

Erfüllen Amphibienleitanlagen ihren Zweck? Ein Fallbeispiel von der K25 im Siebengebirge bei Bonn (NRW)

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Do road tunnels and barrier walls work well in amphibian conservation? A case study from the district road K25 at the Siebengebirge near Bonn (Germany)

During migration from overwintering sites to the breeding ponds and summer habitats, amphibians are often exposed to a high mortality risk, especially when crossing roads. Road tunnels and barrier walls are nowadays often installed to reduce road mortality, but the effectiveness of these measures is rarely examined. We tested the functionality and effectiveness of an amphibian road tunnel and fence system, consisting of two non-contiguous parts along a moderately busy district road, built in the year 2015 within the large-scale nature conservation project „chance7“ (www.chance7.org). For common toads (*Bufo bufo*), common frogs (*Rana temporaria*) and alpine newts (*Ichthyosaura alpestris*) we recorded both the number of adult individuals crossing the road during migration to their breeding ponds in spring and the number of freshly emerged juveniles in summer, on six and eight consecutive days and nights, respectively. Simultaneously, we counted amphibian traffic fatalities on this sector of the road and compared it to the total number of individuals recorded at the tunnels in order to estimate the effectiveness of the system. During the spring migration, we found 5 % (70 toads) of all amphibians dead on the road and counted 1,395 individuals (1,327 toads, 61 frogs and 7 newts) crossing the tunnels safely. Most road kills occurred in areas of the road without underpasses and barrier walls. Throughout the summer migration, 373 juvenile amphibians (354 toadlets and 19 froglets) crossed the tunnels safely, but most juveniles used a 3 m wide creek culvert instead to pass the road. Given that we did not find any toadlets dead on the road, this culvert seems to be crucial for successful migration of the juvenile toads in summer. It should be especially important in dry years, when the freshly emerged toadlets prefer shaded and humid environment. Our results suggest that the tunnels, in combination with the creek culvert, fulfil their intended purpose, protecting up to 95 % of the amphibian individuals recorded during the study.

Key words: Road tunnels, common toad, common frog, amphibian migration, *Bufo bufo*, *Rana temporaria*, *Ichthyosaura alpestris*, habitat fragmentation, conservation measures.

Zusammenfassung

Bei der Wanderung zwischen Winterquartieren, Laichgewässern und Sommerlebensräumen sind Amphibien oftmals einem deutlich erhöhten Mortalitätsrisiko durch den Straßenverkehr ausgesetzt. Um dieses Risiko zu minimieren, werden an