

Field observation of Texas Horned Lizard, *Phrynosoma cornutum* (Harlan, 1825), blood-squirting behaviour elicited by a passing vehicle

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Phrynosoma cornutum (Harlan, 1825) is a semi-arid dwelling lizard that is distributed throughout the south-central United States and north-eastern Mexico. This species, like many of the members of the *Phrynosoma* genera, display unique defensive behaviours such as blood-squirting to avoid capture by predators (Sherbrooke, 2003). *Phrynosoma cornutum* readily exhibits blood-squirting in response to canid attacks (Middendorf and Sherbrooke, 1992), and also have been documented to display this defensive behaviour during attacks from other mammalian predators (Sherbrooke et al., 2012). Mook et al. (2017) reported blood-squirting caused by a Speckled Kingsnake (*Lampropeltis holbrooki*; Stejneger, 1902), and on rare occasions hand-capture from humans can elicit this response (Sherbrooke and Middendorf, 2001). However, these rare occurrences are poorly understood (Lambert and Ferguson, 1985; Sherbrooke and Middendorf, 2001).

On 24 June 2020 at 10:15 h during a wildlife survey on the San Antonio Viejo Ranch in Jim Hogg County, Texas (26.95706°N, -98.83320°W), authors DES and JOH drove a field vehicle over, but did not hit, an individual *P. cornutum* (female; snout-vent length ca. 65 mm). The lizard exhibited a 'sprint and freeze' defensive strategy (Webb and Henke, 2003), by sprinting from the passenger side to halting near the driver side in front of the vehicle. Upon exiting the vehicle to check on the observed individual's condition, we estimated that this lizard was 17.8 cm away from the vehicle's tires. We (DES and JOH) observed that the right eye of the individual was exuding blood, indicative

of blood-squirting behaviour. From our approach to the lizard with the vehicle, we noted that the lizard did not have blood around its eyes. Ejected blood was not observed on the surrounding ground. However, a fresh line of blood ca. 4 cm in length, was observed on the undercarriage of the vehicle. Movement near the lizard (i.e., hand waving and walking around it) did not activate additional defensive display or an attempt to flee or hide. The lizard remained in a still, but lifted position (Fig. 1). After 5 minutes the lizard moved, but appeared confused (i.e., walked back and forth in the same location). Upon closer inspection the blood around its eyes had become covered with dirt caused by our vehicle on the dusty ranch road. The individual was monitored for 15 minutes; however, it showed no signs of getting the dirt-blood mixture out of its eyes and continued to wander back and forth. Because of this impairment, we used water to flush the dirt-blood mixture from its eyes, and then released the lizard under the shade of *Cenchrus ciliaris* (buffelgrass).



Figure 1. A female *Phrynosoma cornutum* standing still after a vehicle passed above it. The vehicle elicited a blood-squirting response as can be observed around her eyes. The lizard remained in a still lifted position and didn't evade from approach by author (JOH).

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Time of day and temperature do not affect the blood-squirting behaviour of *P. cornutum* (Middendorf and Sherbrooke, 1992). Physical attacks, along with olfactory cues typically are required to elicit a blood-squirting response (Middendorf and Sherbrooke, 1992). A combination of a fast approach and loud noise from the vehicle likely caused the lizard's response. This behaviour most likely was a result of our vehicle's advance because the individual was observed without blood prior to approach. The fresh blood exuding from the lizard's eyes and presence beneath the undercarriage of the vehicle reinforced our conclusion. Montgomery and Mackessy (2003) reported high mortality of *P. cornutum* due to vehicle collisions, most likely a result of a combination of their camouflage coloration, which makes them difficult to see, and their 'sprint and freeze' strategy, which can keep them in harm's way. Personal field observations [JOH] of *P. cornutum* that were collected due to vehicular collisions usually exhibited blood around their eyes; however, it was unknown if the blood was ejected before the collision or as a result of bodily injury.

To our knowledge this is the first record of an approaching vehicle that caused the blood-squirting response in a *P. cornutum*. A negative consequence occurred with the rising dirt from our vehicle, which mixed with the fresh blood, and ultimately resulted in the lizard's impaired vision. Such an incident, in turn, could leave the lizard vulnerable to predators, another vehicular incident, or other environmental mortality factors. This behavioural response to vehicles likely occurs frequently for *P. cornutum* but has not been previously reported. With continuous urbanisation, human-wildlife collisions commonly occur (Forman et al., 2003). Understanding how *P. cornutum* responds to such occurrences is of management priority for the conservation of this protected species.

Handling of this individual was in compliance with a Texas Parks and Wildlife Scientific Collection permit

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