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Timber Rattlesnake (*Crotalus horridus*) Predation on a Southeastern Pocket Gopher (*Geomys pinetis*)

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Abstract - Numerous vertebrate species including *Pituophis* spp. (pine snakes) and birds of prey have been shown to consume *Geomys pinetis* (Southeastern Pocket Gopher), but its full spectrum of predators remains undocumented. As a part of a larger project involving radiotracking Southeastern Pocket Gophers in southwestern Georgia, a female Pocket Gopher was consumed by a *Crotalus horridus* (Timber Rattlesnake) while making an aboveground movement. Timber Rattlesnakes are a previously undocumented predator for Southeastern Pocket Gophers. Our observation further demonstrates predation risks associated with aboveground movement.

Introduction. *Geomys pinetis* Rafinesque (Southeastern Pocket Gopher) occurs in the Coastal Plain of Alabama, Georgia, and Florida largely co-occurring with the current and former range of the *Pinus palustris* Mill. (Longleaf Pine) ecosystem (Golley 1962, Pembleton and Williams 1978), but also occurs in scrub, right-of-ways, and other open or grassy habitats with mostly loamy sand soils (Warren et al. 2017). Timber Rattlesnakes are associated with these types of habitat as well (Ernst and Ernst 2003, Waldron et al. 2006). Pocket Gophers are almost exclusively fossorial, except for occasional aboveground dispersal movements (Pembleton and Williams 1978) and share their habitat with many potential predators, including raptors, snakes, and mesocarnivores. Snakes in the genus *Pituophis* (pine snakes) are considered primary predators of Southeastern Pocket Gophers because these snakes can burrow into Pocket Gopher tunnels (Miller et al. 2012, Rudolph et al. 2002). Herein, we describe the first reported occurrence of Southeastern Pocket Gopher predation by a venomous snake.

Observations. As a part of a larger study, we translocated Southeastern Pocket Gophers and tracked their movements using radio telemetry in mature Longleaf Pine on The Jones Center at Ichauway in Baker County, GA (University of Georgia Animal Care and Use protocol number A2017 11-003-Y1-A3). On 8 July 2018, a female Pocket Gopher was released into a starter hole 1 m in diameter and 0.25 m deep. The hole was provisioned with turnips, potatoes, and carrots and was surrounded by a 5-m² silt-fence enclosure to reduce aboveground movements. After 3 days, the gopher dug under the fencing and made an aboveground movement (168 m) after relocation, where she established a burrow and began forming new mounds. During the next tracking event on 19 July 2018, there was an open hole in the ground near her recent mounds, and the receiver registered loudest when pointed at a nearby *Crotalus horridus* L. (Timber Rattlesnake). During the next 16 days, the snake made infrequent, short movements (<100 m) and then defecated the transmitter.

Pocket Gophers make infrequent aboveground movements (Warren et al. 2017), and may have fewer defenses against aboveground predators. In contrast, semi-fossorial rodents like those in the genera *Spermophilus* (ground squirrels) and *Otospermophilus* (rock

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squirrels), which forage exclusively aboveground, have well-developed anti-predator behaviors (Clucas et al. 2008, Owings and Cross 1977, Sharpe and van Horne 1998, Sherman 1977). It is unlikely Southeastern Pocket Gophers have evolved specific aboveground, anti-predator defenses other than a subterranean existence. However, Southeastern Pocket Gophers are described as fiercely aggressive (Baker et al. 2003), which may allow them to combat aboveground predators. Southeastern Pocket Gophers occur in sympatry with Timber Rattlesnakes and *Crotalus adamanteus* Palisot de Beauvois (Eastern Diamondback Rattlesnake). While there is no evidence these snake species use tunnels dug by pocket gophers, they are known to use stump holes, tree tip-ups, burrows of *Dasyopus novemcinctus* L. (Nine-Banded Armadillo), and other refugia (Waldron et al. 2006). Another species, *Geomys breviceps* Baird (Baird's Pocket Gopher), demonstrates belowground defenses by backfilling their burrows, likely as an attempt to block access by *Pituophis ruthveni* Stull (Louisiana Black Pine Snake) (Rudolph et al. 2002). Whether Southeastern Pocket Gophers have a similar defensive behavior is unknown. *Pituophis melanoleucus mugitus* Barbour (Florida Pine Snake), which is sympatric with the Southeastern Pocket Gopher across much of its range, frequently uses Pocket Gopher burrows, and is assumed to be a primary predator (Miller et al. 2012, Rudolph et al. 2002). *Geomys bursarius* (Plains Pocket Gopher) is reported as a prey item for Timber Rattlesnakes, and *Crotalus viridis* Rafinesque (Prairie Rattlesnake) and *Lampropeltis calligaster* Harlan (Prairie Kingsnake) are known to prey on other species of Pocket Gophers (Ernst and Ernst 2003, Connior et al. 2006).

Translocation in general may increase risks of predation (Van Vuren et al. 1997). Our observation demonstrates the risks that Pocket Gophers are exposed to when they make aboveground movements. Pocket Gophers may be susceptible while translocating because they make more aboveground dispersals due to their displacement (J.T. Pynne, pers. observ.). In future translocation efforts, care should be taken to reduce aboveground movement. Softer release measures such as establishing a starter burrow system or placing a wooden board over the release hole may contribute to survival and release-site fidelity (Hansler et al. 2017).

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