Breeding of African Green Monkeys (Cercopithecus aethiops) under Indoor Individually-caged Conditions

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Abstract: This paper reports the results of reproduction with 45 wild African green monkeys (Cercopithecus aethiops) (36 females and 9 males) during the nine years from 1981 to 1989 under indoor individually-caged conditions. In 206 cases of menstruation observed, menstrual discharge lasted for 2.5 ± 1.2 days in cycles of 22–48 days, and the length of each menstrual cycle was 31.2 ± 6.5 days. Females who had regular menstrual cycles were subjected to "one-to-one timed mating"; females and males were put together on a one-to-one basis daily only for a certain period of time on and after the day of ovulation. Females who had irregular menstrual cycles or had no menstruation were subjected to "every-other-day mating"; females and males were put together on a one-to-one basis every other day for at least 16 weeks. The pregnancy rate (No. of pregnant females/No. of mated females) by one-to-one timed mating was 48.9% (116/237); 2.0 mating trials were needed to obtain one case of pregnancy. On the other hand, the pregnancy rate (No. of pregnant females/No. of mating trials) by every-other-day mating was 96% (48/50). Females who delivered normally totaled 129. The mean gestation period was 165 days when males, weighing 343 g on average at birth, were delivered, and 166 days when females, weighing 318 g on average at birth, were delivered. The male and female newborns were nursed for 131 and 138 days, respectively, on average. Details are summarized in Table 3. This paper also reports 23 cases of abortion, 6 stillbirths, and 6 cases of Caesarean section, by which three live fetuses and three dead fetuses were obtained.

Key words: African green monkeys, one-to-one timed mating, every-other-day mating, menstrual cycles, reproductive parameters

Introduction

African green monkeys (Cercopithecus aethiops) have been used for various kinds of biomedical studies and in vivo testing. Furthermore, their kidney cells have been used for human polio vaccine production, and their red blood cells have frequently been used in hemagglutination tests for virological investigations. The usefulness of this primate species has also been recently recognized in other experimental fields includ-
ing ophthalmology, protozoology, toxicology, and oncology. As regards virological studies using African green monkeys, it should not go unmentioned that simian immunodeficiency virus (SIV/AGM) was isolated from apparently healthy animals of this species. Thus, this primate species can be regarded as a useful animal model for human AIDS manifesting no overt diseases [10, 14, 17]. In parallel with the increase in the number of studies using African green monkeys, the number of papers dealing with the breeding of this species has gradually increased.

Besides conducting large-scale breeding of the cynomolgus monkey (Macaca fascicularis) at the Tsukuba Primate Center for Medical Science (TPC hereafter) [8], we have carried out breeding of the African green monkey under indoor individually-caged conditions and obtained successful results comparable to those with the cynomolgus monkey. This paper reports the results of breeding of African green monkeys by two different mating procedures: “one-to-one timed mating” and “every-other-day mating”. One-to-one timed mating could easily be performed, when menstrual bleeding was observed macroscopically and menstrual lengths were confirmed to be regular. As few researchers [2, 19] have reported that the vaginal discharge of the African green monkey is visible, to detect the occurrence of menstruation, many researchers are obliged to use vaginal swabs owing to the fact that menstrual blood of this species of monkey is small in quantity. When neither macroscopic menstrual bleeding nor regular menstrual lengths were observed, every-other-day mating was performed.

Materials and Methods

Subjects

A total of 36 female and 9 male African green monkeys of Kenyan origin were imported as breeders via England in 1979 or via U.S.A. in 1980. After being received, they were strictly quarantined at the TPC [8].

Housing and Feeding Conditions

Details of housing conditions were previously described [9]. Briefly, the monkeys were kept in individual cages (W: 43 × D: 60 × H: 60 cm) placed in completely air-conditioned windowless rooms illuminated with fluorescent lamps for 14 h (06:00–20:00) a day. The temperature and relative humidity were maintained at 25 ± 2°C and 60 ± 10%, respectively. Daily routines for animal care, including health check-ups, cleanup of cages and animals rooms, and feeding, started at 09:00. Each monkey was fed 100 g each of apples and oranges in the morning and 35 g each of monkey chow (AS type, Oriental Yeast Co., Ltd., Tokyo) at 13:30 and 16:30.

Breeding Schedule and Mating Procedures

Female and male breeders were put together on a one-to-one basis by two different mating procedures as described below.

The presence or absence of menstrual blood on the rack-floor under the cages was observed and recorded every morning. The day when the blood was found there for the first time was defined as the first day of the menstrual cycle.

(1) One-to-one timed mating

Females who had successively drawn two regular menstrual cycles were chosen as breeders. According to five reports [4, 7, 11, 13, 16], the regular length of the menstrual cycle of the African green monkey is 16–50 days. However, the minimum and maximum lengths of this range are presented in only one of the five reports, and the regular lengths of menstrual cycle presented in the remaining four reports converge in the range of 22–48 days. These values were coincident with those obtained in our breeding colony [18]. Accordingly, the regular length of menstrual cycle of the African green monkeys was set at 22–48 days in the present study.

Female breeders were housed together with male breeders for 72 h on and after the anticipated day of ovulation, that is, for the period from the 11th to 14th days of the menstrual cycle, which has been reported to be the preovulatory period of the menstrual cycle [1]. We named this procedure “one-to-one timed mating.”

(2) Every-other-day mating

Females whose menstrual cycle lengths were irregular or those whose menstrual discharge had not been observed were chosen as breeders. Each female breeder was housed with a male breeder every other day for 16 weeks at the longest. For this procedure, we designed a connected cage consisting of three compartments. The
cage had two partition plates between the central compartment and each of the right and left compartments; a male breeder was kept in the central compartment (W: 43 x D: 60 x H: 60 cm), and one female each was kept in the right and left compartments (W: 43 x D: 60 x H: 60 cm). The plates were lifted up or down on alternate days so that each of the females could be mated with the male every other day.

Pregnancy Diagnosis and Management of Pregnant Females

Pregnancy resulting from one-to-one timed mating was diagnosed 35 days after the onset of mating by intrarectal digital palpation of the uterus under anesthesia. As for the females who had been subjected to every-other-day mating, pregnancy diagnosis was repeatedly made 6, 8, 10, 12, 14, and 16 weeks after the onset of mating. When no pregnancy could be diagnosed at the 16th week of pregnancy, which was the time limit for every-other-day mating, the females underwent diagnosis for pregnancy around 35 days after separation from the male breeders. A female who had been judged to be pregnant was immediately removed from her compartment of the connected cage to an individual cage and underwent regular health check-ups at the estimated 8th, 12th, 16th, 20th, and 22nd weeks of pregnancy. The health check-ups included body weight measurement and examinations of fetal growth conditions by palpation, which contributed to the detection of some physical disorders.

Examinations of the Newborns and Their Mothers

On the day of birth, newborns were sexed, examined for external malformation, and weighed. Nursing abilities of mother monkeys were also observed and recorded.

Nursing Period

The period of time when the mother monkey nursed her baby was defined as that from the birth to the time when (1) the body weight of the baby at least doubled the birth weight, (2) the upper and lower first deciduous molars on both sides were erupting, and (3) the baby began to feed independently of his/her mother monkey. When the above three criteria were satisfied, the baby was compulsorily removed from his/her mother monkey.

Recurrence of Menstruation after Delivery

The number of months from delivery to recurrence of menstruation was counted with two types of mother monkeys: (1) those who experienced normal deliveries of live babies, and (2) those who underwent Caesarean section giving birth to live babies and nursed their babies for at least four months.

Statistics

Outcome of pregnancy by every-other-day mating and seasonal changes in timing of delivery were statistically analyzed by χ²-test. Values were expressed as the mean with the standard deviation. Birth weight and gestation period were statistically compared between male and female babies by Student's t-test.

Results

Observation of Menstrual Discharge and Cycles

Table 1 shows menstrual discharges observed in 36 female breeders during about nine months from their arrival at the TPC to their first mating. In 30 of the 36 female breeders, the menstrual discharge was seen more than once during the observation period. A total of 206 menstrual discharges were observed, lasting 2.5 ± 1.2 days on average. One hundred and three of the 206 cases of menstruation showed regular cycles of 22–48 days. The mean length of those menstrual cycles was 31.2 ± 6.5 days.

Mating Procedures and Pregnancy Rate

To obtain the first pregnancy at the TPC, ten females, who had menstrual bleeding, were mated with male breeders a total of 29 times by one-to-one timed mating, and only three females became pregnant (Table 2, a.). On the other hand, 33 females, including those who had been mated by one-to-one timed mating and failed to conceive, were mated with male breeders a total of 35 times by every-other-day mating, and all females achieved their first pregnancy (Table 2, b.).

The number of cases of pregnancy by one-to-one timed mating markedly increased from the second pregnancy on. Pregnancy by one-to-one timed mating totaled 116, the pregnancy rate attaining 48.9% (116/237), whereas that by every-other-day mating totaled 48. Since a total of 50 mating trials were done by every-other-day mating, the pregnancy rate was 96.0%
Table 1. Menstrual discharge observed for 9 months immediately before the first mating at Tsukuba Primate Center for Medical Science

<table>
<thead>
<tr>
<th>Category</th>
<th>No. of cases of menstruation</th>
<th>Range (day)</th>
<th>Mean ± S.D. (day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menstrual discharge</td>
<td>206</td>
<td>1-7</td>
<td>2.5 ± 1.2</td>
</tr>
<tr>
<td>Regular menstrual cycle</td>
<td>103</td>
<td>22-48</td>
<td>31.2 ± 6.5</td>
</tr>
</tbody>
</table>

Table 2. Results of breeding of African green monkeys at Tsukuba Primate Center for Medical Science (TPC)

<table>
<thead>
<tr>
<th>Parity at TPC</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8±</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. One-to-one timed mating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of females</td>
<td>10</td>
<td>36</td>
<td>29</td>
<td>21</td>
<td>18</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>48</td>
</tr>
<tr>
<td>No. of mating trials</td>
<td>29</td>
<td>50</td>
<td>53</td>
<td>37</td>
<td>36</td>
<td>18</td>
<td>10</td>
<td>4</td>
<td>237</td>
</tr>
<tr>
<td>No. of cases of pregnancy</td>
<td>3</td>
<td>28</td>
<td>29</td>
<td>21</td>
<td>18</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>116</td>
</tr>
<tr>
<td>Mean No. of mating trials required for one pregnancy</td>
<td>9.7</td>
<td>2.1</td>
<td>1.8</td>
<td>1.8</td>
<td>2.0</td>
<td>1.8</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>b. Every-other-day mating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of females</td>
<td>33</td>
<td>7</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td></td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>No. of mating trials</td>
<td>35</td>
<td>7</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td></td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>No. of cases of pregnancy</td>
<td>33</td>
<td>7</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td></td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>c. No. of births</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Normal birth</td>
<td>30</td>
<td>30</td>
<td>24</td>
<td>15</td>
<td>14</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>129</td>
</tr>
<tr>
<td>Abortion</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td></td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Stillbirth</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Caesarean (alive)</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Caesarean (dead)</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>35</td>
<td>31</td>
<td>24</td>
<td>18</td>
<td>11</td>
<td>7</td>
<td>2</td>
<td>164</td>
</tr>
<tr>
<td>d. No. of retired females</td>
<td>1</td>
<td>4</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Recurrence of menstruation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of females observed</td>
<td>29</td>
<td>27</td>
<td>20</td>
<td>14</td>
<td>11</td>
<td>8</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of days (mean ± S.D.) until the postpartum menstruation after delivery</td>
<td>147.6 ± 3.2</td>
<td>154.8 ± 3.2</td>
<td>151.7 ± 3.2</td>
<td>152.6 ± 3.2</td>
<td>162.8 ± 3.2</td>
<td>185.8 ± 3.2</td>
<td>151.5 ± 3.2</td>
<td>± 44.2 ± 32.2 ± 37.2 ± 48.4 ± 42.8 ± 51.6 ± 55.9</td>
<td></td>
</tr>
</tbody>
</table>

Explanatory notes: For the parity 2, for example, 36 females were subjected to one-to-one timed mating (a total of 50 times), and 28 of them conceived (a). Seven of the 8 females who did not conceive by one-to-one timed mating were subjected to the every-other-day mating, and all the 7 females conceived (b); the remaining 1 female retired (d).

(48/50) (Tables 2 and 3). Thirty (62.5%) of the 48 cases of pregnancy were detected within ten weeks of the onset of every-other-day mating, while 14 and 4 of the remaining 18 pregnant cases were detected by the time of separation and 5 weeks after separation, respectively (Fig. 1).

Table 2 (a.) also shows the mean number of mating trials required for getting one pregnant case by one-to-one timed mating. As was described earlier, to obtain three pregnant cases in the first parity, 29 mating trials were needed. Thirty-six females who had experienced the first parity, regardless of mating procedure, were mated a total of 50 times, and 28 of the females became pregnant again (the second parity). The number
of mating trials required for one case of pregnancy in the following parities was from 1.8 to 9.7, averaging 2.0 for all parities.

Delivery

The number of normal deliveries obtained was 129. Abortion and stillbirths totaled 23 and 6, respectively, and parturition by Caesarean section totaled six consisting of three live babies and three dead babies (Table 2, c.); the total fetal loss was 19.5% (32/164). The age of aborted fetuses was studied with 19 fetuses derived from one-to-one timed mating (Fig. 2). The 19 cases of abortion occurred at the fetal ages of 18–115 days. Among the mother monkeys who aborted (Fig. 2), one mother aborted on Day 18 of pregnancy, before the routine pregnancy diagnosis had been performed. This was a case of abortion which was detected by histological examination of the clot of blood found on the cage floor. Twelve of the 19 cases of abortion (about 63%) occurred at the fetal ages of 47–68 days.

Caesarean-sectioned females at the first parity underwent the operation at the end of the full-term because of placenta previa, typical genital bleeding and lying, resulting in removal of dead fetuses. Of the four cases
Table 3. Statistics of breeding performance of African green monkeys at Tsukuba Primate Center for Medical Science

<table>
<thead>
<tr>
<th></th>
<th>One-to-one timed mating</th>
<th>48.9%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Every-other day mating</td>
<td>96.0%</td>
</tr>
<tr>
<td>Pregnancy rate (%)</td>
<td>Male baby (N=46)</td>
<td>164.8 ± 6.2</td>
</tr>
<tr>
<td></td>
<td>Female baby (N=36)</td>
<td>166.0 ± 6.4</td>
</tr>
<tr>
<td>Gestation period (day)</td>
<td>Male baby (N=71)</td>
<td>342.8 ± 53.6</td>
</tr>
<tr>
<td></td>
<td>Female baby (N=58)</td>
<td>318.4 ± 50.8</td>
</tr>
<tr>
<td>Weight of newborn (g)</td>
<td>Male baby (N=71)</td>
<td>130.8 ± 27.4</td>
</tr>
<tr>
<td></td>
<td>Female baby (N=58)</td>
<td>137.9 ± 36.9</td>
</tr>
<tr>
<td>Nursing period (day)</td>
<td>Normal birth (N=89)</td>
<td>503.0 ± 189.0</td>
</tr>
<tr>
<td>Interbirth interval (day)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Pregnancy (N=116)/mating trial (N=237) × 100. 2) Pregnancy (N=48)/mating trial (N=50) × 100.

of Caesarean section performed at the fourth parity, two cases resulted in dead fetuses. One of the two females who delivered a dead fetus had been damaged by technical errors occurring in the course of collecting test materials in the final stages of pregnancy and was then judged as requiring Caesarean section. The fetus, which was later estimated to be about 150 days old, had died before the operation. The other female, who delivered a dead baby, underwent Caesarean section, since the fetus had been judged to be dead both by palpation and by doppler apparatus.

Recurrence of Menstruation after Delivery

Table 2 (c.) shows the number of days before recurrence of menstruation after delivery (N=113). On average, menstruation recurred 169.9 ± 54.3 (67-435) days after delivery. A small difference in the number of days before recurrence of menstruation was seen with respect to the parity. The first menstrual flow after delivery was larger in quantity, stickier in quality, and darker in color than ordinary menstrual flow.

Gestation Period

The gestation period was determined with 82 of the 129 females who conceived after one-to-one timed mating and experienced normal delivery. It averaged 164.8 ± 6.2 days (N=46) for male babies and 166.0 ± 6.4 days (N=36) for female babies (Table 3). There was no statistically significant difference in the gestation length between male babies and female babies (P<0.05). The gestation period for the six stillbirths ranged in length from 149 to 172 days.

Body Weight of the Newborns

The mean body weight with 95% confidence limits of the male babies (N=71) was 342.8 (235.6-450.0) g, and that of the female babies (N=58) was 318.4 (216.8-420.0) g (Table 3). All of the stillborn babies that had passed a full term of gestation ranged in weight from 290 to 380 g. There was no statistically significant difference in the body weight between stillborn babies and normally-born, live babies.

Nursing Abilities and Nursing Period

All the mother monkeys that had experienced normal deliveries (N=129) or successful Caesarean section (N=3) had nursing abilities and satisfactorily reared their own babies. The nursing period averaged 130.8 ± 27.4 days (N=71) for male babies and 137.9 ± 36.9 days (N=58) for female babies. There was no statistically significant difference in the nursing period between the male babies and the female babies (P>0.05) (Table 3). Nor was there a statistically significant difference in the nursing period with respect to the parity.

Interbirth Interval

Interbirth intervals were calculated for 89 females who delivered normally and averaged 503.0 ± 189.0 days (Table 3). There was no statistically significant difference in interbirth interval with respect to the parity.

Timing of Delivery

Figure 3 shows the timing of delivery in 135 females. Delivery tended to occur less frequently from January through March and more frequently in July and August followed by September. There was no sta-
tistically significant difference in the number of births in each month (P>0.05). Seasons were not taken into consideration when the decision on mating was made.

**Discussion**

Many reports on the menstruation of African green monkeys have been published [1, 3, 4, 7, 11, 13, 16]. All of these previous reports stated that the use of vaginal swabs was necessary for detecting the occurrence of menstruation because menstrual blood of the African green monkey was usually small in quantity. On the other hand, some researchers have reported menstrual cycles obtained not by the swabbing method but by macroscopic observation of menstrual bleeding, but they have not reported results of breeding [2, 19]. To detect the occurrence of menstruation, we chose macroscopic observation from a practical standpoint.

Compared with that before the first parity, or immediately after arrival at the TPC, vaginal discharge after the first parity increased in the present study, but the scientific significance of this phenomenon remains inexplicable. The females whose vaginal discharge thus increased after the first parity could be subjected to one-to-one timed mating. On the other hand, a few females retained a small quantity of vaginal discharge or had irregular menstrual cycles even after the first parity (7/35; Table 2). These females were subjected to every-other-day mating.

Careful consideration must be given to the accuracy of macroscopic observation of menstrual bleeding and the differences in the results between the macroscopic method and the swabbing method. At the TPC, however, we have been trying to raise the accuracy of macroscopic observation by employing skilled animal caretakers, by observing menstrual bleeding carefully referring to previous menstrual bleeding, and by employing multiple animal caretakers to avoid oversight.

For one-to-one timed mating of African green monkeys kept under indoor individually-caged conditions, it is necessary to know accurately the menstrual cycles. In the present study, we were able to observe menstrual flows macroscopically in 30 of the 36 female breeders before their first mating at the TPC (Table 1). The present data evidently indicate that the females who had once experienced pregnancy and delivery at the TPC tended to draw regular menstrual cycles and were easily mated by one-to-one timed mating, resulting in a higher pregnancy rate. Nevertheless, some females drew irregular menstrual cycles even after the second parity. For them, we employed every-other-day mating, for which it is unnecessary to know the menstrual cycle accurately. In addition, the regular length of menstrual cycle of the African green monkeys was set at 22–48 days in the present study, although it has been reported to be 16–50 days [4, 7, 11, 13, 16], as described above.

The interbirth interval of 503 days reported above in this report should not be interpreted as a natural value. However, it can be said from a practical point of view
that this value may usefully be cited when planning to
breed the African green monkey for biomedical use.

As has clearly been illustrated in Fig. 1, pregnancy was
ascertained in 30 (62.5%) of a total of 48 female
breeders mated by every-other-day mating within ten
weeks of the onset of the mating. As for the other
females, whose pregnancy was ascertained 12 weeks
after the onset of mating, it can be said that they con-
ceived 7–9 weeks after the onset of mating, that is,
around the time of the second ovulation after the onset
of mating. This means that they mated very effec-
tively. A statistically significant difference was seen in
the time when pregnancy was detected between the
number of pregnant cases which were detected by the
tenth week and that detected thereafter (P<0.05) (Fig.
1).

On the other hand, it should not be overlooked that
in four females who had been housed with male breed-
er s for 16 weeks, pregnancy was ascertained 5 weeks
after separation from the males, that is, 21 weeks after
the onset of mating.

As for the number of mating trials required for one
pregnancy by one-to-one timed mating, about ten trials
were needed at the first parity after the female breeders
were introduced into the TPC’s breeding facility (Table
2, d.), but only two or three mating trials were needed
later than the second parity. This may partly be due to
the fact that we had not satisfactorily experienced breeding
of the African green monkey. In addition, the
number of females who did not conceive and were re-
tired and the number of those who were obliged to be
retired for non-scientific reasons tended to become higher at the fourth parity and thereafter, as shown in
Table 2.

It has been reported that fetal loss of the African
green monkey is 25.3% (19/75) in small groups under
indoor conditions [11], 22.1% (17/77) in a large out-
door enclosure [6], and 15.8% (35/221) in indoor and
outdoor cages (equipped with walls during cold seas-
sons) [12]. The fetal loss at the TPC was 19.5% under
indoor conditions. The gestation period of the African
green monkey has been presented in six reports; the
shortest was 157 ± 3.6 days (n=5) [7], and the longest
was 164 days (n=12) [5]. In the present study, gesta-
tion periods of 164.8 ± 6.2 days (n=46) for the males
and 166.0 ± 6.4 days (n=36) for the females were ob-
tained. Neither the values of fetal loss nor those of the
gestation period of the African green monkey can be
compared on the same grounds, since the housing
conditions were different among the facilities where the
values were obtained. As for the body weight of new-
borns, values of 328.2 ± 57.8 g (n=24) for males and
308.1 ± 51.7 g (n=14) for females have been reported
[11], but we could find no other values of body weight
at birth among the literature with titles containing the
words “reproduction,” “breeding” or “propagation.”

Acknowledgments

We would like to thank Mr. M. Hamano and other
animal caretakers of the Corporation for Production and
Research of Laboratory Primates for their housing and
care of the monkeys used for the present study and Mr.
H. Ohno for his compilation of computerized data on
the reproduction of the animals. We also thank Dr. Y.
Yoshikawa for kindly reviewing the manuscript.

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