

SEASONAL PATTERNS IN LONG-DISTANCE VOCALIZATIONS OF THE PAMPAS FOX

LYN C. BRANCH, Department of Wildlife Ecology and Conservation and Program for Studies in Tropical Conservation, 303 Newins-Ziegler Hall, P.O. Box 110430, University of Florida, Gainesville, Florida, U.S.A. 32611. (Tel: 1-904-392-4851; FAX: 1-904-392-6984; E-mail: lcb@gnv.lfas.ufl.edu)

Reprinted from *Vida Silvestre Neotropical* 3(2):108-111 (1994). Programa Regional en Manejo de Vida Silvestre para Mesoamérica y el Caribe, Universidad Nacional, Heredia, Costa Rica.

SEASONAL PATTERNS IN LONG-DISTANCE VOCALIZATIONS OF THE PAMPAS FOX

LYN C. BRANCH, Department of Wildlife Ecology and Conservation and Program for Studies in Tropical Conservation, 303 Newins-Ziegler Hall, P.O. Box 110430, University of Florida, Gainesville, Florida, U.S.A. 32611. (Tel: 1-904-392-4851; FAX: 1-904-392-6984; E-mail: lcb@gnv.lfas.ufl.edu)

ABSTRACT

I describe a long-distance, nocturnal vocalization of the pampas fox (*Dusicyon gymnocercus*) with a sonogram and document seasonal patterns of vocalizations (n=132) during 179 nights from June 1985 to December 1986 in La Pampa Province, Argentina. Mean number of vocalizations/hr varied among months (P<0.0001) and exhibited a strong peak during the breeding season in August. Vocalization rates were low during gestation and parturition (September to December). During breeding, high vocalization rates may help maintain exclusive reproductive access to mates, or function in mate attraction. Pampas foxes usually do not hunt in close proximity to their mates. Vocalizations may maintain loose connections between members of a pair, as well as advertise home range occupancy.

KEY WORDS: Argentina, *Dusicyon gymnocercus*, pampas fox, seasonal vocalization rates, sonogram, vocalizations

RESUMEN

Describo una vocalización nocturna de larga distancia del zorro de la pampa (*Dusicyon gymnocercus*) con un sonograma. Documento los patrones estacionales de vocalizaciones (n=132) durante 179 noches desde junio 1985 hasta diciembre 1986 en la provincia de La Pampa, Argentina. El número medio de vocalizaciones/hr varió según el mes (P<0,0001) y mostró su máximo punto durante la estación reproductora en agosto. Las tasas de vocalización fueron bajas durante la gestación y los nacimientos (setiembre a diciembre). Durante la reproducción la tasa elevada de vocalizaciones podría indicar el mantenimiento de un acceso exclusivo reproductor entre parejas, tanto como un funcionamiento de la atracción entre parejas. Además, las vocalizaciones del zorro de la pampa podrían mantener enlaces

apartados entre parejas, tanto como advertir la residencia en un territorio, en vista de la lejanía usual entre zorros.

PALABRAS CLAVES: Argentina, *Dusicyon gymnocercus*, sonograma, tasa estacional de vocalizaciones, vocalizaciones, zorro de la pampa

RESUMO

Descrevo uma vocalização noturna da raposa dos pampas (*Dusicyon gymnocercus*) com um sonograma e documento os padrões sazonais de vocalizações (n=132) durante 179 noites entre junho de 1985 e dezembro de 1986 na província de La Pampa, Argentina. O número médio de vocalizações/hr variou entre os meses (P<0,0001) e exibiu um pico notável durante a estação de acasalamento em agosto. As taxas de vocalização foram baixas durante a gestação e parto (setembro a dezembro). O pico da taxa de vocalização durante o acasalamento pode ajudar a manter o acesso exclusivo aos parceiros, e também a atraí-los. As vocalizações da raposa dos pampas também podem manter uma relação débil entre os membros de um casal, bem como anunciar a ocupação de um território, já que as raposas normalmente não estão em contato próximo entre elas.

PALAVRAS-CLAVES: Argentina, *Dusicyon gymnocercus*, onograma, taxa sazonal de vocalizações, raposa dos pampas.

VIDA SILVESTRE NEOTROPICAL 3(2):108-111

Vocalizations are a primary mode of communication throughout the canid family (Fox and Cohen 1977). Long-distance vocalizations, which probably function as spacing mechanisms, have been documented in a variety of species ranging from the highly social wolves (*Canis lupus*) and coyotes (*C. latrans*), to the relatively solitary maned wolf (*Chrysocyon brachyurus*) (Dietz 1984, Harrington and Mech 1983, Kleiman 1972, McCarley 1975). However, most research on vocalizations has been conducted in captivity and emphasizes communication of animals in close proximity, such as during agonistic encounters, mating, greeting ceremonies, and food sharing (Brady 1981, Cohen and Fox 1976, Tembrock 1976). Seasonal patterns of vocalizations in the field have been quantified for only a few canid species (Laundre 1981, Peters and Wozencraft 1989), and even general descriptions of vocalizations are lacking for most foxes of the South American genus *Dusicyon* (= *Pseudalopex*).

The pampas fox inhabits grasslands, open woodlands, and scrub from southeastern Brazil through central Argenti-

na (Cabrera and Yepes 1960). This species is monoestrous (Crespo 1971). In central Argentina, mating occurs between August and October, and young are born from October to December. In this paper, I describe a long-distance vocalization of the pampas fox, document changes in vocalization rate throughout the year, and discuss temporal patterns of vocalizations in the context of the annual reproductive cycle.

METHODS

Research was conducted in Lihue Calel National Park, La Pampa, Argentina (38°00'S, 65°35'W, Fig. 1). This area (8000 ha) is semi-arid scrub, 300 m above sea level. Data on foxes were collected during a behavior study of the plains vizcacha (*Lagostomus maximus*), a large nocturnal rodent. Between June 1985 and December 1986, observations were conducted on 179 nights (858 h) from six platforms (1.5-2 m) located in a 14-ha study area. Sampling was restricted to calm nights so that seasonal changes

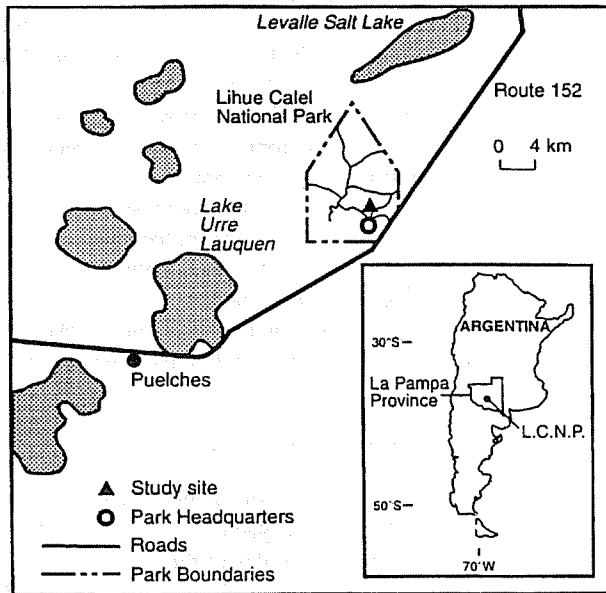


Figure 1. Location of Lihue Calel National Park and La Pampa Province in Argentina, South America.

in wind would not bias results by influencing the distance vocalizations were audible. Observations began about 0.5 h before dusk. Throughout the night, the landscape was scanned with a spotlight and binoculars (see Branch 1993, for details), and all vocalizations and sightings of foxes were noted. Males and females could not be distinguished by sound or visually. The only type of fox call heard during this study was the long-distance vocalization described in this paper. Occasionally this vocalization was heard during the day, but diurnal vocalizations were not quantified.

A sonogram was produced with a sonograph (model 7029A, wide band filter, Kay Elemetrics Corp., Pine Brook, New Jersey, U.S.A., 07058) from vocalizations recorded in the field with a cassette recorder (Sony Professional, model WMD6C). The number of vocalizations/hr was calculated for each night of observation. Nightly rates were averaged for each month. The number of vocalizations recorded each month was compared to an expected frequency based on equal vocalization rates, by way of chi-square goodness-of-fit analysis. The expected number for each month was determined by multiplying the mean number of vocalizations/hr, over all months, by the number of hours of observation during that month. Data were combined for 1985 and 1986, but data for January and May were excluded because of low sampling effort.

RESULTS AND DISCUSSION

The long-distance call of the pampas fox is a wide band

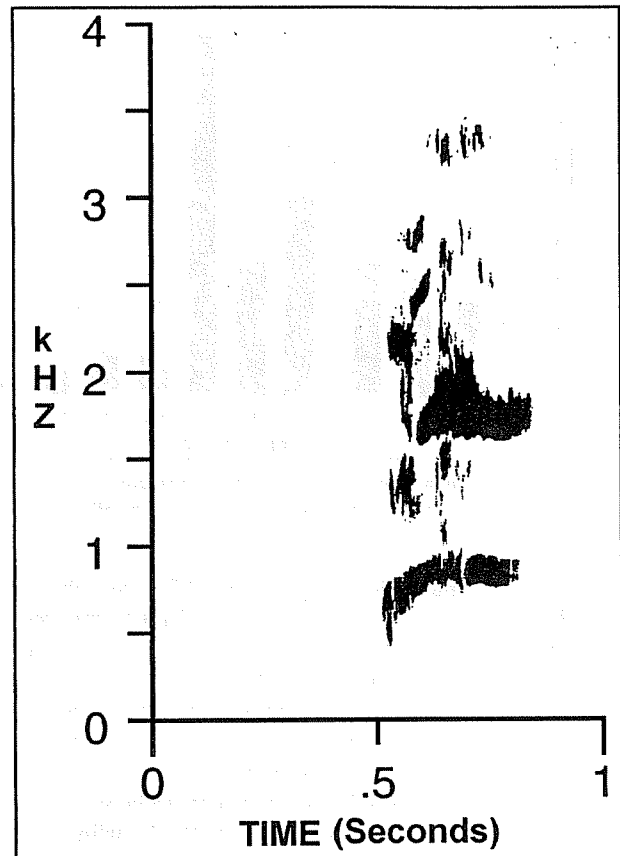


Figure 2. Sonogram of the long-distance vocalization of the pampas fox.

vocalization with a rising tone, rapid frequency modulation, and multiple overtones (Fig. 2). Amplitude peaks at about 1.75 kHz. Cabrera and Yepes (1960) described this vocalization phonetically as *gua-a-a!*. I heard this call from more than a km away. A similar vocalization of *D. griseus* carries a distance of at least 3 km (W. E. Johnson, National Cancer Institute, pers. comm.).

Vocalizations (n=132) were heard throughout the year. Generally, only a single call was given, but occasionally bouts consisted of two calls separated by a few seconds. Vocalization rates differed among months ($X^2=102$, d.f.=9, $P<0.0001$) and were greatest in winter (Fig. 3). On 19 occasions, vocalizations elicited a similar vocalization by another fox. Once in August, two foxes responded to a single long-distance call. Reciprocal vocalizations were heard during all months except from September to December. The increase in vocalizations in June (Fig. 3) coincides with the onset of seasonal weight gain in gonads of males (Crespo 1971). Vocalizations peaked in August as pairing and copulations are initiated. After August, gonadal

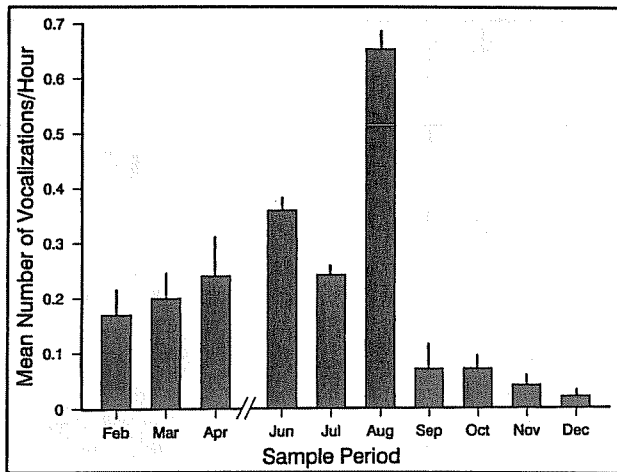


Figure 3. Mean number (\pm SE) of fox vocalizations per hour of nocturnal observation by sample month.

weight in males declines (Crespo 1971), and there was a sharp decline in vocalizations. Vocalization rate remained low throughout the period of gestation and parturition (September - December).

The primary function proposed for long-distance vocalizations is the maintenance of space. In some species, such as the crab-eating fox (*Cerdocyon thous*), long-distance vocalizations are used to maintain contact between members of a pair during foraging (Brady 1979). Howling in wolves (*C. lupus*) advertises the location of packs and is a principal spacing mechanism among social groups (Harrington and Mech 1983). Brady (1981) noted that canids often use the same vocalization in a variety of contexts. In a study of maned wolves, Dietz (1984) recorded exchanges of "roar-barks" between neighboring pairs and between members of a pair, and suggested that this vocalization may be related to spacing within and between pairs.

The social organization of the pampas fox has not been studied, and few background data on this species are available for interpretation of the long-distance vocalization. However, other *Dusicyon* exhibit spacing patterns typical of most fox species (Johnson and Franklin 1994). The members of a pair share a territory throughout the year, and there is little overlap between neighboring pairs. In *D. griseus*, the most well-studied species, members of a pair do not hunt together (Johnson and Franklin 1994). Ninety-three percent of my observations of pampas foxes were of single individuals ($n=40$), indicating that these foxes also do not hunt in close proximity to mates. In absence of visual contact, the *gua-a-a!* vocalization of the pampas fox could help maintain loose connections between members of a pair, as well as advertise home range occupancy.

Greater rates of vocalizations during the breeding season have been noted for a variety of canid species (Brady 1981,

Dietz 1984, Klinghammer and Laidlaw 1979, Nel and Bester 1983, Peters and Wozencraft 1989), including *D. griseus* (W. E. Johnson, National Cancer Institute, Frederick, Maryland, 21702 U.S.A., pers. comm.). During the reproductive period, territorial advertisement, as well as increased communication among members of a pair, may be particularly important in maintenance of exclusive reproductive access to mates. Also, this increase in vocalizations may function in mate attraction (Klinghammer and Laidlaw 1979). In *D. griseus*, foxes frequently change mates between years (Johnson and Franklin 1994). Field studies of the social behavior and mating strategies of the pampas fox are basic to further understanding the functions of long-distance vocalizations.

ACKNOWLEDGMENTS

For logistical support, I thank the Administración de Parques Nacionales, Parque Nacional Lihue Calel, Facultad de Ciencias Exactas y Naturales of the Universidad Nacional de La Pampa, Dirección de Recursos Naturales de La Pampa, the Norlander family, and M. Romero. I gratefully acknowledge the assistance of G. Fowler, D. Villarreal, and E. Villarreal in the field. I thank T. Webber for producing the sonogram. J. Eisenberg, W. Johnson, and M. Sunquist generously shared their knowledge of foxes with me and read drafts of this paper. Financial support was provided in part by the Argentine Secretariat of Science and Technology and the Florida Agricultural Experiment Station. This is Florida Agricultural Experiment Station Series No. R-04146.

LITERATURE CITED

- BRADY, C. A. 1979. Observations on the behavior and ecology of the crab-eating fox (*Cerdocyon thous*). Pages 161-171 in J. Eisenberg, ed. Studies of vertebrate ecology in the northern neotropics. Smithsonian Institution Press, Washington, D. C., U.S.A. 271 pp.
- . 1981. The vocal repertoires of the bush dog (*Speothos venaticus*), crab-eating fox (*Cerdocyon thous*), and maned wolf (*Chrysocyon brachyurus*). *Animal Behavior* 29:649-669.
- BRANCH, L. C. 1993. Intergroup and intragroup spacing in the plains vizcacha, *Lagostomus maximus*. *Journal of Mammalogy* 74:890-900.
- CABRERA, A. and J. Yepes. 1960. *Mamíferos Sud Americanos*. Volumen 1. Historia Natural Ediar, Buenos Aires, Argentina. 187 pp.
- COHEN, J. A. and M. W. Fox. 1976. Vocalizations in wild canids and possible effects of domestication. *Behavioural Processes* 1:77-92.
- CRESPO, J. A. 1971. Ecología del zorro gris *Dusicyon gymnocercus antiquus* (Ameghino) en la provincia de La Pampa. *Revista del Museo Argentino de Ciencias Naturales "Ber-*

- ardino Rividavia" 1:147-205.
- DIETZ, J. M. 1984. Ecology and social organization of the maned wolf (*Chrysocyon brachyurus*). Smithsonian Contributions to Zoology 392:1-51.
- FOX, M. W. and J. A. COHEN. 1977. Canid communication. Pages 728-748 in T. A. Sebeok, ed. How animals communicate. Indiana University Press, Bloomington, Indiana, U.S.A. 1128 pp.
- HARRINGTON, F. H. and L. D. MECH. 1983. Wolf pack spacing: howling as a territory-independent spacing mechanism in a territorial population. Behavioral Ecology and Sociobiology 12:161-168.
- JOHNSON, W. E. and W. L. FRANKLIN. 1994. Conservation implications of South American grey fox (*Dusicyon griseus*) socioecology in the Patagonia of southern Chile. Vida Silvestre Neotropical 3:16-23.
- KLEIMAN, D. G. 1972. Social behavior of the maned wolf (*Chrysocyon brachyurus*) and bush dog (*Speothos venaticus*): a study in contrast. Journal of Mammalogy 53:791-806.
- KLINGHAMMER, E. and L. LAIDLAW. 1979. Analysis of 23 months of daily howl records in a captive grey wolf pack (*Canis lupus*). Pages 153-181 in E. Klinghammer, ed. The behavior and ecology of wolves. Garland STPM Press, New York, New York, U.S.A. 588 pp.
- LAUNDRE, J. W. 1981. Temporal variation in coyote vocalization rates. Journal of Wildlife Management 45:767-769.
- MCCARLEY, H. 1975. Long-distance vocalizations of coyotes (*Canis latrans*). Journal of Mammalogy 56:847-856.
- NEL, J. A. J. and M. H. BESTER. 1983. Communication in the southern bat-eared fox *Otocyon m. megalotis* (Desmarest, 1822), Zeitschrift fur Säugetierkunde 48:277-290.
- PETERS, G. and W. C. WOZENCRAFT. 1989. Acoustic communication by fissiped carnivores. Pages 14-56 in J. L. Gittleman, ed. Carnivore behavior, ecology, and evolution. Cornell University Press, Ithaca, New York, U.S.A. 620 pp.
- TEMBROCK, G. 1976. Canid vocalizations. Behavioural Processes 1:57-75.

Associate Editor: Javier Simonetti