Use of century plants (Agave palmeri) by coatis (Nasua narica)

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of plague. When handling foxes likely to have live fleas, we recommend dusting the foxes immediately with flea powder containing pyrethrins. Handlers should wear long sleeves, long pants, and double or heavy gloves, and handle foxes on a brightly-colored plastic sheet so that fleas are more easily seen.

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USE OF CENTURY PLANTS (*AGAVE PALMERI*) BY COATIS (*NASUA NARICA*)

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Abstract—We report observations and quantification of white nosed coatis (*Nasua narica*) using century plants (*Agave palmeri*) as a novel food source in Arizona. After observing a female coati eating in century plants, we inspected all flowering century plants in areas of coati activity for presence of scratch marks. Use of agaves by coatis was relatively common. Coatis climbed plants with large diameter at breast height relative to unscratched plants, but did not preferentially use agaves based on height or number of flower aggregations. Agaves in areas of high coati activity were more likely to possess scratch marks. Flowering agaves contain nectar, pollen, and arthropod species, all of which likely provide nutrition. The opportunistic foraging and willingness of coatis

to experiment with unique food sources might partially explain the expansive distribution of the species under a wide variety of ecological conditions.

RESUMEN—Describimos y cuantificamos el uso del agave (*Agave palmeri*) por los pisotes (*Nasua narica*) como nuevas fuentes alimenticias en Arizona. Después de observar a una hembra alimentándose de un agave, buscamos los rasguños de pisote en todas las agaves en flor ubicadas en áreas utilizadas por pisotes. El uso de las agaves por los pisotes fue relativamente común. Los pisotes treparon las agaves con el tallo más grueso en comparación a las plantas no rascadas, pero no distinguieron entre las plantas según la altura ni el número de agregaciones florales. Las agaves ubicadas en las áreas más utilizadas por los pisotes mostraron más probabilidad de tener rasguños. Las flores del agave contienen néctar, polen y especies de artrópodos: alimentos potenciales para los pisotes. Puede ser que el forrajeo oportunista y la tendencia a experimentar con nuevas fuentes alimenticias parcialmente expliquen la habilidad del pisote de habitar un rango geográfico amplio y con diversas condiciones ecológicas.

White nosed coatis (*Nasua narica*) are social carnivores common to Neotropical forests (Gompper, 1995), but reach the northernmost point of their range in xeric mountains of southeastern Arizona and southwestern New Mexico (Kaufmann et al., 1976). In tropical forests, coatis forage in canopy and subcanopy vegetation consuming large numbers of invertebrates and fruit (Gompper, 1995). In the northern part of their range, coati food habits are less well described; large fruits are uncommon and invertebrates, such as insects, are plentiful only during warm months. Temperate coati home ranges are markedly larger than tropical ranges (Lanning, 1976; Ratnayeke et al. 1994; Gompper, 1995). This discrepancy might be due to decreased productivity of northern forests (Lanning, 1976; Valenzuela and Ceballos, 2000). In the southwestern United States, anecdotal sightings report coatis shifting from fruits and invertebrates to a more granivorous diet composed of seeds of oak (*Quercus*), juniper (*Juniperus*), and manzanita (*Arctostaphylos*) (Wallmo and Gallizioli, 1954; Gilbert, 1973; Kaufmann et al., 1976).

On 18 July 1997, at approximately 0700 hours, we observed an adult female coati climbing and foraging in a century plant (*Agave palmeri*) in Chiricahua National Monument, Arizona (31°60.5'N, 109°19.0'W). She fed for several minutes, descended, and repeated her behavior on 2 neighboring plants. Upon examination of the stalk, we noted that coatis leave distinctive claw marks (multiple parallel scratches approximately 5 cm wide and ≥1 cm apart) when ascending century plants. Ringtails (*Bassariscus astutus*) and Chiricahua fox squirrels (*Sciurus nayaritensis chiricahae*), the only other clawed arboreal mammals in Chiricahua, would leave substantially smaller scratches. During summers of 1998 and 1999, our research team observed 4 females and 1 male on century plants, suggesting that this foraging behavior might be relatively common. Herein, we report results of our survey of use of century plants by coatis.

Since 1996, coatis have been captured using live traps (102 cm × 31 cm × 31cm; Tomahawk Live Traps, Tomahawk, Wisconsin) baited with wet cat food. Traps were set in Bonita and Rhyolite canyons of Chiricahua National Monument. Once trapped, animals were transferred to handling cones, weighed (±100 g), sexed, and fitted with radio collars (Wildlife Materials, Inc., Carbondale, Illinois). Individual identification was enhanced by banding tails with unique colored tape patterns (Gilbert, 1973). Radiotelemetry was used to locate 16 adult coatis (10 females, 6 males) every hour (0600 to 1900) from 19 July through 21 August 1997. Locations were triangulated within 2.5-ha grid squares on study area maps.

To quantify frequency of century plant use, we examined all flowering century plants (n = 111) located in canyons monitored for coati activity. Century plant stalks were inspected for presence of coati scratch marks. Plant height (measured by clinometer) and number of branches in the inflorescence (number of flower aggregations) were recorded for all plants. Diameter at breast height (DBH) was measured for 82 plants. Plant locations were plotted on a topographical map of the study area, which was divided into 2.5-ha grid squares.

To determine whether coatis preferentially used plants with particular morphology, Stu-

dent's *t*-tests were used to compare mean DBH, stalk height, and number of branches on scratched versus unscratched plants. Coati locations within the grid square containing a plant and in the 8 contiguous grid squares were tallied for all plants. Chi-square goodness-of-fit tests were used to examine congruence between coati distribution and grid squares with scratched and unscratched century plants. Mann-Whitney *U*-tests were used to compare number of radiotelemetry locations near scratched and unscratched agaves. Scratched agaves should be more likely found in areas with more coati activity.

Use of agaves by coatis was relatively common, with scratch marks detected on 24.3% of 111 century plants. Coatis climbed plants with large DBH (5.83 ± 0.34 cm) relative to unscratched plants (4.64 ± 0.25 cm; $t = 2.76$, $df = 80$, $P < 0.01$), but did not differentially use agaves based on height (scratched: 6.05 ± 0.35 m, unscratched: 6.24 ± 0.20 m; $t = 0.46$, $df = 109$, $P > 0.06$) or number of flower aggregations (scratched: 15.52 ± 0.87, unscratched: 14.86 ± 0.59; $t = 0.57$, $df = 109$, $P > 0.50$). More frequent use of agaves with large DBH suggests plant selection might be influenced by ability of the stalk to support a body mass over 6 kg (Gilbert, 1973; Gompper, 1995).

Agaves in areas of high coati activity were more likely to possess scratch marks. Scratched agaves were found in areas frequently visited by coatis (within the same grid square as agave: $\chi^2 = 54.70$, $df = 1$, $P < 0.01$; within 1 grid square surrounding agave: $\chi^2 = 185.57$, $df = 1$, $P < 0.01$). Mean number of coati visits to the same grid square as agaves did not differ between scratched and unscratched plants ($W = 1000.00$, $df = 70$ and 25, $P > 0.50$); however, mean number of coati visits within 1 surrounding grid square was greater for scratched plants ($W = 1163.00$, $df = 70$ and 25, $P = 0.05$).

A. palmeri produces large amounts of nectar (Schaffer and Schaffer, 1977), which is used by other species as a food source (Slauson, 2000). These agaves also house several species of arthropods (Waring and Smith, 1987) that, along with pollen, might make up a portion of coati diet. Flowering agaves likely provide a reliable, though short-lived (mean flowering duration for a related agave species is 29 days according to Arizaga et al., 2000), food source for coatis. Opportunistic foraging by coatis (Kaufmann, 1962) and home range plasticity, combined with willingness to experiment with novel food sources (such as century plants), might partially explain the expansive distribution of the species and its ability to survive under a wide range of ecological conditions.

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PRONGHORN USE OF AREAS WITH VARYING SOUND PRESSURE LEVELS

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ABSTRACT—The Sonoran pronghorn (*Antilocapra americana sonoriensis*), a subspecies in danger of extinction, inhabits an area of the Barry M. Goldwater Range (BMGR) in southwestern Arizona. Since 1941, BMGR has been a training site for military pilots. We evaluated whether this subspecies of pronghorn used areas, as defined by noise levels produced by military aircraft, in proportion to their availability. Radiocollar-equipped pronghorn were monitored during September 1994 to August 1998, and their locations were recorded on a map of sound levels. In general, pronghorn used areas with lower levels of noise (<45 decibels [dB]) more than expected and areas with higher levels (≥55 dB) less than expected. More intensive monitoring, habitat influences, and additional measurements of noise in the area, could produce a clearer picture of the factors that determine areas of use within the BMGR by Sonoran pronghorn.

RESUMEN—El berrendo Sonorense (*Antilocapra americana sonoriensis*), una subespecie en peligro de extinción, habita una porción del área Barry M. Goldwater Range (BMGR) en el suroeste de Arizona. Desde 1941, BMGR ha sido un sitio de entrenamiento para pilotos militares. Evaluamos si ésta subespecie de berrendo usa las áreas dentro de BMGR (áreas definidas por el nivel de ruido de aviones militares) en proporción a su disponibilidad. Berrendos equipados con collares con radios fueron monitoreados durante septiembre 1994 y agosto 1998, y sus localizaciones fueron registradas en un mapa de niveles de sonido. Por lo general, los berrendos usaron las áreas con menores niveles de ruido (<45 decibeles [dB]) más de lo esperado, y áreas con mayores niveles (≥55 dB) menos de lo esperado. Un monitoreo más intenso, la influencia del hábitat y registros adicionales de ruido en el área, podrían dar una figura más clara de los factores que determinan el uso de las áreas dentro de BMGR por el berrendo Sonorense.

Wildlife, even in remote settings, are susceptible to human disturbance (Dunnett, 1977). Noise (i.e., sound pressure levels) associated with military aircraft activity and its effects on wildlife is an area of concern for wildlife biologists (Greater Owyhee legal defense versus United States Department of Defense [case number CIV 92 0189 S BLW, United States District Court, District of Idaho, 1999]). Effects of noise from military activity on coyotes (*Canis latrans*) (Gese et al., 1989), mule deer (*Odocoileus hemionus*) (Stephenson et al., 1996; Weisenberger et al., 1996), waterfowl (Conomy et al., 1998), caribou (*Rangifer tarandus*) (Calef et al., 1973), and bighorn sheep (*Ovis canadensis*) (Weisenberger et al., 1996; Krausman, et al.,