Telemetry study on the common toad (*Bufo bufo*) during postbreeding migration through cereal fields in Germany

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Meet us at booth 25

Introduction

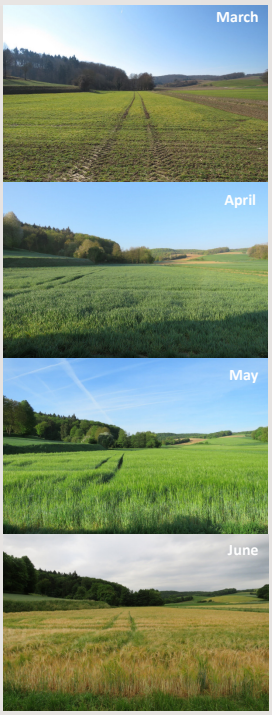
The recent Scientific Opinion on the state of the science on pesticide risk assessment for amphibians and reptiles (EFSA 2018) points out the need to collect more data on the ecology of amphibians to reduce uncertainties when assessing the potential risks associated with exposure to pesticides. There is still a general lack of knowledge of the ecology of many species (in agricultural landscapes), especially concerning their terrestrial life stages. In fact, data on anuran spatial and temporal occurrence in different crops are sparse. Few telemetry studies have been done on anurans in Europe, and the available studies focus mainly on non-agricultural habitats. In this study, common toad individuals where radio-tracked in order to test small and light tracking devices, to develop methods to sample data on habitat use in agricultural landscapes and to record movement of adult common toads leaving breeding ponds at the end of the deposition phase (i.e. to cover the post-breeding migration of the species).

Study area and methods

The study area was located in Southern Germany and represented a typical cereal growing area. The landscape was characterized by large cereal fields with surrounding habitats such as small forests, hedges, and bushy non-crop areas.

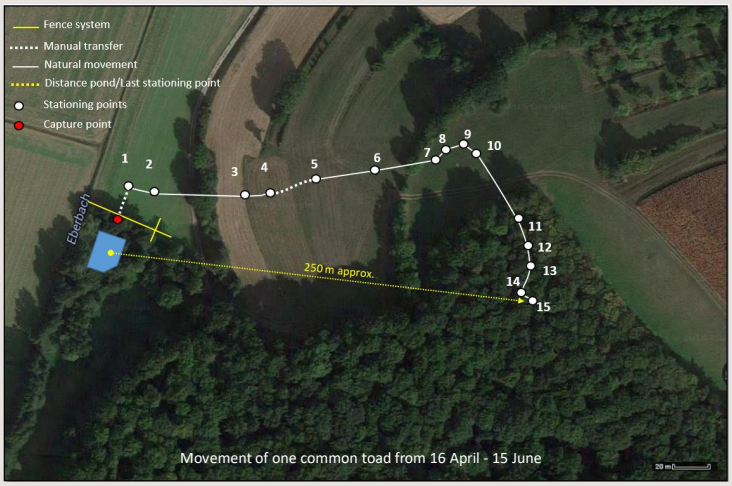
During the reproductive season of 2015, three adult common toads, captured with drift fences and pitfall traps at their breeding ponds, were radio-tagged in order to follow their movements during post-breeding migration. The individuals were marked with Passive Integrated Transponders (1.25x7mm, Schott Bio Glas Transponder, ISO 11784/11785 FDX-B standard) injected into the abdominal cavity of the animal. To avoid infections, the puncture site was closed with a surgical skin adhesive.

The radio-tagged toads were released approximately 10 meters from the drift fence where they were originally collected in a cereal field. The toads were placed in a hidden and shaded place to reduce predation probability and dehydration after they were released. Time, exact location and habitat in which the individual toads were located were recorded twice a day (after sunrise and before sunset). In case the toads utilized a cereal field, the growth stage of cereals was recorded as well.



Cereal field close to the breeding pond from the beginning of the migration (March) of common toads until the end of the radio-tracking period in this study (June)

Results

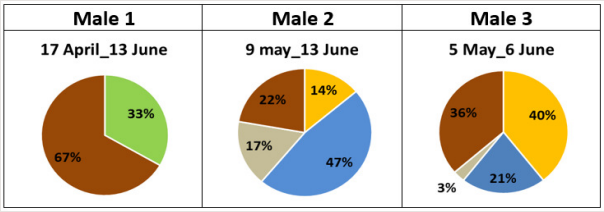


All recorded movements took place during the night. However, movements during the day to return to the exact previously noted position cannot be fully excluded.

In general, after the first release, the toads remained relatively stationary until the sunset check. All individuals covered great distances during the first night.

Maximum distances completed until the end of the radio-tracking period (5 to 8 weeks per toad) were approximately 250 meters from the breeding pond. The maximum distance between two stationary points where a toad remained for longer periods was about 30 meters. The toads remained at these locations for 1 to 11 days before another 'long-distance movement' was started.

No individual returned into the cereal field in which they were captured and released. Two individuals returned to the breeding pond for a longer period. They also used an abandoned orchard located close to the pond as main habitat. All individuals used the woods around the pond for several weeks.



Habitat use of male common toads during the radio-tracking period

Habitat types used by radio-tracked common toads, the yellow arrows indicate exact positions of tracked animals

The tagging methodology

Adult males were equipped with radio-tags weighing 0.6g (Biotrack, PicoPic, Ag376, 28 ms, 33 bpm, Lifespan >5 weeks). In order to not exceed a maximum of 5% of the toad weight, only individuals with a body weight greater than 12g were selected.

Elastic waist belts with different circumferences were cut out from rubber balloons (see pictures on the right). Holes were cut in the belt in order to lighten the structure and to allow greater transpiration of the epidermis of the tagged individual. The transmitter was attached to the belt with a tissue superglue. The belt was attached in front of the hind legs and remained on the back for at least 5 weeks, to a maximum of 8 weeks.

Conclusions and considerations

- The tagging method has proven to be reliable allowing radio-tracking of tagged common toads for 5 to 8 weeks.
- No individual showed skin alteration under the elastic waist belt at the end of the radio-tracking period.
- Individuals showed a moderate increase of their recorded physical parameters (snout to vent length and body weight) at the end of the radio-tracking period, suggesting that they were not impeded by the attached tags.
- The injected transponders in the abdominal cavity of the individual was not lost or did not appear to cause any negative effect on the toads.
- The tagging methodology verified the possibility to conduct field studies on amphibian species to record relevant risk assessment parameters requested by EFSA (2018) such as data about the portion of time individuals spend active in treated crops.

REFERENCES: European Food Safety Authority, 2018. Scientific Opinion on the state of the science on pesticide risk assessment for amphibians and reptiles. EFSA Journal 16(2):5125, 301 pp. Available at https://doi.org/10.2903/j.efsa.2018.5125