

## Standing-Over in Captive Coywolves, *Canis latrans* × *lycaon*

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I documented standing-over behavior in a captive Coywolf (*Canis latrans* × *lycaon*, Eastern Coyote) pack from April 2002 to October 2003. Standing-over involves an individual positioning its inguinal area over a recumbent (i.e., lying) individual's head. While all five Coywolves in my study pack performed standing-over, the dominant female was responsible for the vast majority. Thus, standing-over appears to be primarily female-oriented, as has previously been reported for Wolves, *Canis lupus*, and may involve two functions: (1) to advertise the reproductive state of the animal doing the standing-over and (2) to assert dominance via a low-intensity agonistic interaction.

**Key Words:** Coywolf, Eastern Coyote, *Canis latrans* × *lycaon*, agonistic/aggression, behavior, breeding/dominant female, standing-over.

To fully understand a given species' social system, it is important to gain insight into the nature of interactions between members of that species. Some animals, like Coywolves (*Canis latrans* × *lycaon*) (also called Eastern Coyote; Way et al. 2010), are elusive and are rarely observed for extended periods in the wild (although see Way 2003 and 2007a); therefore, it is likely that there are aspects of the behavior that have previously not been reported. Many of the constraints of observing Coywolves in the wild can be rectified by observing them in captivity (e.g., Way et al. 2006). Either in the field or in captivity, however, it is important to note behaviors which take place in a given species to see if they occur within closely related species. For instance, this could aid in identifying relatedness among and between taxa/species. For example, the Coywolf is a Coyote × Eastern/Red Wolf hybrid that currently has questionable taxonomic status (Way et al. 2010). Gaining insight into behaviors documented among closely related species of *Canis* could aid scientists/managers in properly classifying the species within their jurisdictions.

Standing-over has been documented in Wolves, *Canis lupus*, both in the wild (Mech 2001) and in captivity (Goodmann and Klinghammer 1990\*: 26; Schmidt et al. 2004\*: 51). Standing-over, as defined by Mech (2001), is a low-intensity display in which one canid casually approaches a recumbent (i.e., lying) one and stands over or alongside the recumbent canid so that the standing individual's groin is positioned above the recumbent canid's nose. It is not usually characterized by aggression or play. To my knowledge, this behavior has not been reported in Coyotes (*Canis latrans*) or Coywolves, either in the wild or in captivity, except briefly by Way et al. (2006: 270). This study describes unique behavioral data previously unreported.

### Methods

This study took place from April 2002 to October 2003 on five captive, hand-reared Coywolves detailed

previously (Way et al. 2006; Way 2007b). The pups were born on 18 and 19 March 2002, so were studied from the age of 1 month to 19 months. I created an ethogram on Coywolf behavior on standardized observation forms whereby I used focal animal sampling to collect spot/instantaneous fixes every 15 seconds for 30 minutes (Way et al. 2006). Typically one or two 30-minute observation bouts took place six days a week. Of the 540 behavioral patterns recorded on the ethogram, 6 of those described different positions of standing-over behaviors (see Way et al. 2006: 270).

To assess for dominance, I quantified dyadic interactions. I ranked the Coywolves and called the top-ranking male and female the dominant pack members. The remaining three Coywolves were referred to as intra-sex (i.e., male or female) rank 2 or 3, even though the second-ranked male (Trans) was dominant over all three females after three months of age.

To analyze standing-over among individuals, seasons (winter, spring, summer, and fall), and years (2002 vs. 2003), I used a chi-square test of heterogeneity (Microsoft Excel, Microsoft Corporation, www.microsoft.com) to detect for differences. I calculated the expected frequency by analyzing the difference in total spot observations per Coywolf or timeframe (i.e., season or year) by comparing the total number of instances of standing-over observed with the total number of spot fixes per session (i.e., per individual, a specific season, or year).  $P < 0.05$  represents statistical significance.

### Results

I observed standing-over 133 times during the study (Table 1; Figures 1 and 2, and cover). The majority of instances of standing-over were initiated when the Coywolf that was being stood over lay down ( $n = 120$ ). The Coywolf that stood over the lying Coywolf walked up to the recumbent individual and stood over it (Figures 1 and 2) with its inguinal area over the head of the lying animal (Figure 3). Standing-over bouts lasted 10 seconds to 3 minutes (average = 30 seconds) and

TABLE 1. Coywolf gender, intra-sex rank, number of instances of standing-over observed, and number of behaviour observations recorded between April 2002 and October 2003 in a captive pack.

ID	Sex	Rank	Standing-over behaviour recorded	Behavior observations recorded <sup>1</sup>
Cane	F	1	95	14 880
Caon	F	2	12	14 280
Late	F	3	6	14 280
Lupe	M	1	18	14 640
Trans	M	2	2	14 440
Total	3F, 2M		133	72 520

<sup>1</sup>Observations refer to number of spot-sample data points collected every 15 seconds on each individual.

were terminated when the Coywolf doing the standing-over (Figures 1 and 2) walked away or when the individual being stood over (Cover) got up.

While all individuals performed standing-over, the dominant female (Cane) performed the vast majority ( $\chi^2 = 216.8$ ,  $df = 4$ ,  $P < 0.00001$ ; Table 1). In fact, she did more standing-over (95) than the other four Coywolves combined (38; Table 1). Cane performed slightly less standing-over than expected in winter, spring, and summer and more than expected during fall ( $\chi^2 = 9.16$ ,  $df = 3$ ,  $P = 0.027$ ; Table 2). She also performed more standing-over in her second year (2003) than in her first ( $\chi^2 = 135.4$ ,  $df = 1$ ,  $P < 0.00001$ ).

## Discussion

Like the Mech (2001) study of standing-over behavior in wild Wolves, this study found that the dominant female performed the majority of standing-over. Harrington and Asa (2003: 82) mistakenly stated (cf. Mech 2001) that males perform more standing-over and that they do it to advertise hormonal condition, but no data were provided to support this claim. Thus, until more evidence is presented to the contrary, standing-over seems to occur most frequently in dominant female canids, although all individuals may perform the behaviour (Mech 2001; this study: Table 1).

Mech (2001) thought that standing-over was performed to advertise reproductive condition. While I concur, I also believe there are other, potentially subtle, reasons for this behavior in canids. Because the dominant female performed the majority of standing-over in my study pack (Figures 1 and 2), I believe that it is also a non-agonistic way of asserting dominance. Unfortunately, although I did not quantify dyadic standing-over, I did notice that Cane performed more standing-over on the second-ranked female in the pack (Caon; Figure 1) than the others. Most of these instances of standing-over with Caon were not friendly in nature. Caon, in a recumbent position, either ignored Cane standing directly above her, or one of the indi-



FIGURE 1. Dominant female Coywolf Cane standing over her sister Caon.

viduals exhibited low-intensity growling toward the other. I did not notice friendly or amiable interactions occurring between Cane and Caon during a standing-over. I believe that these interactions would best be qualified as low-aggression interactions. The second most common animal that Cane stood over was the dominant male (Lupe; Figure 2), and I do believe that these instances of standing-over were done to advertise reproductive condition. Lupe occasionally sniffed Cane's inguinal area during these instances of standing-over. Future studies should quantify dyadic interactions more fully when collecting a valid sample size for later analysis.

Cane performed more standing-over than expected during fall (Table 2). She was probably advertising her reproductive condition to Lupe while also passively asserting her dominance over Caon. This coincided with pre-breeding activities before more aggressive behaviors were witnessed in this group during winter (J. Way, unpublished data). It is also of interest that Cane performed more standing-over during her second year than in her first. While this study spanned only the first one and a half years of the animals' lives and ended with the separation of the pack in late-October 2003 due to intra-pack aggression, I did observe Cane performing more standing-over than Caon or Lupe when the three lived together from late 2003 until I stopped observing them in February 2005, just prior to their third birthday (J. Way, unpublished data; Way 2007b). Long-term data on individual Coywolf/canids standing-over behavior would be helpful to elucidate at what age(s) standing-over behavior is most commonly observed.

This study documented standing-over behavior in Coywolves, previously only reported in detail for Wolves (Mech 2001), and it provides additional data showing that it is primarily the dominant female that



FIGURE 2. Dominant female Coywolf Cane standing over dominant male, Lupe.

performs standing-over. Future studies should be longer (e.g., Mech 2001) and should collect more detailed data. Additionally, researchers should also attempt to document standing-over behavior in wild Coywolves and Coyotes.

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TABLE 2. Seasonal variation in number of instances of standing-over by the dominant female Coywolf, Cane, of the captive study pack and number of behaviour observations recorded.

Season	Standing-	Behavior	Expected <sup>1</sup>
	over behaviour recorded	observations recorded	
Winter (December–February)	8	1 680	11
Spring (March–May)	26	4 680	30
Summer (June–August)	32	5 760	37
Fall (September–November)	29	2 760	18
Total	95	14 880	

<sup>1</sup>Chi-square expected value calculated based on observations (spot samples) taken per season compared to total instances of standing-over observed and total fixes taken.

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