

Recent Record of a Cougar (*Puma concolor*) in Louisiana, with Notes on Diet, Based on Analysis of Fecal Materials

PAUL L. LEBERG^{1*}, MICHAEL R. CARLOSS², LARRY J. DUGAS³,
KRISTINE L. PILGRIM⁴, L. SCOTT MILLS⁵, M. CLAY GREEN¹,
AND DANIEL SCOGNAMILLO⁶

Abstract - We report a sighting, supported by DNA evidence from a scat, of a cougar (*Puma concolor*) in southeastern Louisiana. The 16S-rRNA genotype obtained from mtDNA is one that is common throughout North America, making it difficult to determine the origin of the individual. Based on DNA and hair scale analysis, the scat contained the partially digested remains of a dog (*Canis familiaris*) and an eastern cottontail (*Sylvilagus floridanus*), indicating that the individual was successfully foraging on locally occurring prey.

Report and Discussion

Despite repeated reports of sightings of cougars (*Puma concolor* L.) throughout the southeastern United States, little supporting physical evidence exists outside of Florida and Texas. Elsewhere, recent "hard" evidence (see Pritchard 1976, Witsell et al. 1999), such as a photograph, carcass, live capture, scat, or plaster cast of a track, appears to exist only for some portions of Arkansas (Clark et al. 2002, Witsell et al. 1999). Cougars have also been reported recently from southern Illinois (Heist et al. 2001) and Missouri (D. Hamilton, Missouri Department of Conservation, pers. comm. 2004).

The last documented mortality in Louisiana occurred in 1965 in the northwestern parish of Caddo (Goertz and Abegg 1966, Lowery 1974). However, the lack of food in the stomach, as well as the animal's behavior, morphology, and parasite fauna, indicated that it may have originated in captivity (Yenke 1982). Other records from that time period include a cougar treed by a dog in southwestern Louisiana in 1973 and a plaster cast made of a track found in northeastern Louisiana in 1975 (Yenke 1982). We are unaware of other

¹Department of Biology, University of Louisiana, Lafayette, LA 70503. ²USDA/Natural Resources Conservation Service, 646 Cajundome Boulevard, Suite 180, Lafayette, LA 70506. ³Lake Fausse Pointe State Park, 5400 Levee Road, St. Martinville, LA 70582. ⁴Wildlife Genetics Lab, University of Montana/US Forest Service-Rocky Mountains Research Station, Missoula, MT 59812. ⁵Wildlife Biology Program, College of Forestry and Conservation, University of Montana, Missoula, MT 59812. ⁶School of Renewable Natural Resources, Louisiana State University, Baton Rouge, LA 70803. *Corresponding Author - Leberg@Louisiana.edu.

strong evidence for the state in the last 25 years, but we now report a recent sighting of a cougar in southern Louisiana, along with results of associated analyses of a scat found at the same location.

The sighting occurred near the entrance of Lake Fausse Pointe State Park in St. Martin Parish Louisiana (\approx N $30^{\circ} 03.837'$, W $91^{\circ} 36.436'$). The predominant cover type on the park is bottomland hardwood forest and cypress (*Taxodium distichum* [L.] Rich) swamp. This 2400 ha park is adjacent to the Atchafalaya River Basin (Fig. 1). The Atchafalaya Basin, and adjacent swamps and bottomland forests, may be the largest (3600 km²) continuous forested wetland in North America.

On April 23, 2002 at approximately 2015 h, one of us (MC) and a passenger in the same vehicle observed a cougar on the mowed shoulder of an asphalt road. The stationary animal was first viewed approximately 50 m from the vehicle and appeared to be hunched down or squatting. As the vehicle approached to within 18 m, the animal first turned towards the vehicle and then started trotting towards the adjacent bottomland forest (approximately 25 m away). The observers came within 9 m of the animal, which was observed for about 20–30 seconds. This sighting was made under twilight conditions; visibility was not obstructed by vegetation. One of the observers (MC) is a professional biologist and resource manager with 18 years of field experience in southern Louisiana.

On the next morning, the park naturalist (LD) searched the immediate area of the sighting for evidence of the animal. At approximately 0700 h, he recovered a large scat, which included a considerable amount of hair; the recovered material was sealed in a plastic container

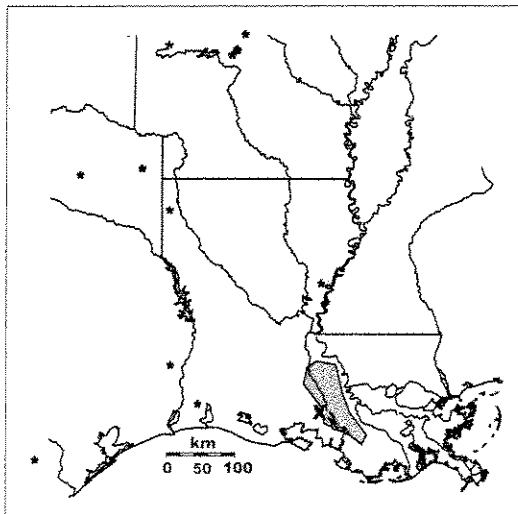


Figure 1. Location of the recent observation of a cougar in Louisiana (X), and of other well documented observations (*) in Louisiana 1965–1975 (Yenke 1982), Arkansas 1996–1999 (Clark et al. 2002, Witsell et al. 1999), and eastern Texas 1983–1994 (Russ 1995). The area shaded in gray represents the location of the bottomland forests in and immediately adjacent to the Atchafalaya basin.

and frozen. Based on measurements made from a photograph, the entire scat, as it laid on the ground (some portions partially on top of others), was approximately 12 cm long and 8 cm wide. Individual segments measured 1.9–2.6 cm in diameter and total length of the visible segments was at least 18 cm. Photographs, along with samples of the scat preserved in ethanol, were deposited in the collections of the Lake Fausse Point State Park and the Louisiana Museum of Natural History at Baton Rouge.

DNA extraction, and the amplification and restriction digestion of the 16SrRNA region of the mtDNA, followed the protocol outlined in Mills et al. (2000) for identification of North American felids. A restriction fragment pattern consistent with *Puma concolor* was obtained. The sequence of this portion of the 16SrRNA corresponded to haplotype "M" (GENBANK Accession AF241853) as designated by Culver et al. (2000). Almost all cougars in North America have this haplotype and it is rare south of Nicaragua.

In addition to the amplification product from *P. concolor*, a second amplification product was obtained. The sequence of this product was very similar to a number of domestic dog (*Canis familiaris* Allen) sequences deposited in GENBANK. We assumed that the cougar had probably consumed a dog, and we conducted additional analyses of hairs in the scat. This sequence is deposited in GENBANK (Accession number AY651773).

Microscopic analysis was used to compare hair present in the scat to a reference collection of local mammals. Hairs were washed and dried overnight in a microprocessor oven at 16 °C. Given the homogeneity in macrocharacteristics of hairs in the scat, only 20 individual hairs were compared to the reference collection. A microfilm of white glue or nail shine was created on microscope slides; impressions were obtained by placing each hair in both substances creating two sets of impressions. Scat and reference hairs were placed on the slides and removed when the microfilm was dry. The impressions on the slides were observed with a microscope set at the lowest magnification. This analysis was conducted by one of us (DS), who had no knowledge of the DNA results.

Hair scale patterns matching those of a domestic dog and an eastern cottontail (*Sylvilagus floridanus* L.) were found in both the white glue and nail shine preparations of the hairs from the feces. Based on these hairs, we believe that both a rabbit and dog were recently consumed by the cougar. We have frequently observed eastern cottontails around Lake Fausse Pointe State Park and free-ranging dogs are occasionally seen in the area. In both Florida and Texas, rabbits

are sometimes an important secondary food source (Dalrymple and Bass 1996, Harveson et al. 2000, Maehr et al. 1990). Although food habit studies from nearby states do not report dogs as a prey item, in other parts of the cougar's range they are occasionally consumed (Currier 1983).

It is difficult to determine the origin of the observed cougar from available data. If the animal had a genotype from South America (O'Brien et al. 1990), it would have been possible to establish a captive origin. The mtDNA genotype is the one expected in North America, but we can not eliminate the possibility that the cougar originated from somewhere outside the Southeast and was transported to southern Louisiana by humans. If the cougar had a captive origin, it appears to have adjusted to its new habitat sufficiently to forage on locally occurring species.

The existence of a remnant population of cougars in the swamps of southern Louisiana would have conservation implications because the subspecies that was historically there is federally listed as endangered (*P. c. coryi* Bangs). The Atchafalaya Basin is relatively remote, but it is not clear that 3600 km² of forested wetlands, within and adjacent to the basin, is sufficient to support a viable population of cougars for several decades while leaving little or no evidence of its presence. In southern Florida, the *P. c. coryi* population has recently expanded to about 78 individuals occupying 8000 km² (Comiskey et al. 2002). Making the tenuous assumption that the habitat in the Atchafalaya Basin could support a similar density of cougars, up to 35 individuals could hypothetically inhabit the area. A population of this size or smaller would be at risk of severe inbreeding effects if isolated for a long period of time. Furthermore, if this hypothetical population of 35 cougars experienced traffic mortality at a rate similar to that in Florida (US Fish and Wildlife Service 1999), we would, on average, expect to observe a road kill once every 2–3 years. The absence of any road kills in at least the last 50 years would argue against a viable, remnant population of *P. c. coryi* in southern Louisiana.

It is plausible that the cougar dispersed to Louisiana from the expanding population of *P. c. stanleyana* Goldman in eastern Texas (Russ 1995). Cougars have been collected in eastern Texas (Newton Co.) within 275 km of Lake Fausse Pointe (Fig. 1). Given that dispersal distances of up to 483 km have been recorded for the species (Logan and Sweanor 2000), individuals from Texas might occasionally be observed in Louisiana. Available genetic markers have insufficient resolution to determine if the fecal sample came from a member of *P. c. coryi* or the Texas population (Culver et al. 2000).

Acknowledgments

We wish to thank D. LeBlanc of the US Department of Agriculture, D. Fuller of the US Fish and Wildlife Service, M. Hafner of the Louisiana Museum of Natural History, and I. Maxit of the Louisiana Department of Wildlife and Fisheries for their assistance or comments.

Literature Cited

- Clark, D.W., S.C. White, A.K. Bowers, L.D. Lucio, and G.A. Heidt. 2002. A survey of recent accounts of the mountain lion (*Puma concolor*) in Arkansas. *Southeastern Naturalist* 1:269–278.
- Comiskey, E.J., O.L. Bass, Jr., L.J. Gross, R.T. McBride, and R. Salinas. 2002. Panthers and forests in South Florida: An ecological perspective. *Conservation Ecology* 6:18. [online] URL: <http://www.consecol.org/vol6/iss1/art18>.
- Culver, M., W.W. Johnson, J. Pecon-Slattey, and S.J. O'Brien. 2000. Genomic ancestry of the American puma (*Puma concolor*). *Journal of Heredity* 91:186–197.
- Currier, M.J. 1983. *Felis concolor*. *Mammalian Species* 200:1–8.
- Dalrymple, G.H., and O.L. Bass, Jr. 1996. The diet of the Florida panther in Everglades National Park, Florida. *Bulletin of the Florida Museum of Natural History* 39:173–193.
- Goertz, J.W., and R. Abegg. 1966. Pumas in Louisiana. *Journal of Mammalogy* 47:727.
- Harveson, L.A., M.E. Tewes, N.J. Silvy, and J. Rutledge. 2000. Prey use by mountain lions in southern Texas. *Southwestern Naturalist* 45:472–476.
- Heist, E.J., J.R. Bowles, and A. Woolf. 2001. Record of a North American cougar (*Puma concolor*) from southern Illinois. *Transactions of the Illinois State Academy of Science* 94:227–229.
- Logan, K.A., and L.L. Sweanor. 2000. Puma. Pp. 347–377, *In* S. Demarais and P. Krausman (Eds.). *Ecology and Management of Large Mammals in North America*. Prentice-Hall, Englewood Cliffs, NJ.
- Lowery, G.H., Jr. 1974. *The Mammals of Louisiana and Adjacent Waters*. Louisiana State University Press, Baton Rouge, LA 565 pp.
- Maehr, D.S., R.C. Belden, E.D. Land, and L. Wilkins. 1990. Food habits of panthers in southwest Florida. *Journal of Wildlife Management* 54:420–423.
- Mills, L.S., K.L. Pilgrim, M.K. Schwartz, and K. McKelvey. 2000. Identifying lynx and other North American felids based on mtDNA analysis. *Conservation Genetics* 1:285–288.
- O'Brien, S.J., M.E. Roelke, N. Yuhki, K.W. Richards, W.E. Johnson, W.L. Franklin, A.E. Anderson, L.O. Bass, R.C. Belden, and J.S. Martenson. 1990. Genetic introgression within the Florida panther *Felis concolor coryi*. *National Geographic Research* 6:485–494.
- Pritchard, P.E.H. (Ed.). 1976. *Proceedings of the Florida panther conference*. Florida Audubon Society, Gainesville, FL. 121 pp.
- Russ, W.B. 1995. The status of mountain lions in Texas. *Proceedings of the Annual Conference of the Southeast Association of Fish and Wildlife Agencies* 49:545–551.

- US Fish and Wildlife Service. 1999. South Florida Multi-species Recovery Plan. Atlanta, GA. 2172 pp.
- Witsell, T., G.A. Heidt, P.L. Dozhier, T. Frothingham, and M. Lynn. 1999. Recent documentation of mountain lion (*Puma concolor*) in Arkansas. Journal of the Arkansas Academy of Science 53:157-158.
- Yenke, W.H. 1982. History and present distribution of *Felis concolor coryi* in Louisiana. M.Sc. Thesis, Louisiana Tech University, Ruston, LA. 56 pp.