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Fire-prone animals: adaptive responses in lizards

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Abstract

Fire is a natural process in many ecosystems. In animals, fire ecology research has focused on fire effects on abundance and persistence of populations. However, the mechanisms behind the observed patterns of animal responses remain unclear. After a wildfire, the low mortality observed in burrowing lizards suggests the resiliency of their populations to fires. Thus, lizards likely have adaptive traits to cope with fires, or even to benefit from them. Here, we unravel these traits and present our advances in this matter. Before a fire arrives, early fire detection is expected to be particularly important for fire avoidance. Reptiles use sensory cues like smell and sound to detect threats; our results suggest that lizards use those cues to detect coming fires. During a fire, there may not be enough time to flee. Reptiles often survive sheltering in crevices or under rocks, and some have the ability to withstand the high critical temperatures reached in shelters during a fire. The very recent postfire environments may be inhospitable; however, reptiles have the ability to endure days without eating and enter a state of torpor. Moreover, wildfires induce environmental changes that reptiles can benefit from. We found that fire reduced parasite load in lizards. Other benefits could come through postfire enhanced thermoregulatory opportunities or the increasing availability of some prey (i.e: pyrophillous insects). Also, fire-disturbed landscapes induce phenotypic plasticity in lizards. We found that lizards adjust their dorsal coloration likely to optimize their thermoregulation in burnt areas. Wildfires' strong effects on animal communities must be assessed by taxa. Here we advocate for more studies to fill the knowledge gaps in reptiles' fire ecology and hope to provide a conceptual framework to study fire effects and adaptive responses in other animals through a comprehensive approach.

Keywords: fire adaption, global change

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