Van de Werken H. 1968. Preliminary report on cheetahs in zoos and in Africa. Zool. Garten 35: 156-161.

Keywords: 1Afr/8NL/Acinonyx jubatus/age/breeding/captivity/cheetah/data/questionnaire/zoo

Abstract: In December 1966 questionnaires sent to 80 Zoos in the world, concerning number, age, breeding and cause of death of cheetahs in captivity. In the course of the following three months 62 completed questionnaires kept in the collection during the period 1945 through January 1967. The following data are therefore based on information received from 44 Zoos.

Royal Zoological Society Natura Artis Magistra Amsterdam

Cheetahs in Captivity

Preliminary Report on Cheetahs in Zoos and in Africa

By H. VAN DE WERKEN, Amsterdam

In December 1966 questionnaires were sent to 80 Zoos in the world, concerning number, age, breeding and cause of death of cheetahs (*Acinonyx jubatus*) in captivity. In the course of the following three months 62 completed questionnaires were returned (77.5 percent). Eighteen Zoos stated that no cheetahs have been kept in the collection during the period 1945 through January 1967. The following data are therefore based on information received from 44 Zoos.

Since 1945 in these 44 Zoos 279 specimens (123 ♂♂, 145 ♀♀, 11 sex unknown) were kept of which 25 (11.14) were sold. Up to January 1967, 175 specimens died (73 ♂♂, 93 ♀♀, 9 unknown): at that time, 79 specimens (39 ♂♂, 38 ♀♀, 2 unknown) were living in 38 Zoos.

The average longevity in captivity of 153 specimens (of 10 specimens no exact data were received; 12 others were excluded because they were new-born when brought on one day to one zoo and died within a few days) was 3 years, 5 months, 1 day. Of 69 ♂♂: 3 years, 4 months, 16 days; of 77 ♀♀: 3 years, 5 months, 29 days. (Of 7 specimens sex was unknown.)

Number and average longevity of 153 specimens which died during the mentioned years in 44 Zoos:

1946	1 specimen	—	9 months	10 days
1947	7 specimens	1 year	8 „	9 „
1948	2 „	—	11 „	12 „
1949	6 „	—	6 „	7 „
1950	4 „	1 year	6 „	5 „
1951	11 „	2 years	7 „	19 „
1952	5 „	3 „	2 „	— „
1953	5 „	3 „	11 „	21 „
1954	7 „	1 „	6 „	12 „
1955	7 „	2 „	6 „	29 „
1956	8 „	5 „	3 „	2 „
1957	4 „	4 „	3 „	15 „
1958	7 „	3 „	6 „	3 „
1959	11 „	2 „	9 „	9 „
1960	9 „	1 „	4 „	5 „
1961	10 „	3 „	8 „	2 „
1962	15 „	5 „	1 „	12 „
1963	8 „	7 „	3 „	16 „
1964	9 „	2 „	3 „	3 „
1965	8 „	4 „	1 „	24 „
1966	9 „	5 „	11 „	13 „

Although there is an apparent decline in some of the last years, it is obvious that cheetahs in captivity are slowly advancing in years. The average longevity from 1962 to 1966 was 5 years, 1 month, 14 days. In the previous 5 years, from 1957 to 1961, it was 3 years, 1 month, 13 days.

Figures on longevity of 146 (69.77) specimens

Died in captivity when	♂	♀	Died in captivity when	♂	♀
0 — 1/2	14	16	7 — 7 1/2	—	2
1/2 — 1	4	11	7 1/2 — 8	2	—
1 — 1 1/2	13	7	8 — 8 1/2	2	—
1 1/2 — 2	3	2	8 1/2 — 9	1	—
2 — 2 1/2	7	6	9 — 9 1/2	2	1
2 1/2 — 3	3	2	9 1/2 — 10	—	—
3 — 3 1/2	1	7	10 — 10 1/2	1	2
3 1/2 — 4	5	1	10 1/2 — 11	—	2
4 — 4 1/2	2	7	11 — 11 1/2	—	2
4 1/2 — 5	—	1	11 1/2 — 12	—	2
5 — 5 1/2	2	1	12 — 12 1/2	3	1
5 1/2 — 6	1	1	12 1/2 — 13	—	1
6 — 6 1/2	1	—	13 — 13 1/2	1	1
6 1/2 — 7	—	1	13 1/2 — 14	—	—
			14 — 14 1/2	1	—

Figures on longevity of 146 (69.77) specimens

Lived longer than	Specimens	♂	♀
1/2 year	116 (79.5%)	55 (79.7%)	61 (79.2%)
1 ,,	101 (69.9%)	51 (73.9%)	50 (64.9%)
1 1/2 ,,	81 (55.5%)	38 (55.0%)	43 (55.8%)
2 ,,	76 (52.1%)	35 (50.7%)	41 (53.2%)
2 1/2 ,,	63 (43.2%)	28 (40.6%)	35 (45.5%)
3 ,,	58 (39.7%)	25 (36.2%)	33 (42.9%)
3 1/2 ,,	50 (34.2%)	24 (34.8%)	26 (33.8%)
4 ,,	44 (30.1%)	19 (27.5%)	25 (32.5%)
4 1/2 ,,	35 (24.0%)	17 (24.6%)	18 (23.4%)
5 ,,	34 (23.3%)	17 (24.6%)	17 (22.1%)
5 1/2 ,,	31 (21.2%)	15 (21.7%)	16 (20.8%)
6 ,,	29 (19.9%)	14 (20.3%)	15 (19.5%)
6 1/2 ,,	28 (19.2%)	13 (18.8%)	15 (19.5%)
7 ,,	27 (18.5%)	13 (18.8%)	14 (18.2%)
7 1/2 ,,	25 (17.0%)	13 (18.8%)	12 (15.6%)
8 ,,	23 (15.8%)	11 (15.9%)	12 (15.6%)
8 1/2 ,,	21 (14.4%)	9 (13.1%)	12 (15.6%)
9 ,,	20 (13.7%)	8 (11.6%)	12 (15.6%)
9 1/2 ,,	17 (11.6%)	6 (8.7%)	11 (14.3%)
10 ,,	17 (11.6%)	6 (8.7%)	11 (14.3%)
10 1/2 ,,	14 (9.6%)	5 (7.3%)	9 (11.7%)
11 ,,	12 (8.2%)	5 (7.3%)	7 (9.1%)
11 1/2 ,,	10 (6.8%)	5 (7.3%)	5 (6.5%)
12 ,,	8 (5.5%)	5 (7.3%)	3 (3.9%)
12 1/2 ,,	4 (2.8%)	2 (2.9%)	2 (2.6%)
13 ,,	3 (2.0%)	2 (2.9%)	1 (1.3%)
13 1/2 ,,	1 (0.7%)	1 (1.5%)	— —
14 ,,	1 (0.7%)	1 (1.5%)	— —
14 1/2 ,,	— —	— —	— —

From the figures it appears that, naturally, the first half year claims many victims. In most cases it will concern young individuals, maybe cubs. The rate of mortality declines gradually but remains on a high level until about $4^1/_2$ years. If an individual is $4^1/_2$ years in captivity, there is a good chance that the animal will enjoy a long life.

Cheetahs in captivity have a chance of but 24 percent (♂♂ 24.6; ♀♀ 23.4 percent) to live there $4^1/_2$ years. But as soon as they have stayed $4^1/_2$ years in the Zoo, they have a chance of 57.1 percent (♂♂ 47; ♀♀ 66.7 percent) to reach a longevity of 9 years.

Of 146 (69.77) specimens, 34 (17.17) lived longer than 5 years in captivity.

Pairs

It is remarkable that among the total of 20 individuals (8 ♂♂, 12 ♀♀) with a longevity of 9 years or more, 7 ♂♂ and 7 ♀♀ arrived together and were kept as pairs in the Zoos. The partners also died in a relatively short period after each other: difference in longevity of the partners of each pair: 9 months on an average.

Pair	I	♂	12 years,	10 months;	♀	12 years,	1 month	
	II	♂	13 „	1 „	♀	12 „	8 „	
	III	♂	9 „	3 „	♀	10 „	5 „	
	IV	♂	10 „	3 „	♀	10 „	2 „	
	V	♂	12 „	— „	♀	10 „	8 „	
	VI	♂	12 „	1 „	♀	11 „	9 „	
	VII	♂	14 „	1 „	♀	13 „	4 „	

Cause of death

Post-mortem examinations of 123 specimens revealed a.o. the following:

(The deviations found need not to be the cause of death. Different deviations of one individual may be mentioned in corresponding places.)

	Specimens	Average longevity
Tuberculosis (generalised or at organs, except liver)	29	2 y. 1 m. 7 d.
Liver diseases	33	3 4 2
of which cirrhosis	13	4 8 7
Feline distemper	31	1 — 6
Pneumonia and other bronchial diseases	15	1 4 20
Peritonitis	3	
Gastritis	3	
Enteritis	7	
Others	22	
Unknown	18	
Euthanasia, old age	23	

Though liver diseases, and especially cirrhosis, are dreaded diseases in Zoos, the animals suffering from these complaints proved to reach a longevity equal to, or in case of cirrhosis higher than, the average longevity. Of many individuals liver diseases were just stated at the post-mortem after they died at a great age for cheetahs in captivity. Feline distemper, pneumonia and tuberculosis form a greater danger.

Living specimens

The 79 specimens (39 ♂♂, 38 ♀♀, 2 unknown) living in 38 Zoos (in 6 of the 44 Zoos no cheetahs were kept at the time) as of January 1967 have been acquired in the following years:

1956	3 sp.	(3.0)	1962	10 sp.	(5.5)
1957	3	(1.2)	1963	6	(1.4; 1 unknown)
1958	1	(0.1)	1964	13	(6.7)
1959	2	(2.0)	1965	11	(6.5)
1960	6	(3.3)	1966	14	(5.8; 1 unknown)
1961	6	(4.2)	1967	2	(1.1)

Mating

In the 44 Zoos, there were 9 observed cases of mating. In two Zoos cheetahs have been born, viz two in Krefeld (Germany) where both grew up, and two in Arnhem (Holland); these cubs were eaten by the parents within two days.

Unfortunately we did not receive back the questionnaire sent to the Philadelphia Zoo where, as is well-known, also a litter was born.

Cheetahs in the wild

In the wild, cheetahs belong to the animals of which little or nothing is known, regarding their biological and ecological requirements. Undoubtedly the reason for this is that there are proportionally small numbers of cheetahs and they are somewhat shy and retiring. (Strictly, their numbers turn out better than is generally supposed: see the reports on Cheetah survey in East African Wildlife Journal, Vol. 4, 1966.) The lack of knowledge of these animals' natural behaviour is most probably responsible for the often less satisfactory experiences with them in Zoos.

During the seven weeks, which we spent for the greater part in Africa on observation of and compiling data about cheetahs, it was impossible to make a profound study. The more so, as even experts in the field of cheetahs often keep conflicting opinions. We only can make some general remarks which probably can be useful when keeping cheetahs in captivity.

Many insiders in Africa think that cheetahs live solitary; others are convinced that they live and hunt in groups. It is a question whether, in the latter case, a ♀ and three or four nearly full-grown cubs are not taken for a group. In Amboseli (Kenya), we once observed a ♀ with three practically full-grown cubs which could hardly be distinguished from each other. Because of previous

reports, we knew it was a family; otherwise, we should have taken them for a group. Insiders who have the conviction that cheetahs live solitary say that only when the ♀ comes into oestrus the ♂ or ♂♂ will look for her.

Nobody we met ever actually saw mating. It appears to be not quite impossible that more than one ♂ is involved in the matter. The number of ♂♂ in the wild seems to surpass that of the ♀♀ by far. An animal catcher mentioned that four ♂♂ are caught to one ♀. Mr. C. A. CADE (Orphanage, Nairobi) counted among seven cheetahs brought in the orphanage only one ♀. He also is under the impression that there are considerably more ♂♂ than ♀♀. This might be an indication that ♂♂ live in groups indeed. GRAHAM (Cheetah Survey, E. A. Wildlife Journal, Vol. 4) says that groups of ♂♂ have been recorded but not groups of ♀♀, while mixed groups occur. Of 47 adult cheetahs living in pairs or groups he found that 39 were ♂♂, 8 ♀♀; that is nearly 5 to 1.

Experiences in Africa seem to make it desirable that ♂♂ and ♀♀ are separated in captivity and only meet when the ♀ is in oestrus. It also seem desirable to introduce, that is, experimentally, more than one ♂, even three.

In the wild the rather nervous animals do not make a single contact with other predators. Cheetahs are not able to hold themselves against greater predators. In this connection the unanimous opinion in Africa is to keep cheetahs in captivity, as far as possible, separated from big cats, hyaenas, etc., which animals they preferably should not see, hear, or smell in the near vicinity.

All this agrees with the cause of things in Rome at Mr. LUCIANO SPINELLI's, who borrowed two ♂♂ from the Rome Zoo to mate with a tame ♀ at his home. The first time it resulted in one ♂ cub; the second, in December 1966, in three cubs, all ♂♂.

In our Zoo, we learned that cheetahs kept in an enclosure between hyaenas and wolves did not do very well in the long run. When removed to a cage between big cats, they at first improved their condition, but soon afterwards they declined. After being returned to the original enclosure, they regained their original state.

In Rotterdam Zoo two ♂♂ and one ♀ were brought together. If one of the ♂♂ approached the ♀, it stimulated the other ♂ to mate her.

Food

We got the impression that cheetahs in the wild usually are much more slender and less fat than most cheetahs in Zoos. When observing several kills and the eating of them in the wild, it is found that the prey is eaten with hair and skin.

In one case of a ♀ and two half-grown young when the process could be observed from close by, we stated that the ♀ "skinned" the prey, a full-grown Grant Gazelle buck, to a larger part and first of all ate the skin and the hair, even of the legs. At a certain moment the antelope was completely skinned on belly, sides and upper hindlegs. It is impossible that teeth and jaws of the juveniles played an important part in the matter because they obviously were

still too weak to tear off the skin. This does not alter the fact that the skin really was eaten.

The opinion that cheetahs never return to their prey once they are chased off is so far true that they usually have no chance to return when being driven away by big predators. As a rule they therefore only eat fresh meat. Remnants are not guarded and when left are, of course, eaten by vultures, jackals, etc.

In captivity, meat should be as fresh as possible and without any fat. It is recommendable to give each individual once or twice a week a rabbit and/or a chicken, both with skin, hair or feathers. Cheetahs in Nairobi Orphanage keep perfectly fit and healthy on a ration of six feedings a week — one day fasting. Three lbs of fresh lean meat a day, once or twice a week substituted for a rabbit. Intestines and stomach of the rabbit have to be removed. Additional vitamines, minerals, etc., should be given to the meat.

Postscript

To our knowledge eight times cheetahs were born in captivity since 1945:

Philadelphia Zoo	1956: 2.1; one was killed by ♀, the others died within 3 days
Philadelphia Zoo	1957: 1.1; both died within 3 months
Krefeld Zoo	1960: 4: 2 were killed by ♀, 2, handreared, lived 4 years
Oklahoma Zoo	1962: 2.1; 1.0 died instantly, the others after 24 hours and 1½ week
Arnhem Zoo	1963: 2; both eaten by parents within 2 days
Rome (Dr. SPINELLI)	1966: 1.0; raised by ♀
Rome (Dr. SPINELLI)	1966: 3.0; raised by ♀
Whipsnade	1967: 1.2; according to latest reports, ♀ takes good care of the cubs

Re our remarks on keeping more than one ♂ with one ♀

Dr. GÜNTER VOSS, Assiniboine Park Zoo, mentioned in personal correspondence:

"The suggestion is not absolutely isolated in the case of cheetah. The owner of Alberta Game Farm was unable to breed his Arctic Foxes which were kept in pairs. An Eskimo experience is that there must be competition among the ♂♂. When introducing another ♂ to a pair, there was mating and breeding success."

Re our remarks on mating and food

Dr. GEORGE SCHALLER, Serengeti (personal correspondence): "In Serengeti I have only seen one ♀ in heat and she had three ♂♂ following her. But this is not necessarily usual. In over 70 kills examined I find that most of the skin is not eaten, only some of the thinner skin, particularly on the belly. Cheetah kill remnants are characteristic in that the bones and skin are usually all attached with the meat and viscera eaten off."

Mrs. JOY ADAMSON, Meru National Park, is observing in close contact a tame ♀ which is rehabilitated. After mating with a wild cheetah, the ♀ has 3,1 cubs; (personal correspondence): "Of thin skinned animals like Grant gazelle and goats, the cubs and the ♀ always eat the skin, starting behind the hindlegs where it is thinner, then gnawing up the belly and rump until all flesh and bones are exposed. When eating Guineafowl or Francolin, everything is eaten, except feathers. They eat the quills which contain calcium, as well the solid edges of the wings where the quills grow out. Grass is often eaten and not only in case of digestion trouble."