SUCCESSFUL BREEDING OF LESSER PANDA *(AILURUS FULGENS* F. CUVIER, 1825) AND LOSS THROUGH INOCULATION

by

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RÉSUMÉ

Les petits Pandas se sont reproduits dans un petit enclos non couvert muni d'un abri contre la pluie et de cages. Le mâle avait cinq ans et les femelles étaient adultes mais d'âge inconnu. L'accouplement eut lieu en janvier-février et la naissance en juin. La période de gestation a été de 125 à 132 (155?) jours. La cause de l'agitation des femelles après la naissance n'est pas clairement expliquée, elle est peut-être la conséquence d'un habitat imparfait. Les animaux ont souffert de températures élevées (environ 27°C ou plus).

En 1970, deux sujets ont été élevés et un est mort. La croissance est lente.

Les jeunes animaux ont été vaccinés à 53, 68 et 179 jours avec le virus vivant lyophilisé de la rougeole, le virus vivant lyophilisé de la leucopénie des chats, le virus vivant lyophilisé de la maladie de Carré et le virus de l'hépatite contagieuse. Dix jours après la dernière inoculation les deux jeunes tombèrent malades et moururent. Dix jours après, les trois adultes tombaient malades et moururent aussi. Les recherches post-mortem ont montré que les deux derniers étaient morts d'une infection due à un virus de Carré virulent. Comme tous les animaux ont montré les mêmes symptômes, bien que tout à fait différents de ceux des chiens, nous avons conclu que tous étaient morts de la même maladie et que l'infection avait été causée par l'inoculation du virus vivant.

Les symptômes de la maladie de Carré chez le petit Panda sont: une inflammation des muqueuses de la bouche et des yeux et des troubles nerveux importants dès le premier jour de la maladie (crises épileptiformes, coma).

Une enquête faite auprès de quarante-cinq zoos montra enfin que dans plusieurs cas, la maladie de Carré est apparue après vaccination avec du virus vivant. Nous conseillons de ne pas vacciner du tout. Si pour quelques raisons la vaccination semble souhaitable, on devra utiliser des vaccins tués ou le vaccin contre la rougeole.

ZUSAMMENFASSUNG

Die Kleinen Pandas züchteten in einem kleinen Außengehege mit Regenschutz und Käfigen. Das Männchen war bei der Zucht 5 Jahre alt, die Weibchen erwachsen (Alter unbekannt). Die Paarung fand im Januar/Februar statt, die Geburt im Juni. Die Tragzeit betrug 125 bis 132 (155?) Tage. Der Grund für die Unruhe der Weibchen nach der Geburt ist nicht bekannt, möglicherweise ist sie auf eine unzureichende Unterbringung zurückzuführen. Die Tiere leiden von Temperaturen von ungefähr 27° C und darüber.

1970 wuchsen zwei Jungtiere auf, eines starb. Die Entwicklung ist langsam. Die Jungtiere wurden im Alter von 53, 68 und 179 Tagen mit lebendem, gefriergetrocknetem Masernvirus, lebendem, gefriergetrocknetem Panleucopenie-Virus der Katzen und lebendem, gefriergetrocknetem Staupe- und Hepatitis contagiosa-Virus des Hundes geimpft. Zehn Tage nach der letzten Impfung wurden die Jungtiere krank und starben. Nach abermals zehn Tagen erkrankten und starben die drei erwachsenen Tiere. Die Sektionsbefunde ergaben, daß die letzten beiden an einer sehr virulenten Infektion durch den Hundestaupe-Virus starben. Da alle Tiere dieselben Symptome zeigten, die allerdings ganz anders als die bei Hunden waren, schlossen wir daraus, daß alle an derselben Krankheit starben und die Infektion durch die Impfung mit lebendem Virus hervorgerufen wurde.

Die Symptome der Hundestaupe bei Kleinen Pandas sind eine Entzündung der Mund- und Augenschleimhäute und schwere nervöse Symptome, schon vom ersten Tage der Krankheit an (epileptische Anfälle, Koma).

Eine Umfrage bei 45 Zoos ergab, daß zumindest in einigen Fällen Staupe nach Impfung mit lebendem Virus auftrat. Wir würden raten, auf keinen Fall zu impfen. Wenn aus irgendeinem Grunde eine Impfung wünschenswert erscheint, sollte mit abgetötetem Virus oder mit Masernvirus geimpft werden.

In the past we have had births of Lesser Panda at the Amsterdam Zoo but none of the young survived. In 1969 we kept one male, born at the Tierpark, Berlin, in 1964, and two females. The imported females were bought from a dealer in February 1968 (numbers 1 and 2).

Housing

The open semicircular enclosure (about 18 × 11 ft = 6 × 3.5 m) had a dead appletree in the centre. At the back were a rain shelter and four cages (2'6" × 2'8" = 0.75 × 0.80 m). In October 1969 a wooden barrel was put in the enclosure as an extra breeding facility (length 2'4" = 0.70 m, width 2' = 0.60 m, opening 8" × 10" = 0.20 × 0.25 m).

Mating

On January 16, 1969 the male was seen following both females. All three were very noisy but actual mating was not observed.

In 1970 the same behaviour was seen on January 26. On February 25 of that year mating with female 1 was observed. On March 5 and 18 the male tried to mate with female 1 but was not accepted.

Gestation period

In the literature periods between 150 and 131 days are given (Mottershead, 1958; Munro, 1969). For the first female (nr. 1), we found gestation to be 125 days (mating February 25, birth June 30). For the second female, (nr. 2) counted from the days of activity, the gestation period might have been 155 days in 1969 and 132 days in 1970.

Birth in 1969

On April 4, female 1 was reported to have a swollen belly, but that year we did not observe any sign of birth or young. Female 2 was found with two young in the open enclosure on June 19. The three were locked in one of the cages, but as the female was extremely restless and nervous the door was unlocked. At 13.45 h she was seen carrying a wounded young. As the second one also showed some wounds they were separated from the mother but died within 24 hours.

Birth in 1970

The accommodation was different. From April on the four cages were open day and night; two were empty and two were provided with a box and hay. The barrel was also provided with hay. On June 1 it was clearly visible that both females were pregnant. On June 7 the two females and two young were sleeping in the barrel. Female 1 left the barrel later on and was isolated as female 2 appeared to be the mother. The male stayed with female 2 and young. The next day the mother was seen several times carrying one young in and out of the cages. Twice she even left one baby in the enclosure for some time. At the end she chose the barrel and stayed there most of the time with the young. During the following weeks she was often seen in the evenings carrying one young but she always returned it to the barrel. From June 23 on she left them alone for longer periods. They developed well.

On June 30 female 1 gave birth to one young (as it proved 8 days later). Her accommodation was an empty cage and one with box and hay and she was left alone, except for feeding. During a heat wave (maximum 30° C) a week later, she was very restless and we gave her all the available room (four cages), but her young died. The young of female 2 survived but suffered visibly during the short period of extreme heat.

Development

Compared with cats the development of the Panda babies was very slow. At least one animal had its eyes open only on July 17, 41 days after birth. The first time the young were seen eating from the food-tray was at the age of 16 weeks.

From August 14 the neck wounds were treated with chloramphenicol and sulfanilamid ointment. Complete healing was reached only after separation from the adults during the day at the beginning of October, thus preventing both the females from continuing to drag the young around.

The young (both males) were healthy and lively but showed a very marked difference in growth. They often played together and sometimes with the adults. In this period it became apparent that the time of highest activity was between 5 p.m. and 5 a.m. They were just as tame as the adults and even liked to be handled.

Food

We fed per animal per day a mixture of the following foods:

1 orange	1 egg
1 apple	2 spoons whole powder milk
1 banana	1 spoon grassmeal (= alfalfameal)
1 small carrot	50 g Bambix (commercial brand of a mixture of cereals)
200 g green vegetables	some Bamboo branches

100 g multivitamin-mineral mixture

The vitamin content of this mixture is:

vitamin A	7500 I.U.	vitamin C	200 mg
D_3	1450 I.U.	K	5.5 mg
E	30 mg	nicotinic acid	60 mg
B_1	9 mg	panthothenic acid	23 mg
B_2	11.5 mg	folic acid	1.1 mg
B_6	5 mg	biotin	0.1 mg
B_{12}	0.03 mg	choline chloride	650 mg

Inoculation

We decided to try to protect the young against feline panleucopenia and canine distemper as we knew from literature that they seemed to be susceptible to both diseases.

Inoculation scheme

Date of birth: June 7, 1970

1) July 30: Dohyvac M, N.V. Philips-Duphar, Amsterdam. Live, freeze-dried tissue-culture vaccine based on attenuated measles virus for immunizing dogs against canine distemper.
2) August 14: Dohyvac P, N.V. Philips-Duphar, Amsterdam. Live, freeze-dried tissue-culture vaccine based on attenuated feline panleucopenia virus for immunizing cats against feline panleucopenia.
3) December 16: Epivax-T.C.-Plus, Burroughs Wellcome & Co., London. Combined canine distemper vaccine tissue-culture-adapted (living) and canine contagious hepatitis vaccine; tissue-culture-adapted (living), freeze-dried.

Disease and death

The young

On December 26 and 27, 1970 the animals left the greater part of their food. On the 28th both young were very sick. The smallest was cold and stiff, the other had his eyes closed, with frozen droplets on the lids. They were separated from the adults and housed in heated quarters. Injections with penicillin-streptomycin and isotonic electrolyte solution were started immediately.

On the 29th the smallest died; with the other the treatment was continued and he even ate and drank a little, but died during the night of the 30th to 31st. Post-mortem findings were not very clear: the most important findings were degeneration of heart and liver; gastro-enteritis with a little bleeding in the first and much more in the second animal.

The adults

On January 5, 1971 female 2 showed the first signs of illness. She was salivating, fluid was coming out of the eyes and there was considerable loss of appetite. Treatment started on the 6th with injections of procaine penicillin and dehydrostreptomycin. The mucous membranes of mouth and throat were very red, there was much saliva flowing. The next day the two other animals were sick. All animals had a purulent inflammation of the mucous membranes of the eyes and anorexia. On its first day of illness (the 7th) the male had an epileptic seizure. It fell on its side and showed typical tonoclonic and running movements of the extremities and evacuation of bladder and bowels. All animals were treated with penicillin-streptomycin.

The following days the Pandas had an epileptic seizure after each treatment during which a stream of saliva came out of the mouth, followed by a coma of five to ten minutes. For this reason a long term penicillin preparation was chosen for treatment so that the number of handlings of the animals was reduced as much as possible.

On January 9 female 2 drank for the first time in three days immediately after an epileptic seizure. When the male was injected with isotonic electrolyte fluid during a coma tonoclonic and running movements of the legs occurred.

The male died on the 10th. The females did drink and eat a little on that day but died during the night of the 12th to 13th after having been in a coma for two days and one day, respectively. The period of illness varied thus from four to seven days.

Post mortem findings

Examination of the male was done at the same institute at Utrecht (Dr. P. Zwart, Ziektekunde

Bijzondere Dieren) which had dealt with the young. Degeneration of the heart was not reported (only white spots on myocard), but a nephritis and bronchitis showed with the gastro-enteritis. The females were sent to the Central Veterinarian Institute at Rotterdam, which specialises in canine distemper. Only one showed enteritis with heavy bleeding. There is no other information about degeneration of other organs. The main result was that very many typical inclusion bodies were found (Page Green colouring) in the epithelium of trachea, membrana nictitans and bladder; this is a proof of canine distemper.

Conclusion

We conclude that all our Pandas died from distemper. The clinical symptoms of distemper in these Pandas were quite different from those in dogs. In dogs we mostly see in the first stage loss of appetite, a purulent conjunctivitis and rhinitis, pneumonia and diarrhoea with blood. Only after two or three weeks are symptoms of the nervous system apparent. The whole process is much quicker in Pandas. There was almost no sign of inflammation of the respiratory tract and the epileptic seizures started, immediately at the beginning (male) or in an early stage of illness.

It is clear that the Dohyvac M did not give a good immunity against canine distemper. It is highly probable that the young were infected by the Epivax inoculation. In the zoo canine distemper has not occurred for more than 20 years. The illness in the young started 10 days after inoculation and the adults fell ill 10 days later. If an infection from visitors had been the cause, it might have been expected that more animals would have fallen ill at about the same time.

Enquiries in other zoos

After this sad happening we thought it important to ask colleagues about their experience. We sent an enquiry to 58 zoos and received 45 answers. We are very grateful to all those who took the trouble to send us information. Seven zoos had no Pandas at all. In twelve babies had been born. In four, successful rearing had followed once or more often.

The information received about inoculation concerns solely adult animals received at the zoo. Twenty-four zoos did not inoculate. There might have been three cases of distemper. Seven inoculated with living virus and had four cases after and one before inoculation. Seven only used dead virus and had three cases. Two zoos informed us that distemper occurred within some weeks after inoculation. As the symptoms were so different, distemper was only proved in very few cases. We assumed that when the information referred to fits, coma or other nervous symptoms, it was a case of canine distemper.

General conclusions

Breeding Lesser Pandas in zoos is quite possible. The important features are adequate food and housing. There should be a choice of cool sleeping boxes. As arboreal animals they like sleeping on a high place and will use a nesting box in a tree as they did at Chester (Mottershead, 1958). As the normal time of birth seems to be June, it is important in hot climates to provide airy quarters with a temperature between 17 and 25° C. The animals seem to suffer at a higher temperature. The development of the young is slow.

Inoculation against canine distemper with living virus is not to be recommended and can be considered as very dangerous. If there is a real danger of infection the measles vaccine or dead virus vaccine should be used but it has not yet been proved that this is of any use in Lesser Panda.

LITERATURE

Anonymous, 1950. Some learn and some don't. Animal Kingdom, **53**: 40—43.

Anonymous, 1960. Susceptibility of the Lesser Panda to canine distemper. Cheyenne Mountain Zoological Park and London Zoo. Internat. Zoo 4b., **2**: 107.

Folmer Gray, Betty-Jean, 1970. Care and development of a hand-reared Red Panda. Internat. Zoo 4b., **10**: 139—142.

Jong, L. J. de, 1955. Panda's. Artis, **1**: 8—10.

Folmer, C. J., 1957. De bevroren Panda. Artis, **3**: 88—89.

Mottershead, G. S., 1958. Interesting experiments at Chester Zoo. Zool. Garten, **24**: 70—73.

—, 1963. The Lesser Panda in the Chester Zoological Gardens. Zool. Garten, **27**: 300—302.

Munro, George, 1969. Breeding the Lesser Panda. Internat. Zoo News, **89**: 281—283.

Rensenbrink, H. P., 1971. Kleine kleine panda's. Artis, **16**: 162—167.

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