated area. Daily activity and home ranges of lizards can then be exactly quantified using continuous radio-tracking.
- Our first results confirm the use of vineyards as foraging habitat by sand lizards (mainly using habitats bordering vineyards).
- Sand lizards show the tendency to be covered by vegetation or other shelter during 'active phases' in vineyards and being open exposed to the sun only for thermoregulation.
- Escape behaviour during the application of pesticides, and re-entry time of lizards into vineyards should be investigated to assess pesticide exposure risks in more detail.

References

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- Rappole J.H. and Tiptone A.R., 1991. New Harness Design for Attachment of Radio Transmitters to Small Passerines. Journal of Field Ornithology 62:335-337