Third International Conference on Bears

Paper 6

Observations on the Breeding of Captive Black Bears, *Ursus americanus*

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INTRODUCTION

Although breeding of black bears is rarely seen in the wild, black bears have bred successfully in captivity (Lucas 1970-1971; Duplaix-Hall 1972-1973). Surprisingly, there have been no descriptions of these matings. This paper reports on the breeding of a pair of captive black bears observed in 1973.

METHODS

The bears were kept in the Goldrush Junction Amusement Park, Pigeon Forge, Tennessee, just outside the Great Smoky Mountain National Park. They were acquired from the Gallop Animal Farm, Vermont, as unrelated cubs, in 1970, and had been kept together since. The enclosure for the bears was approximately 25 m × 80 m. A shelter in the south end of the enclosure had two separate sheds on each side with a roof attaching the two. The male and female were individually housed during the night. The bears had no access to these sheds during the day, but could lie between them under the center roof for shade or shelter. There were no trees in the enclosure, but the west and north sides were bordered with forest. A stream about one meter wide traversed the north end of the enclosure.

The bears were fed Purina Calf chow, given individually into each side of their shelter. Water was available from the stream, but only during the day when the bears were free to leave the shelter.

A super-8 mm ciné camera (Nizo S-80) and a 35 mm still camera (Minolta SRT-100) were used to film the bears' activity. In analyzing the data, the three movie films were viewed in blocks of 10 frames, to determine frequency of behaviors.

RESULTS

The following is a composite description of the mating behaviors observed July 2 and 4. Once the female was receptive, the male and female showed little courtship behavior prior to copulation. The male approached the female, sniffing the ground near her, and then sniffing or licking her head, trunk and external genitalia. The male mounted her from behind at an angle with one paw placed mid-way up her back. The male then grasped her stomach with both forepaws and lifted himself up on two legs. While mounting he often bit her neck (Fig. 1), behind the ears, and to one side. The neck bite was intermittently renewed throughout copulation. Occasionally, the male would bite

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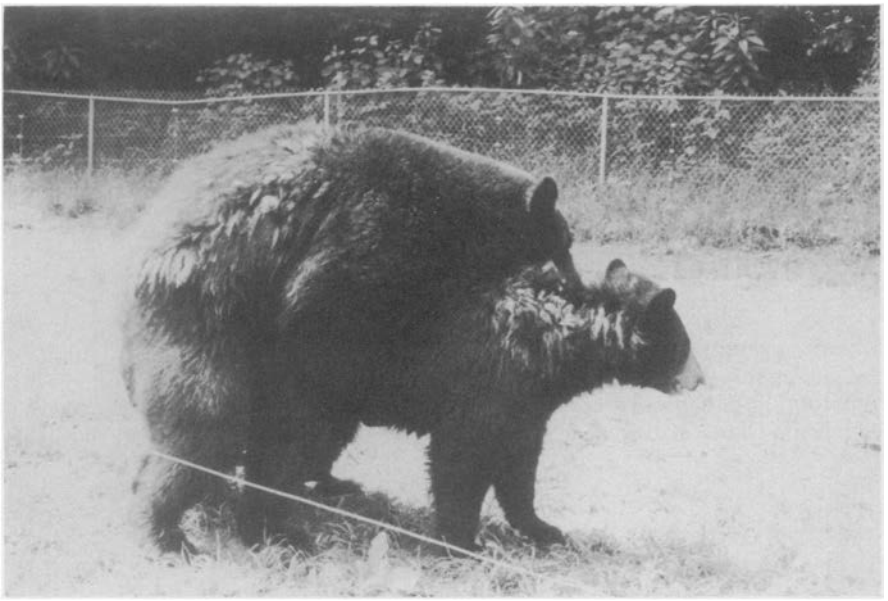

Fig. 1. Neckbite.

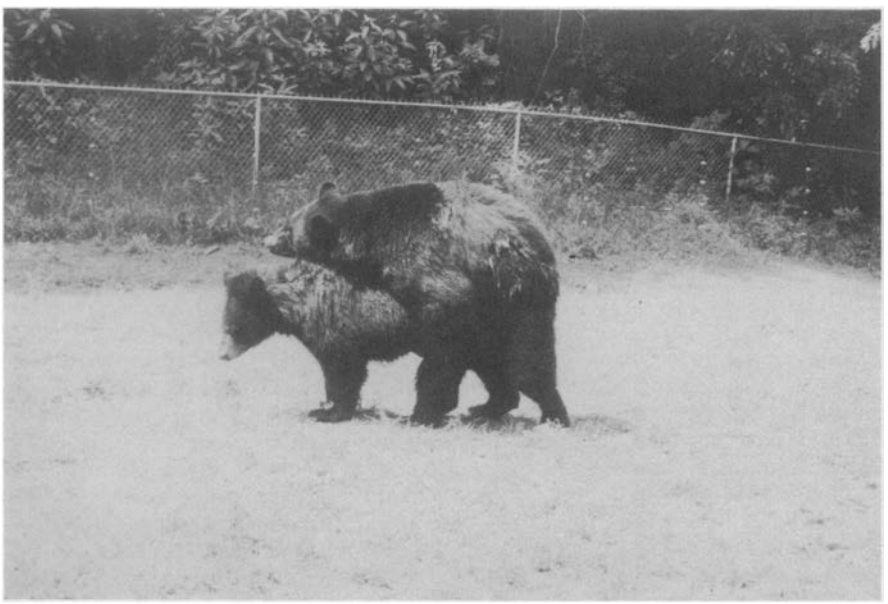

Fig. 2. Male's head held above female's back.

Table 1. Analysis of films of mating behaviors on 2 July 1973, 10:15 A.M.

	Male					Female			
Mounted	Bite Female	One Paw Down	Head Down	Paw on Female's Back	Quiver	Walk	Stand	Bite Male	Head Low
				FILM 1					
361*	66	6	43	20	--	124	237	1	43
				FILM 2					
359*	25	16	20	54	25	147	212	1	56

*Activity at every tenth frame is recorded as totals for each film, thus total frames in film 1 = 3610; total frames in film 2 = 3590.

Table 2. Analysis of film of mating behaviors on 4 July 1973, 10:30 A.M.

Total No. of 10th frames viewed	Male						Female								
	Mount	Follow	Bite	Lay	Mo. W	Mo. St	W	St	Lie	Sit	Bite	SC	Tail Lift	Quiver	Str
37	16	1	18	2	14	3	9	5	3	1	6	8	2	--	--
33	--	--	--	33	--	-	12	4	3	15	-	13	--	--	--
22	--	--	--	22	--	-	--	--	22	--	-	--	--	22	--
40	--	--	--	40	--	-	--	--	40	--	-	--	--	11	5
27	--	--	--	27	--	-	10	4	12	--	-	1	2	--	--
120	--	--	--	120	--	-	6	74	--	42	-	29	--	4	51

Activity at every tenth frame is recorded as totals for the film. There were six noncontinuous sequences. Total frames in film = 3120.

Key to abbreviations used: W Walk; St Stand; SC Sniff Close (nose close to object); Str Stretch (back or front legs out, stiff); Mo Mounted

the female's face. During the earlier stages of copulation, behavior patterns most often seen in the male were biting the female and holding his head down by her side. The female stood still while mounted (Table 1). During the later parts of copulation, more frequent behaviors were the following: the male rested one paw on the ground or by the female's side, and he placed one or both paws up on the female's back; the female walked and sniffed or scratched the ground while mounted (Table 2).

When the male was not biting the female's neck, his head was either resting on her back, pressed against her side, hung down near her side or held above her back (Fig. 2). The female did not remain stationary for the entire copulation, but walked several meters every few minutes. The female both initiated and returned bites towards the male, biting his ears, head or forepaws. While mounted, the female might walk, look around, sniff the ground, eat grass, drink water, or stand still with her head up.

After mounting, the male assumed an arched position with both forepaws pressed in against the female's pelvic area. His hind legs were usually bent somewhat, although on occasion he would stretch them back and out or go up 'on his toes.' Once mounted and positioned on the center of the female's back, he began pelvic thrusts, occasionally varied by circular movements. These continued whether the female was stationary or moving. After several minutes of copulation, the male might remove one forepaw and either hang it down by the female's side, rest it on the ground, or place it on her back. While standing, the female's legs were in a braced position, her back slightly arched. Both bears panted heavily during mating and at times stood with mouths open. Once, the male stood on his left hind foot while resting on the female. Of the seven mounts observed, three were timed. They lasted 3'10", 30" and 29'0". It was impossible to determine accurately when intromission and ejaculation occurred. However, during one copulatory sequence, the male was mounted on the female and quivered every 25-30 seconds. He 'hung' on to the female until the quivering began, then grasped her in the pelvic area and arched his back. The mean interval between quiverings was 30 seconds. This particular behavior was observed only once, and no further mating occurred on this day. Meyer-Holzapfel (1957) reports that in brown bears it is during quivering that ejaculation occurs.

Copulation was usually terminated by the female walking and the male 'standing down.' The male then sat or lay flat on his side. Several times he walked to the stream and lay in the water for up to ten minutes. The female was more active than the male after mating and appeared restless: lying down, then walking around the enclosure, sniffing the ground or the male. It was after copulation that the female exhibited quiverings or muscle spasms of her hindquarters. She did this while walking around the enclosure, standing, or lying down. When this occurred while walking, she would stand, with apparent muscle spasms twitching her body from the pelvic area back . If the quivering occurred while she was lying down, she would rise and walk a meter or two. At times her back legs were extended stiffly out and back. During one post-copulatory sequence, her hind legs gave way five times. The quiverings appeared to be due to exhaustion, but may be related to the success of breeding by aiding the sperms' course up the vagina.

DISCUSSION

In general the mating behavior of bears is similar in some ways to the canids (the mount and the pelvic thrusts) and in other ways to the felids (the neck bite)

(Ewer 1973). The duration of successful mounts and intromissions was about 20 to 30 minutes. Copulation occurs while both animals are standing, and there does not appear to be a copulatory tie (as in canids, where the male and female stand for over 10 minutes in a locked position). However, several reports state that the bear has a penis bone which maintains the joining of the pair for a relatively long time (Meyer-Holzapfel 1957). The mating of black bears appears to be very similar to that of the brown bears (as described by Meyer-Holzapfel 1957): mating foreplay involves licking the female's face and sex organs; actual mating lasts more than 15 minutes; copulation occurs on several successive days; and, when the female is no longer receptive, she moves away from the male.

The breeding of the two black bears filmed was successful, and two cubs were born in early February, 1974. The gestation period was about 30 weeks.

ADDITIONAL NOTE

Several participants in the Binghamton Conference mentioned that they had observed breeding of bears in the wild: Lyn Rogers, Univ. of Minn.: *americanus;* Frederick C. Dean, Univ. of Alaska: *U. arctos horribilis;* Mike Luque, Utah State Univ.:*U. arctos*. Rogers observed mating from a plane and from the ground; Luque noted brown bears quiver two to three times.

ACKNOWLEDGEMENTS

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