

## ANALYSIS OF COYOTE VOCALIZATIONS

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Research on coyote vocalizations have included McCarley's (1975) description of long-distance vocalizations and Lehner's (1976) descriptive lexicon of vocalizations including a discussion of their behavioral context. The research reported on here is one phase of continuing research to determine the function of the lone howl, group howl and group yip-howl vocalizations.

### Methods

The period July 3 - August 11, 1976, was spent conducting field studies in Grand Teton National Park and on the National Elk Refuge. The Jackson Hole Biological Research Station, Moran, Wyoming, provided housing. The study was conducted as two separate, but related research projects.

### Broadcasts of Lone Howl and Group Yip-howl

Thirty playback sites were randomly selected from the 44 sites used in 1975 at which vocal responses were received. Each site was sampled twice. A sample consisted of broadcasting one vocalization, listening for 15 minutes, broadcasting the other vocalization and listening for five minutes. The vocalization to be played first on the first sample was randomly selected. On the second sample the order was reversed. Time between samples averaged 14 days (range 2-30 days). Broadcasts were always made at night between 22.02 and 04.25 hrs. The electronic broadcast system consisted of a Uher 4000 Report-L audio taperecorder with BASF DP-26 tape, a Realistic MPA-20 amplifier and a Realistic PA-12 trumpet speaker. Responses were recorded on a Nagra IV-L taperecorder with an Electro-Voice microphone and a Torngren parabolic reflector. Written records of responses were also maintained. In addition, during each sample environmental light levels were measured horizontal to the ground in the four cardinal directions at a height of two feet with a Gamma Scientific photometer.

### Observational Playback

Three groups of coyotes (designated A, B and C) holding adjacent territories on the National Elk Refuge were observed during the daylight hours throughout the study period. Three vocalizations were selected for playback to individuals or groups from different locations within their territories. The three vocalizations were: (1) unfamiliar lone howl, (2) unfamiliar group yip-howl, and (3) familiar group yip-howl from group B. Playback was made by one researcher who was hidden from view of the coyotes while the other researcher observed the behavior of the coyotes from a distant location with the aid of a spotting scope. Mr. Michael C. Wells was my research assistant throughout the study.

## Results

The results of the vocalization broadcasts are shown in Table 1. Barks and bark-howls are alarm and threat vocalizations that were given only after we were approached closely by coyotes and apparently identified as an unusual and unexpected source of vocalizations; these vocalizations were not included in the analysis. Vocal responses were generally given to like vocalization-broadcasts; that is, group yip-howls were given most often in response to group yip-howl broadcasts, and lone howls to lone howl broadcasts. However, this is significant only at the 90% level ( $\chi^2 = 3.03$ ,  $df = 1$ ,  $p < 0.10$ ). The ratio of 'response' to 'no response' was compared for broadcasts made when the mean light level was above and below  $1.0 \times 10^{-3}$  ftc. Significantly more responses were given to broadcasts made when light levels were above  $1.0 \times 10^{-3}$  ftc. than to those below. I believe this is a result of increased activity of the coyotes rather than the higher environmental light level per se.

Forty-four vocalization playbacks were made to coyotes under observation. Additional playbacks were made 23 times following an initial playback. Additional playbacks were the same or different vocalizations depending on the observer's assessment of the coyote's behavior and his judgement as to what vocalization would be most appropriate. The responses of the coyotes to these playbacks are shown in Table 2. This project can be considered only as a research probe at this point, and the results are only preliminary and tentative. However, there are four results worthy of emphasis: (1) all the attacks and 80% of the approaches were made to unfamiliar vocalizations; (2) most (7 of 8) of the group yip-howl responses were given to group yip-howl playbacks; (3) the animals appeared to be able to discriminate between lone howls of group members and non-group coyotes; and (4) location of playback in the territory did not appear to be as important in determining an individual's response as did the ongoing behavior or social status of that individual.

## Conclusions

The broadcast experiments weakly supported the hypothesis that the lone howl and group yip-howl are qualitatively different vocalizations. The entire behavioral response of coyotes to playback during the day is extremely variable but the results do suggest that important variables affecting the responses are: vocalization type, familiarity of vocalization, social status and ongoing behavior of the recipient coyote(s).

## Literature Cited

- Lehner, P. N. 1976. Coyote vocalizations: a lexicon and comparisons with other canids. *Anim. Behav.* (in press).
- McCarley, H. 1975. Long-distance vocalizations of coyotes (*Canis latrans*). *J. Mamm.* 56(4): 847-856.

Table 1. Coyote vocalizations elicited by 60 broadcasts of lone howls and group yip-howls, Jackson Hole, Wyoming, July-August, 1976.

Vocalization Broadcast	No. of Responses				Total No. Responses	No. of broadcasts in which no response was received
	Bark	Bark-howl	Lone Howl	Group Howl		
Lone Howl	3	3	26	6	46	34
Group Yip-howl	1	1	20	4	43	31
Totals	4	4	46	10	89	65

Table 2. Responses of individual coyotes to broadcasts of selected vocalizations, National Elk Refuge, Jackson, Wyoming, July-August, 1976.

Vocalization	Coyote Group	Vocal Responses					Withdrawal	Approach	Attack	No Response
		Bark	Bark-howl	Lone Howl	Group Howl	Group Yip-howl				
Lone Howl (unfamiliar)	A	1	1				1P*	8	2	12 + 1P
	B						1			1
	C			9	2	1		2		3 + 1P
	Total	1	1	9	2	1	1 + 1P	10	2	16 + 2P
Group Yip-howl (unfamiliar)	A	1	3	11		2	1	3	5	4
	B			2P		1	1P	1		1P
	C							2		1
	Total	1	3	11 + 2P		3	1 + 1P	6	5	5 + 1P
Group Yip-howl (familiar)	A	1	1	1		2	3 + 1P	4		3
	B									
	C			3	1	2				1
	Total	1	1	4	1	4	3 + 1P	4		4
Totals	3	5	24 + 2P	3	8	5 + 3P	20	7	25 + 3P	

\*"1P" denotes pup.