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SEXUAL BEHAVIOUR OF HAMADRYAS BABOONS

ABSTRACT — Various aspects of sexual behaviour and reproductive parameters of hamadryas baboons (*Papio hamadryas*) reared in Sukhumi Primate Research Center are presented. Three groups living under different ecological conditions (free ranging group, open-air enclosure living group and cage reared group) have been examined. The main attention of the study is turned to the population dynamics and copulatory behaviour. The specificity of sexual behaviour of hamadryas baboons has been shown and the differences among *Papio hamadryas* and other *Papio* species as well as macaques are stressed. Marked differences in sexual behaviour and reproductive parameters exist between captive and free ranging hamadryas baboons, e.g. earlier sexual maturation in captive groups, caused very probably by the different ecological parameters typical for individual types of environment.

KEY WORDS: *Papio hamadryas* — Sexual Behaviour — Copulatory Behaviour — Reproductive Parameters — Ecology of Reproduction.

Nonhuman primates are irreplaceable in the contemporary biomedical research. Natural populations of these animals decline due to the destruction of their natural habitats as a result of cultivation and urbanization. Exhaustion of wild primate populations is threatening to decrease their supply in the near future. One of the most reliable ways to keep adequate resources of primates for laboratory use is to breed them in primate nurseries and reserves.

Successful breeding of animals depends on the knowledge of peculiarities of their reproduction. Studies on breeding parameters and sexual behaviour of hamadryas baboons in different conditions of maintenance are of great theoretical value as well. Contrary to the genus *Macaca* whose reproductive behaviour was described in a number of publications (Vandenberg 1973, Loy 1971, Takahata 1980, Trollope 1975, Wallen 1982), baboons are comparatively less known in this respect. Sigg et al. (1982) investigated some reproductive parameters of hamadryas baboons kept under freeranging conditions. We have failed to find materials dealing with sexual behaviour of this species in the available literature.

The aim of our research was to study sexual behaviour and reproductive parameters of hamadryas baboons in different ecological conditions.

METHODS

Sexual behaviour and reproductive parameters of hamadryas baboons were studied under free-ranging conditions (the Gumista Primate Reserve) and under the conditions of the Sukhumi (USSR) nursery. Hamadryas baboons of the reserve were imported from Ethiopia in 1971–1972. At the end of 1974, the first group of hamadryas baboons consisting of 76 animals was released in the West Gumista Sanctuary. During the investigation period, the troop consisted of 186 animals. Observations of two nursery hamadryas baboon groups were also conducted. One group was kept in an open-air enclosure (200 square meters) and the other was kept in a cage (6 square meters). Table 1 shows sex/age composition of all the groups under investigation. All the animals were identified and had individual numbers. All pregnancies, births, pregnancy and labour pathologies and lactation were registered. Besides, sex skin state was followed daily with references to the four phase of sexual cycle: follicular phase (the beginning of sex skin swelling), ovulation period (maximum swelling), lutein phase (decrease of swelling) and prefollicular phase or resting period.

Observations were made using the method of continuous recording and timing (Deriagina et al. 1984).

TABLE 1. Composition of the hamadryas baboons groups

classes	Groups	Forest troop	Open-air enclosure	Cage
Adult males (more than 7 years old)		13	1	1
Subadult males (4—7 years old)		16	—	—
Juvenile males (1.5—4 years old)		32	6	2
Adult females (more than 4 years old)		61	27	8
Juvenile females 1.5—4 years old		29	7	1
Infants of both sexes		35	19	5

RESULTS

It has been established that female hamadryas baboons born and kept in the reserve exhibit their first sex skin swelling at the age of 40.5 ± 0.9 months. The first conception of the reserve females occurs at the age of 53.8 ± 1.3 months. Nursery females exhibit first signs of sex skin swelling at the age of 34.8 ± 0.3 months, the first successful mating of most of them being observed 10—11 months after that (according to Asanov 1968).

After births, the average duration of sexual cycles of the reserve females makes up 36.9 ± 0.5 days.

Observations and analyses of births in the reserve and in the nursery have shown that, irrespective of maintenance conditions, hamadryas baboons breed throughout the year (Fig. 1). At the same time, a certain increase in the number of births is noted in spring and autumn, both in the nursery and in the reserve.

Table 2 presents data on birth rate and survival of neonates in different ecological conditions.

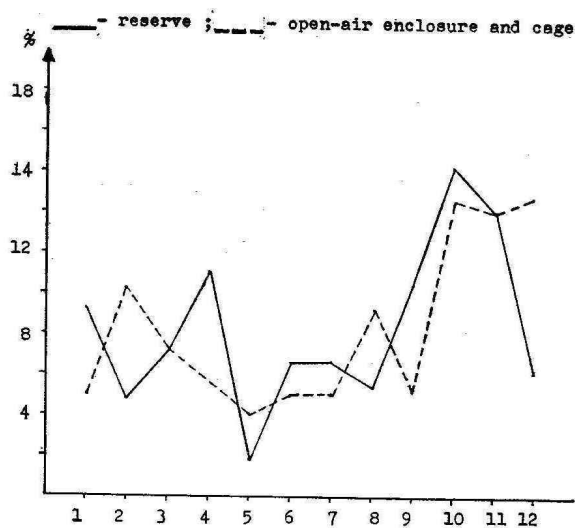
FIGURE 1. Distribution of births over the year (*Papio hamadryas*).

TABLE 2. Birth rate and survival of infant baboons

Index	Groups		
	forest troop	open-air enclosure	cage
Normal birth outcome	0.63	0.65	0.61
Yield of one-year old infants	0.48	0.51	0.48

Maturation of male hamadryas baboons occurs when they are four years old, their harems being formed 2 or 3 years later (Table 3). As seen from the table, the number of females in the adult males' harems range from two to ten. We should point out, however, that the harems of the two oldest males (No. 12592 and No. 13721) were formed during the period when there were only two other adult males and 43 females in the troop.

Copulative behaviour of hamadryas baboons is characterized by a number of stereotypic patterns. Both a female and a male may initiate mating. In the first case, mating occurs after the female presentation to her male partner. In the second case, the male, before copulation, seizes a female sitting nearby or catches up with a female which is in the distance.

TABLE 3. The number of females in the reserve harems

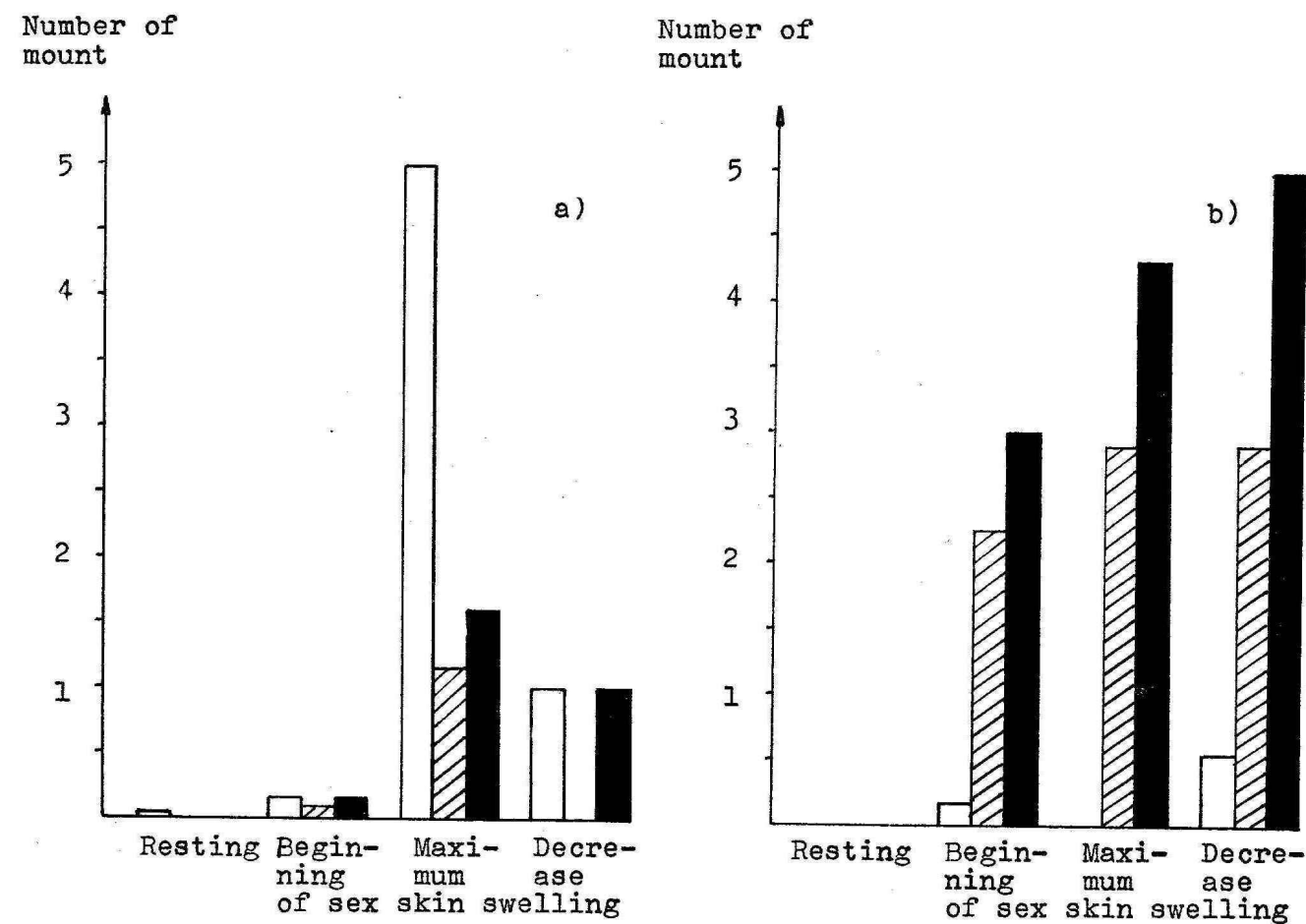
Male number	Male age (in years)						
	5	6	7	8	9	10	11
12592	—	4	9	11	12	10	8
13721	—	4	9	10	10	10	10
13734	—	2	6	7	6	6	—
13722	—	—	2	4	4	5	—
14179	—	—	2	3	5	5	—
14547	—	—	—	4	4	—	—
16459	—	—	2	2	—	—	—
15519	—	—	3	3	—	—	—
14876	—	—	4	5	—	—	—

Then the male "embraces" the female's loins keeping his hind limbs on her ankles; then a number of pelvic thrusts occur (from 2 to 20 thrusts). After ejaculation with which copulation is ended, the female, as a rule, grooms the male.

Our analysis has shown that the number of presentations to adult males is the greatest in females exhibiting maximum sex skin swelling and the lowest in females at the state of sexual rest (Fig. 3). Females kept in cages presented to adult males (during all phases of their sexual cycles) more often than those kept in open-air enclosures or in the reserve. As for juvenile males kept in captivity, females with maximum or with decreased sex skin swelling presented to them most often. No cases of presentation to juvenile males were observed in the reserve.

Figure 2 shows the frequency of mounts. Adult males, irrespective of the maintenance conditions,

□ - reserve; ▨ - open-air enclosure; ■ - cage

FIGURE 2. Frequency of mount (*Papio hamadryas*) during 1 hour (a — adult males, b — juvenile males).

most often mounted females with maximum sex skin swelling, as compared to females at other phases of sexual cycle. In the reserve, juvenile males most often mounted Lutein-phase females. No cases of their mating with females exhibiting maximum sex skin swelling were noted. In captivity, frequency of juvenile males mating with females exhibiting maximum sex skin swelling is high.

Table 4 shows the frequency of female-female mounting. Not a single case of such behaviour was observed in the reserve (during the observation period), while it was quite common in captivity. Both females are usually at the state of maximum sex skin swelling or at the state of decreased swelling.

DISCUSSION

Our observations have shown that sexual behaviour of nonhuman primates is closely connected with the formation of the reproductive function of the organism, which is supported by the data of other authors as well (Gordon 1981, Gordon, Bernstein 1973). Comparisons of the time of sexual maturation of females in captivity and under the conditions approaching the natural ones make it possible to conclude that there is a certain delay in maturation of the reserve baboons. Earlier occurrence of maturation in captivity was also noted by Altmann et al. (1977). It appears to be due to more favourable conditions

TABLE 4. Frequency of female-female mounts (during an hour)

Sex skin state	Reserve		Open-air enclos.		Cage	
	female mounts	female is mounted	female mounts	female is mounted	female mounts	female is mounted
Rest	—	—	—	—	1.8	1.8
Onset of swelling	—	—	1.0	1.1	1.4	3.1
Maximum swelling	—	—	1.2	0.7	13.3	13.3
Swelling decrease	—	—	—	2.1	21.0	18.0

□ - reserve; ▨ - open-air enclosure; ■ - cage

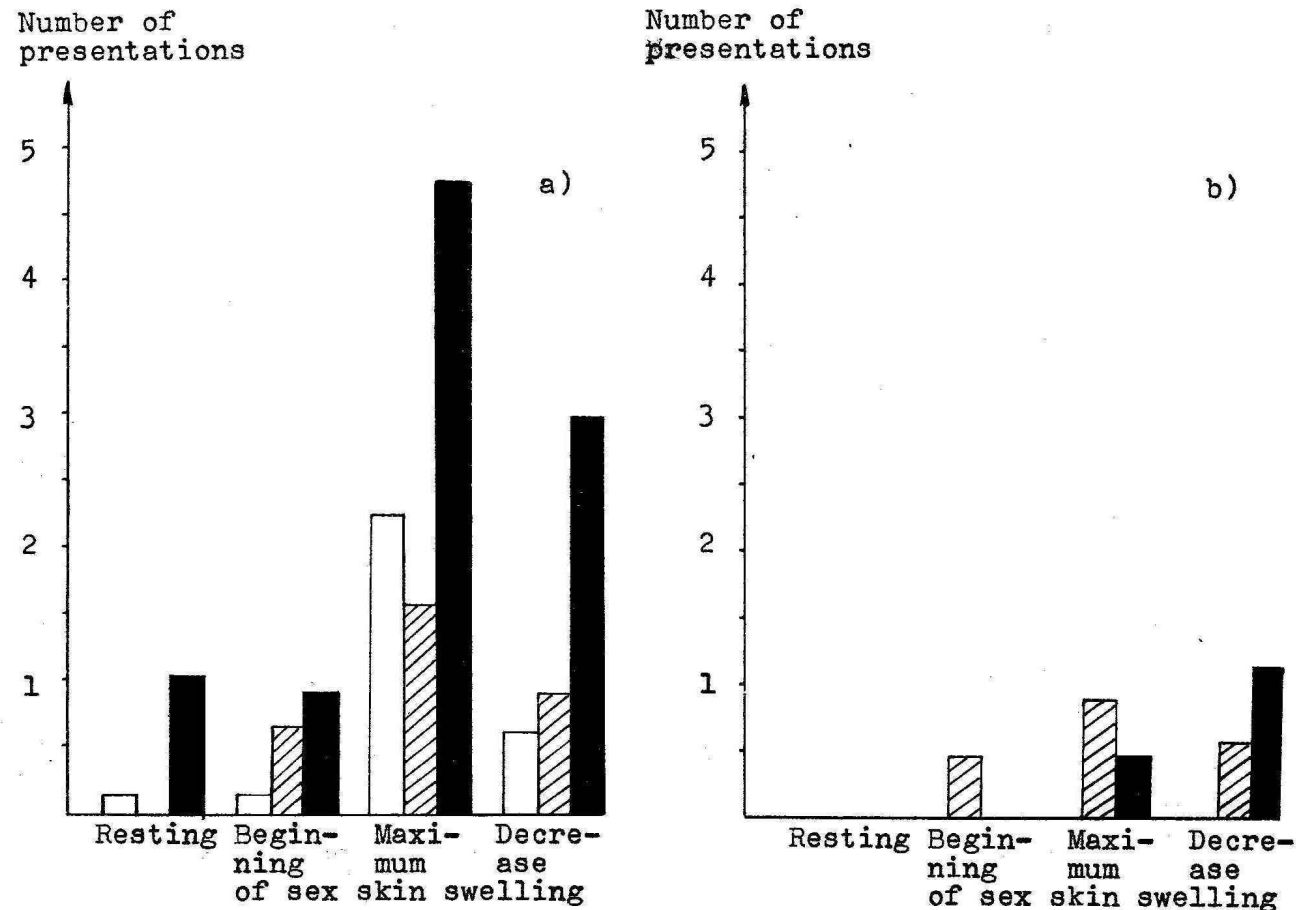


FIGURE 3. Frequency of female presentations (*Papio hamadryas*) during 1 hour (a — to adult males; b — to juvenile males).

created in captivity. The reserve baboons live in the open air all the year round and have to get by themselves most part of their diet. At the same time, the reserve females are ahead of hamadryas baboon females from Erer, Ethiopia (Sigg et al. 1982), as far as their development is concerned.

Sexual behaviour of hamadryas baboons differ from that of other baboons and macaques (Loy 1971, Chevalier-Sholnikoff 1975, Saayman 1970). Harem-type polygyny is characteristic of hamadryas baboons. It should be noted that young males of the Gumista Reserve form their harems earlier than in Ethiopia: the first females appear in their harems by the time they are 7 years old, as compared to 8.5—11.5 years of age in Ethiopia (Sigg et al. 1982).

Our observations have shown that copulative behaviour is qualitatively the same in different ecologic conditions. But although the copulative behaviour remains the same, such parameters as the frequency of female presentations to males and that of female-female mounts do change. Such changes in the frequency of sexual behaviour elements in captivity can be regarded as a compensation for motor activity associated with the search for food in the natural habitats. Besides, shortening of individual distances between the animals kept in cages seems to play a

significant role. The same reason account for the occurrence of homosexual behaviour in cages and open-air enclosures.

In the reserve, in the conditions of constant presence of many females, the dominant male strictly guards his receptive females (maximum sex skin swelling) and does not allow any other males to mount them. In cages and open-air enclosures, this "pasturage" behaviour is not so well expressed, so juvenile males are allowed to mount females at all phases of their sexual cycle.

In summary, it should be noted that we have made an attempt to shed light on certain aspects of hamadryas baboons reproductive behaviour. The problem is very extensive, however, and needs further studies.

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