

KARYOTYPIC VARIATION IN SPOTTED SKUNKS
(CARNIVORA: MUSTELIDAE: *SPILOGALE*)
FROM TEXAS, MEXICO AND EL SALVADOR

James G. Owen, *Robert J. Baker and *Stephen L. Williams

*Universidad Salvadorena "Alberto Masferrer",
Apartado Postal 2053, San Salvador, El Salvador and
*The Museum and Department of Biological Sciences,
Texas Tech University, Lubbock, Texas 79409*

Abstract.—The karyotypes of two specimens of *Spilogale putorius interrupta* from Texas and Mexico and two specimens of *Spilogale putorius tropicalis* from El Salvador are examined. Karyotypic variation within the genus *Spilogale* is also reviewed.

The spotted skunks, genus *Spilogale*, comprise one of three genera in the subfamily Mephitinae. This genus was last reviewed by Van Gelder (1959) who recognized two species, *Spilogale pygmaea* and *S. putorius*. The pygmy spotted skunk is monotypic and restricted in distribution to the Pacific coastal plains of Mexico and Guatemala. Van Gelder (1959) considered *S. putorius* to be polytypic with 15 subspecies ranging from British Columbia southward through much of the United States, Mexico, and Central America. Jones et al. (1992) recognized the western form of *S. putorius* as a distinct species, *S. gracilis*. This study follows the nomenclature proposed by Jones et al. (1992), but recognizes that the specific and subspecific distributional boundaries of the *Spilogale putorius/S. gracilis* complex are in need of further clarification.

Four specimens of *Spilogale* were karyotyped during the course of this study. This report provides a description of karyotypes from these specimens, data on karyotypes of other specimens provided by Mead (pers. comm.) and a summary of karyotypic data from the literature. One of these karyotypes corrects an error in the literature, and two document previously undescribed variation. Collectively this information provides new insight relative to chromosomal evolution in this mustelid complex.

METHODS AND MATERIALS

Mitotic metaphase chromosomes were prepared from bone marrow following the techniques of Robbins & Baker (1983). Voucher specimens are deposited in the Museum of Texas Tech University (TTU) and the Carnegie Museum of Natural History (CM). Based on Hall

Table 1. Karyological variation within the genus *Spilogale* (AN = autosomal arm number; M = metacentric; SM = submetacentric; m = minute).

Taxon	2N	AN	Acrocentric pairs	Biarmed pairs	X	Y	Literature Reference
<i>S. pygmaea pygmaea</i>	48	86	3	20	M	m	Lee & Modi (1983)
<i>S. gracilis leucoparia</i>	58	70	21	7	M	m	Lee & Modi (1983)
<i>S. gracilis leucoparia</i>	60	—	—	—	—	—	Mead (pers. comm.)
<i>S. gracilis latifrons</i>	60	70	23	6	M	m	Hsu & Mead (1969)
<i>S. gracilis phenax</i>	60	—	—	—	—	—	Mead (pers. comm.)
<i>S. putorius ambarvalis</i>	64	70	27	4	M	m	Hsu & Mead (1969)
<i>S. putorius interrupta</i>	64	70	27	4	M	m	Hsu & Mead (1969)
<i>S. putorius interrupta</i>	62	70	25	5	SM	m	this study
<i>S. putorius interrupta</i>	64	70	27	4	M	m	this study
<i>S. putorius tropicalis</i>	58	68	22	6	SM	m	this study

(1981), this study examined two specimens each of *S. putorius interrupta* and *S. putorius tropicalis* collected from natural occurring populations in Texas, Mexico and El Salvador.

Material examined.—1 mi SE of Post, Garza County, Texas, one specimen of *Spilogale putorius interrupta* (TTU 17491). 2.5 mi SE of Altamira, Tamaulipas, México, one specimen of *Spilogale putorius interrupta* (TTU 14334). Los Marranitos, Departamento de La Paz, El Salvador, one specimen of *Spilogale putorius tropicalis* (CM 111000). Deininger Park near Amayo R., Departamento de La Libertad, El Salvador, one specimen of *Spilogale putorius tropicalis* (TTU 64152).

RESULTS AND DISCUSSION

The data reveal extensive karyological variation within the *S. putorius/S. gracilis* complex (Table 1). Within the complex, *S. putorius tropicalis* had a diploid number of 58 with 68 autosomal arms (Fig. 1), whereas *S. putorius interrupta* from Texas and Tamaulipas had diploid numbers of 64 and 62, respectively (not figured). This means that at least six different karyotypes are known for the complex. Perhaps there would be even more if complete data were available for *S. gracilis phenax* and the $2n=60$ form of *S. gracilis leucoparia*. The diploid number of *S. gracilis phenax* was erroneously published by Hsu & Mead (1969) and subsequently cited by Lee & Modi (1983) as 64, rather than 60 (Table 1; Mead, pers. comm.).

Five of the karyotypes of the *S. putorius/S. gracilis* complex (Table 1) appear to be interconvertible by centric fusions/fissions (= Robert-



Figure 1. Nondifferentially stained karyotype of a male *Spilogale putorius tropicalis* (CM 111000) from Los Marranitos, Departamento de La Paz, El Salvador.

sonian events). The number of arms in the autosomal complement of the specimens from El Salvador is lower than the value characteristic of northern spotted skunks, thus cannot be described solely as Robertsonian variation. It is noteworthy that specimens with diploid numbers of both 58 and 60 have been found in *S. gracilis leucoparia*. As currently recognized, this subspecies appears to be a composite of two diploid numbers.

Geographic distribution of karyotypic variation observed in *Spilogale* does not fit the pattern expected of a Rassenkreis (Mayr 1970:423). Furthermore, strong differences in reproductive characteristics have been shown for karyotypes with only Robertsonian differences. Also, variation in the number of arms of the autosomes, such as observed in the material from El Salvador, often signals specific differences. Based on karyotypic and reproductive data (Mead 1967; 1968a; 1968b), it is worth examining geographical distributions and boundaries of chromosomal races to determine if the different cytotypes are behaving like biological species. Definitive answers must await further comparative studies, especially in zones of presumptive intergradation.

ACKNOWLEDGEMENTS

We thank M. S. Powell for assistance with the chromosomal analysis and R. A. Mead for sharing information relevant to this contribution.

LITERATURE CITED

- Hall, E. R. 1981. The Mammals of North America. John Wiley & Sons, New York, 2:vi+601-1181+90.
- Hsu, T. C. & R. A. Mead. 1969. Mechanisms of chromosomal changes in mammalian speciation. Pp. 8-17, in *Comparative Mammalian Cytogenetics* (K. Benirschke, ed.). Springer Verlag, New York, 473 pp.
- Jones, J. K., Jr., R. S. Hoffmann, D. W. Rice, C. Jones, R. J. Baker & M. D. Engstrom. 1992. Revised checklist of North American mammals north of Mexico, 1991. *Occas. Papers, Mus., Texas Tech University*, 146:1-23.
- Lee, M. R. & W. S. Modi. 1983. Chromosomes of *Spilogale pygmaea* and *S. putorius leucoparia*. *J. Mamm.*, 64:493-495.
- Mayr, E. 1970. *Populations, Species, and Evolution*. Harvard University Press, Cambridge, Massachusetts, xv+453 pp.
- Mead, R. A. 1967. Age determination in the spotted skunk. *J. Mamm.*, 48:606-616.
- Mead, R. A. 1968a. Reproduction in western forms of the spotted skunk (Genus *Spilogale*). *J. Mamm.*, 49:373-390.
- Mead, R. A. 1968b. Reproduction in eastern forms of the spotted skunk (Genus *Spilogale*). *J. Zool.*, 156:119-136.
- Robbins, L. W. & R. J. Baker. 1983. Karyotypic data for African mammals, with a description of an *in vivo* bone marrow technique. Pp. 188-210 in *Ecology and Taxonomy of African Small Mammals*. *Bull. Carnegie Mus. Nat. Hist.*, 6:1-214.
- Van Gelder, R. G. 1959. A taxonomic revision of the spotted skunks (Genus *Spilogale*). *Bull. Amer. Mus. Nat. Hist.*, 117:229-392.

RJB at: bjrjb@ttacs1.ttu.edu