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Factors Influencing Snake Mortality Due to Erosion Control Blankets

Roads have long been recognized as threats to wildlife, including herps. The impacts of road collisions and chemical treatments have received considerable scrutiny. Recently, it has become apparent that erosion control blankets (ECBs) pose a threat to snakes, as snakes are prone to become entangled in them and either suffocate or succumb to the elements. However, to date, few comprehensive studies have been conducted to identify factors that influence the threat of ECBs. To address this, the authors of this paper collected information from literature, performed field surveys, and conducted experiments aimed to reveal which factors contribute to snake mortality due to ECBs, hypothesizing that larger-bodied snakes would be more prone to ECB entanglement, and that ECBs with woven mesh would be less dangerous to snakes than those with fixed intersections. The surveys were conducted in nine areas in Houston County, Texas, where ECBs were being used, totaling 65 site visits distributed between April and June 2018. The experimental trials employed 128 wild-caught snakes from eastern Texas representing 14 species, which were exposed to three different commonly used ECB types, and their interactions with the ECB were observed. The literature review found 175 published instances of reptiles being entangled in mesh products, 81% of those being snakes. Of the snake entanglement accounts, 45.5% involved wildlife exclusion netting, while 43.6% involved ECBs. Ten snake genera were reported to have been encountered ensnared in mesh products, but more than 40% of the reports involved snakes of the genus *Pantherophis* (five different species), which are long, thick bodied, and active foragers (factors that reasonably should increase risk of mesh entanglement). The field surveys turned up ten entangled snakes, eight of which were dead. The experiments found that fixed-intersection mesh ECBs did indeed pose a significantly greater threat to snakes relative to woven mesh ECBs. Other factors associated with snakes becoming entangled in ECBs include mesh diameter and snake diameter. Smaller mesh diameter increased rate of snake entanglement, and entanglement rates increased 4% with every 1-mm increase in snake body diameter. These findings heighten our understanding of the threat posed to snakes by ECBs and provide some baseline data that should prove valuable in efforts to design snake-friendly erosion control products.

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Metabarcoding Methods Reveal Diet Differences for Three Sympatric Moroccan Lizards

Traditionally, dietary studies have been carried out through visual investigation of gut contents, either flushed from living animals or removed through dissection of preserved animals, or by examining fecal pellets. These have been very successful for predators of vertebrates, but less successful for predators with diverse invertebrate diets, and soft-bodied invertebrates are often missed completely. One potential solution to this problem is to employ DNA "metabarcoding" methods to analyze fecal pellets to identify multiple operational taxonomic units (OTUs) within the sample. This method should not be biased towards prey with hard body parts. The authors of this paper aimed to investigate the diets of three lacertid lizards occurring sympatrically at a site in north-eastern Morocco using DNA metabarcoding methods. Two of these lizards are currently regarded as conspecific: *Scelarcis perspicillata chabanaudi* and *S. p. pellegrini*. Based on size and patterning, *S. p. pellegrini* may employ an active foraging strategy while the more cryptic *S. p. chabanaudi* may be a sit-and-wait forager. A previous study using traditional gut content analysis found evidence for the two lizards having more divergent diets in sympatry, which would serve to reduce competition. The third lizard, *Podacris vaucheri*, resembles *S. p. pellegrini* and may share its same foraging strategy and a similar diet. A total of 68 lizards were caught in September 2016, subjected to meristic and demographic data collection, allowed to release a fecal pellet, then released. DNA from extracts of the fecal pellets were PCR amplified for regions of the *COI* and 16S rRNA genes, and subjected to Illumina sequencing. The resulting sequence data revealed 45 operational taxonomic units, 33 of which could be assigned to family, 13 to genus, and five to species. The 16S data proved much more informative than the *COI* data. Overall, the most abundant prey type identified were beetles, followed by hymenopterans, with most of the remainder divided among blattodeans, flies, hemipterans, lepidopterans, and orthopterans. *S. p. pellegrini* exhibited the most diverse diet with a niche breadth of 16.7, supporting the hypothesis that it is an active forager. The diet of *P. vaucheri* was nearly as diverse as *S. p. pellegrini* indicating a similar foraging strategy. Conversely, the niche breadth of *S. p. chabanaudi* was only 6.85, in accordance with expectations for a sit-and-wait predator. With respect to understanding feeding ecology, one limitation of the DNA metabarcoding method identified by the authors is an inability to determine life stage of prey, which could be relevant for insects that have flying and non-flying stages. Nevertheless, the authors conclude that these methods allow for greater taxonomic resolution of prey and thus a more accurate measure of prey diversity, and an ideal approach would be a combination of barcoding and microscopy methods.

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