

Reproduction in captive-born zorillas

Ictonyx striatus [Plate 38]

at the National Zoological Park, Washington

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The zorilla or Striped polecat *Ictonyx striatus* is a small terrestrial mustelid which inhabits most of the African continent south of the Sahara and perhaps the western portion of Asia Minor (Shortridge, 1934). Nocturnal and solitary, it is found in a variety of habitats, primarily in semi-arid rock and scrub areas and frequently near human habitations where it preys upon domestic fowl as well as small rodents, insects, reptiles, eggs and birds (Grzimek, 1975; Walker, 1975). Parts of its range it shares with two smaller related species, the North African or Libyan striped weasel *Poecilictis libyca* and the White-naped weasel *Poecilogale albinucha*, which are basically similar in habits, black-and-white colouration and diet. Almost nothing is known of the reproductive biology of these two weasels (Rosevear, 1974; Walker, 1975).

In colouration and general behaviour the zorilla also resembles its better documented New World counterpart, the Spotted skunk *Spilogale putorius*, including the defensive ability to spray a foul smelling secretion from the anal glands. The Spotted skunk, however, exhibits several interesting differences. More arboreal than the zorilla, its nest site entrances have been located some 6 m above ground level in hollow trees (Crabb, 1948). In addition, western forms are known to be subject to delayed implantation, which results in a gestation period of up to 230 days, including the 180–200 days when the

blastocyst remains unimplanted; this is not known in eastern populations (Mead, 1968).

HOUSING AND CARE

The zorilla adapts readily to captivity. When taken young, it becomes quite tame and friendly and even adults adjust quickly to routine procedures, using their defensive spray only when annoyed, frightened or handled. Average life span in captivity appears to be about five years (Shortridge, 1934; Crandall, 1964). Once common in zoos, the species is now rare in collections and despite its former popularity there are comparatively few instances of captive births; according to *Yearbook* records, the only recent centres of consistent breeding, apart from the National Zoo, are Toronto and Stuttgart zoos.

The National Zoological Park received its breeding pair in September 1975 from Toronto Zoo, where the animals had been born of wild-caught parents. At that time the ♀ was approximately seven months old and the ♂ about one year. Since their arrival they have been housed in a variety of indoor enclosures in the Small Mammal House, ranging in floor area from 1.2 × 1.5 m to 3.5 × 1.5 m and 2.1 m high. They have at various times been kept under natural light (from overhead skylights), artificial light, and under a reversed light cycle in the nocturnal section of the building; in the nocturnal room they experience 12 hours of 'daylight' and 12 hours of

subdued, blue 'twilight' during public hours. Pine bark chips or hay are used as a cage substrate and the soiled litter is removed and replaced daily; the enclosures are given a complete overhaul twice weekly. Natural hollow logs and halved sections of cork bark logs provide shelters for sleeping and concealment.

Feeding takes place once a day between 1400–1500 hours. Adult zorillas each receive one-third cup Feline Diet or two freshly killed chicks plus half a hard-boiled egg, these items being given on alternate days. Once a week in addition they each get two freshly killed mice and on one day a week (Sunday) the ration consists of a section of oxtail, which helps prevent the formation of tartar on the teeth. Crickets, 12 at a time, are given when available. An occasional smelt *Osmerus mordax* is relished. No vitamin or mineral supplements are used, and fresh water is available at all times. When the ♀ has dependent young, she receives the above stated quantities twice a day, with the addition of a live chick at each feed. Whole milk was offered after her first two litters but as she showed no interest it was discontinued.

Neither adult nor young has so far presented any medical problems. On arrival the original pair were both anaesthetised, using Halothane and nitrous oxide, for routine blood tests and X-ray, and vaccinated against feline and canine distemper (1 ml Felocine each; 4 ml Trioid Plus for the ♂ and 3 ml for the ♀). Their respective weights at this stage were 1346 and 760 g. Temperatures taken at the time registered 40° and 38°C.

During daylight the animals tend to seek concealment in or behind the hollow logs, usually sharing the same sleeping site. On the other hand, in the periods when they have been

kept under subdued lighting in a nocturnal exhibit, they have been active at all hours. The usual gait is a brisk trot with the back slightly arched; the ♂ generally carries his tail in a vertical position while the ♀ carries her horizontally with the tip dragging. Interaction between the two, apart from sharing a sleeping site, is limited to apparently random encounters. On these occasions the ♀ will yield to the ♂ and move out of his path or turn and go in another direction. No overt aggression has been noted.

From time to time the ♂ has exhibited behaviour which appears to be a play invitation; this has been directed both towards his ♀ cage-mate and at the human observer. During play invitation the back is held tightly arched, the tail curves forward over the back and the whole body is bent into a semi-circle. While he holds this posture he moves sideways with legs held stiff, making continuous scuff marks in the cage litter. The ♀ has never been seen to engage in this activity, nor does she respond to it.

REPRODUCTION

Zorilla births at the National Zoo have taken place in February, March, May and August (Table 1). At Toronto they have occurred in January, February, September and October (Gamble, pers. comm.) and at Stuttgart in February, March, April, July, October and December; the latter zoo also reports a maximum gestation of 44 days (W. Neugebauer, pers. comm.). The data suggest that in captivity at least the breeding season is not restricted. On one occasion the ♀ at the NZP mated and conceived two days after the death of the previous litter. Her age at first conception, calculated on the basis of a 35 day gestation period (Table 1) was 10½ months.

DATE OF MATING	DATE OF BIRTH*	GESTATION PERIOD (days)	NO. OF YOUNG	AGE AT DEATH (days)	CAUSE OF DEATH
?	7 Feb 76	?	1	3	unknown
12 Feb 76	18 Mar 76	35	3	1, 3, 10	disappeared, presumed eaten by ♀
?	7 May 76	?	1.0.1	14, 23	killed by ♀
27 Jul 76	31 Aug 76	35	0.2	survived	

* a fifth litter (1.0) was born 20 Mar 1977 and has been reared by the ♀.

Table 1. Breeding record of a pair of captive-bred zorillas *Ictonyx striatus* which arrived at the National Zoological Park, Washington, in September 1975 at the age of seven (♀) and 12 (♂) months.

Four litters have been born between February and August 1976, but in only the last of these have the cubs survived beyond the first days (Table 1). The ♂ was separated immediately following the second litter (he had not been removed after the first birth), and during the two subsequent pregnancies he was removed one to two weeks before the expected date of parturition and not returned until after the separation of ♀ from cubs, either by weaning or death. After the birth of the first two litters, the roof and front of the enclosure were covered with burlap to reduce light and provide more privacy. For the third and fourth litters, which were born in a nocturnal exhibit, black plastic was used as a covering material and in addition, following the fourth birth, the public was barred from the room for some weeks. After each birth all cleaning activities were suspended until the cubs were seen moving about on their own. Observations were made through small openings in the covers or during the daily feed periods.

No overt behavioural changes signal the onset of oestrus. Precopulatory behaviour observed on 27 July 1976 consisted of several minutes of rolling and play biting, followed by both animals jumping to their feet and running side by side around the enclosure. The ♂ then seized the ♀ by gripping her neck, tail or back in his teeth and dragging her a short distance before attempting to mount. The ♀ broke away a number of times and the sequence was repeated until a mount with successful intromission was achieved.

During copulation the ♂ clasps the ♀ with his forelegs anterior to her hind legs, using a bite grip on her neck, rib cage or just behind a foreleg. Thrusting bouts occur at intervals of 4–32 seconds, with 4–12 thrusts per bout. In most cases thrusting takes place while both animals are lying on their sides, but at least twice the ♀ lay on her ventral surface with the ♂ mounted on her back. Between bouts, they both roll and twist, the ♂ all the while retaining his grip on his partner; she, during this time, gives forth a series of loud, sharp chirps which vary in pitch. In each instance it was the ♀ who ended coition by breaking away from the ♂. Its total duration (in the three observed matings) was 47–75 minutes. During the July breeding, a second copulation took place three hours after the first.

All the births have taken place between 0700–1130 hours. The ♂ was present in the enclosure during the first two, and showed no interest in the newborn cubs or in the birth process. The birth of the second litter was observed. Three cubs were delivered over a 20-minute period between 1015–1035 hours, one of them a breech presentation without sac. Birth took place while the ♀ was lying on her side. She would lick the genital area frequently, raising one hind leg stiffly above and to one side of her head as she did so. As each birth was accomplished, she would lick and nose the cub and then pay it no further attention during delivery of the next infant. Shortly after the last delivery, the mother moved two of the newborn cubs to another location, but failed to retrieve the third for about two hours, even though the lone cub kept up an almost continuous series of shrill squeaks. To carry the cubs, the mother grasps their venter in her mouth, the young assuming a curled body posture with legs, head and tail curved up on either side of the ♀'s face.

DEVELOPMENT OF YOUNG

Zorillas are born in an altricial condition with eyes and ears sealed. They are pinkish-grey and sparsely covered with a fine white down; the pigmented areas corresponding to the black dorsal stripes of the adult pelage are clearly visible. At ten days the young are already well furred. During the first two weeks they were sometimes heard to give a soft, high-pitched squeak, usually when the ♀ was at a distance. Presumably this is a contact call as it was not heard after the eyes had opened on about day 24.

For the first weeks after giving birth, the ♀ leaves the nest only to eat, drink, urinate or defecate. When she is with the cubs, she keeps them close to her ventral surface and curls her body so that they are nearly hidden in her fur. Following the birth of her first litter, which consisted of a single cub, she exhibited extreme agitation for the first day, carrying the infant almost constantly around the enclosure and sometimes leaving it lying on the floor. After dropping it she would continue to run about, retrieve it and begin carrying again. On day 2 the erratic carrying behaviour ceased and the mother seemed to be caring well for the cub, but on the morning of day 3 it was found dead outside the

cage in a mutilated condition; cause of death could not be determined. This agitated carrying behaviour was not repeated with subsequent litters.

To reduce stress to a minimum, no attempt was made to handle or weigh any cubs when young, nor to observe them while they were still in the nest. They were first seen outside during the fourth week, and in their seventh week were observed eating chicks; it is not certain, however, whether they had taken solid food previously. At 16 weeks they were separated from the ♀. The weight of the first, three-day-old infant at death was 14.9 g. At four months 21 days, the two cubs of the fourth litter weighed 828 and 842 g.

AUTHOR'S NOTE

A fifth litter consisting of one ♂ cub was born 20 March 1977 and has been raised by the mother; at time of writing it is doing well. Like the third and fourth litters, the ♀ gave birth in a tunnel in the hay which she had constructed herself, although, as before, a nestbox and hollow logs were available. She also fashioned several hollows in the hay, connected to the den by a series of tunnels, and used these as resting sites, carrying the cub with her and remaining in the rest sites for periods of one to two hours at various times throughout the day. No night observations were made. As in the previous births, the cub was moved into the L-shaped nestbox when it was a few weeks old. The adult ♂ was present in the enclosure during this last birth, which had not been anticipated, and was removed when the ♀ exhibited extreme aggressive behaviour towards him, attacking, biting and emitting loud, shrill shrieks.

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PRODUCTS MENTIONED IN THE TEXT

Feline Diet: manufactured by Central Nebraska Packing Co., North Platte, Nebraska, USA.

Felocine: killed feline distemper vaccine, manufactured by Norden Laboratories, Lincoln, Nebraska 68501, USA.

Halothane: gas anaesthetic, manufactured by Ayerst Laboratory, New York, NY, USA.

Trioid Plus: killed canine distemper/hepatitis vaccine, manufactured by Fromm Laboratories Inc., Grafton, Wisconsin 53024, USA.

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