SUMMARY

The goal of this research project was to investigate the social behavioral dynamics of all-male groups of captive western lowland gorillas (*Gorilla gorilla gorilla*) in two European Zoos. First, a group formation of an all-male group at Paignton Environmental Park (UK) was observed. The group included two silverback and two juvenile males. Second, selected social behaviors among members of an established all-male group at Loro Park, Tenerife (Spain) were also recorded. Another objective of this project was to gain an understanding of the development of the social behavioral dynamics within an all-male group in comparison to what is known from free-ranging mountain gorillas (*Gorilla gorilla beringei*). Additional attention was paid to the design and the utilization of the enclosure and its influence on the group dynamics. The knowledge obtained from this study provides the necessary background information and recommendations for the European Endangered Species Program for the Gorilla (EEP-Program) to assist in future group formations and long-term management of such all-male groups in captivity.

Qualitative data of the two silverbacks were obtained at the Cologne Zoo (Germany) prior to their move to Paignton Zoo and during the initial phase after the arrival of the silverbacks at Paignton Zoo. Quantitative data in the form of scan sampling were collected prior to and subsequent to the group formation. At Loro Park, all-occurrence sampling of selected social behaviors was applied to record all affiliative and agonistic interactions between the members of the all-male group. Between samples, scan sampling was used for the whole group to record the location of each gorilla. The times of observations in all three zoological gardens added up to 260 hours.

The results of the group formation showed that starting an all-male group with two young silverbacks, even when familiar with each other, could lead to serious fights and result in the subsequent permanent separation of them. Almost all non-social and social behaviors decreased post group formation, with the exception of idle behaviors. Stereotypic and aberrant behaviors increased for the remaining silverback as well as for the hand-reared juvenile. Social affiliative behaviors were expressed by the juvenile

males only, but these decreased post group formation. It is interesting to note that after the juveniles settled in, the group-reared male bonded with the hand-reared male. As a result, the juveniles built a coalition between the younger males towards the silverback in agonistic encounters. The data from the group formation showed that an all-male group should be founded with subadult and juvenile males at various ages and not more than one blackback or young silverback. It is important that the integration processes are carried out gradually to provide a stress free environment for the animals.

Among the all-male group at Loro Park, the results revealed that all males engaged in social affiliative interactions. The silverback was never observed playing. He stayed mainly in contact or in proximity to others, whereas the blackbacks and subadults played with each other. The only group-reared male expressed the highest rate of affiliative interactions. He was the only animal who had friendly interactions with all group members, and this supports the importance of socially experienced animals in the long-term management of all-male groups in captivity. All group members expressed agonistic behaviors, mainly moderate aggression, with the highest rates exhibited by two of the older blackbacks and the lowest rates by the silverback and the juveniles. The silverback received the majority of agonistic support from one of the blackbacks, thus, avoiding serious, subsequent fights. Coalitions were seen mainly between the silverback and one of the blackbacks and among juveniles.

Establishing coalitions and mutual support for individual group members has also been observed among free-ranging gorillas. This project showed that gorillas in captivity use similar mechanisms to coexist as has been seen among free-ranging gorillas. Similar to free-ranging mountain gorillas, captive males can be part of an all-male group, but as they mature, it usually becomes necessary for the zoo management to move individual adult males to other locations. Nonetheless, all-male groups can be an interesting and educational opportunity for the public.