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ANTIPREDATORY DEFENSE OF NEONATAL PRONGHORN (*ANTILOCAPRA AMERICANA*) BY YEARLING MALE PRONGHORN IN SOUTHWESTERN SOUTH DAKOTA

Christopher N. Jacques^{1,2} and Jonathan A. Jenks¹

ABSTRACT.—Antipredatory defense of pronghorn (*Antilocapra americana*) neonates (≤ 1 month old) by adult females (> 18 months old) is well documented throughout the geographic range of this species. However, reports of male pronghorn defending neonates against predators are limited to a single study in northwestern Wyoming where occurrences were documented of adult males assisting female pronghorn in defending neonates against coyotes (*Canis latrans*). To our knowledge, defense of neonatal pronghorn by yearling males (12–18 months old) has not been reported previously for this species. We report occurrences of antipredatory defense of neonatal pronghorn by yearling males in southwestern South Dakota.

Key words: antipredatory defense, *Antilocapra americana*, pronghorn, neonates, coyotes, predation, South Dakota.

RESUMEN.—La defensa antidepredadora de los neonatos (≤ 30 días de edad) del berrendo (*Antilocapra americana*) por hembras adultas (> 18 meses de edad) está bien documentada en toda la distribución geográfica de esta especie. Sin embargo, no se había reportado la defensa de neonatos contra depredadores por parte de berrendos machos con excepción de un solo estudio en el noroeste de Wyoming, donde documentaron algunos casos en los que machos adultos ayudaron a los berrendos hembras a defender los neonatos contra coyotes (*Canis latrans*). Hasta donde sabemos, la defensa de berrendos neonatales por machos de alrededor de un año de edad (de 12–18 meses de edad) no se había reportado previamente. Reportamos casos de defensa antidepredadora de berrendos neonatales por parte de machos de un año de edad en el suroeste de Dakota del Sur.

The instinct to escape from predators is a behavior that is beneficial to individuals. Also, behavioral responses of prey species often vary depending on the behaviors of the predator (Tinbergen 1969). Predation pressure plays an important role in shaping mother–young relationships among ungulates (Lent 1974, Estes 1976). Previous observations of ungulate–predator interactions demonstrate that antipredatory responses of herd-dwelling ungulates exist (Eisenberg and McKay 1974). Berger (1979) indicated that typical responses of ungulates to predators included retreat (the most common response), staring or exhibiting curiosity, and following a predator. Predator harassment involving one or more prey species chasing a predator is rarely observed as a form of predator defense in ungulates (Lipetz and Bekoff 1980).

The pronghorn (*Antilocapra americana*) has developed several behavioral traits in response to the sustained history of coyote (*Canis latrans*) predation on neonates, including heightened vigilance by pronghorn mothers when away from hidden neonates and aggressive defense

of neonates from predators (Byers 1997). Although parental care behaviors are well documented for female pronghorn, it is generally understood that male pronghorn provide minimal parental care for young (Kitchen 1974). To our knowledge, Berger (2005) provided the only previous documentation of defense of neonates against coyotes by male pronghorn. She reported 2 instances of adult male pronghorn assisting females in defending neonates against coyotes in Grand Teton National Park in northwestern Wyoming. Our purpose was to report occurrences of antipredatory defense of neonatal pronghorn (≤ 1 month old; Jacques et al. 2007) by yearling male pronghorn (12–18 months old; Jacques et al. 2007) in eastern Fall River County, southwestern South Dakota (zone 13, 4762379–4814028 N, 662733–576249 E). Fall River County encompassed 5071 km² and was characterized by a mosaic of mixed-grass prairie interspersed with limited patches of shrubs (*Artemisia* spp.) and ponderosa pine (*Pinus ponderosa*) forests (Jacques et al. 2007).

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The first encounter occurred on 26 May 2005 while we monitored the lactating behavior of a radio-collared adult female (>18 months old; Jacques et al. 2007). At approximately 11:40 Mountain Standard Time (MST), 2 coyotes, appearing to be a pair, approached within 80 m of the bedded pronghorn. After visually detecting the coyotes, the pronghorn ran toward them and initiated a series of circular chases (11:43 MST), presumably to displace the coyotes from the area. Antipredatory behavior, chasing in this instance, continued until 11:59 MST, at which time 2 yearling male pronghorn, initially observed feeding 0.2 km north of the chase location, noticed the antipredatory defense behavior of the lactating female. After 4 minutes of observing this behavior, the yearling males also initiated aggressive antipredatory defense behavior (12:10 MST). All 3 pronghorn adopted defensive positions with the adult female at the center and the yearling males flanked on either of her sides. Both yearling males repeatedly stepped forward to continue the chase whenever a coyote successfully evaded the charging female. These circular chases continued until 12:40 MST, at which time all 3 pronghorn successfully displaced both coyotes from the chase location. Both yearling males returned to their original location (12:50 MST) and resumed feeding, while the adult female remained vigilant for the next 108 minutes before returning to her twin neonates (1 ♂, 1 ♀) at 14:28 MST; the neonates were bedded within 50 m of the area the coyotes had been searching.

The second encounter occurred on 1 June 2005 also while we monitored parturition behavior of a radio-collared adult female. At 16:10 MST, the lactating female noticed a coyote traveling in a shallow creek bottom approximately 75 m north of her location, at which time she ran toward the coyote and initiated aggressive antipredatory defense behavior (chasing). A solitary yearling male feeding within 0.1 km of the lactating female noticed the chase and moved toward the chase location; the yearling male continued to observe the defense behavior of the lactating female for about 3–4 minutes before initiating defensive behavior (16:19 MST). Both pronghorn adopted primary defense roles and ran toward the coyote with their heads lowered before displacing the coyote (16:30 MST) from the chase location. Both pronghorns pursued the coyote for approximately 0.8 km, at which time all 3 individuals disappeared from

sight (16:40 MST). The yearling male pronghorn returned to within 0.2 km of his original location and resumed feeding, while the lactating female also returned to her original location (16:57 MST) and reclined for 85 minutes before reuniting with her twin neonates (1 ♂, 1 ♀); both neonates were bedded within 75 m of the chase location. Age and sex of neonates was determined when we captured and radio-collared all 4 neonates involved in both encounters as part of a long-term pronghorn survival study in western South Dakota (Jacques et al. 2007).

Antipredatory defense of pronghorn fawns by male pronghorn is poorly documented in the ecological literature. Though it remains unclear why male pronghorn would engage in defense of neonates, several explanations have been suggested. For instance, the behavior of the yearling males involved in predator chases was noteworthy. In our observations, yearling males did not immediately chase predators. Individual males moved in the direction of the chase and spent approximately 2–4 minutes observing the chase behavior of lactating females prior to participating in antipredatory defense behavior (chases). During our study, estimates of mean relative coyote densities ranged from 16 to 119 coyotes per km² (Gerads 2000, Chronert et al. 2007), suggesting that the probability that yearling pronghorn had not previously encountered coyotes was low. Our observations support the naïve-prey hypothesis postulated by Kruuk (1972), Berger (1979), and Berger et al. (2001), which suggests that chasing predators may give naïve individuals opportunities to learn to recognize predators by participating in low-risk chases.

Alternatively, yearling male pronghorn may have been engaged in self-defense behavior rather than in defense of neonates. Though predation on adult pronghorn has been documented in western South Dakota (Jacques and Jenks 2008), previous estimates of adult annual survival ranged from 82% to 89% (Jacques et al. 2007). Thus, the self-defense hypothesis seems to be weakly supported because of relatively high survival rates and limited predation events throughout western South Dakota. Lastly, yearling males also may have been engaged in altruistic behaviors by defending siblings from predators (i.e., kin-selection hypothesis). However, Jacques and Jenks (2007) noted that 74% of yearling pronghorns dispersed 6–26 km from natal areas to adult home ranges. Further,

they found that 8 of 9 radio-collared fawns separated from their radio-collared mothers during their first fall season, emigrated to permanent home ranges elsewhere, and did not move back to natal ranges. Thus, the kin-selection hypothesis also seems weakly supported because of high dispersal rates among yearling pronghorn throughout western South Dakota. Definitive explanations for why yearling male pronghorn participate in defending neonates from predators remain unknown. A greater understanding of the behavioral mechanisms contributing to male-directed aggression, particularly among yearling pronghorn, toward predators is needed, and further investigation is warranted. Nonetheless, our observations confirm that yearling male pronghorn participate in defending neonates from predators.

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