

# EFFECTS OF HAND REARING ON THE REPRODUCTIVE SUCCESS OF WESTERN LOWLAND GORILLA'S IN NORTH AMERICA

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Hand rearing of captive born primates by human caregivers may delay or compromise socialization when the hand-reared individual is returned to its original social group. This study sought to assess the potential effects of hand rearing by evaluating whether it is associated with lower reproductive success relative to mother-reared individuals.

Many zoo professionals feel that hand-reared individuals have lower reproductive success than those that are mother-reared, presumably because the latter have better social skills. Reports that hand-reared western lowland gorillas have fewer offspring than individuals reared by their mothers (Beck and Power 1988; Meder 1993) are of particular concern to the American Association of Zoos and Aquariums' (AZA) Species Survival Plan (SSP) for western lowland gorillas. The major objective of SSPs is to maintain a genetically diverse, self-sustaining population. If hand-reared individuals are less likely to reproduce than mother-reared individuals, hand rearing could compromise demographic and genetic management tactics devised to ensure the maintenance of a self-sustaining population. To eliminate any adverse effects of hand rearing, the AZA SSP for western lowland gorillas has implemented husbandry changes aimed at promoting mother rearing by gorillas at North American zoos.

Despite recommendations, the frequency of hand rearing among lowland gorillas has not declined substantially since the early 1970s, remaining around 25-30% of the proportional frequency of rearing types for infants born in North American facilities each year. Our study included data on 697 gorillas: 257 wild-caught and 440 born at zoos or related facilities in North America. Data were extracted from the North American Western Lowland Gorilla Studbook (Dan Wharton, 1999) and amended and updated to February, 2000 with regard to rearing information.

We found that female captive-born gorillas are more reproductively successful than their wild-born counterparts in the studbook, in terms of infants per reproductive year. This is not significant for males (females: 0.23 inf/R Y CB vs. 0.13 inf/R Y WB ( $F=24.04$ ,  $p<<0.0001$ ); males: 0.31 inf/R Y CB vs. 0.24 inf/R Y WB ( $F=1.55$ ;  $p=0.215$ )). The effect of rearing type on male reproductive success in captivity was evident: more mother-reared males reproduced than hand-reared or partially hand-reared males ( $X^2=6.4$ ,  $p=0.0114$ ). We used a traditional method of demonstrating reproductive success (infants per reproductive year) and a more exacting method of comparing the percent of used reproductive opportunity to determine that mother-reared zoo-born females were also more reproductively successful than hand-reared females [0.808 R Y U vs. 0.290 R Y U ( $F=7.381$ ,  $p=0.0089$ )]. This means that females that were mother-reared are spending over 80% of their reproductive adult life engaged in reproduction and rearing.

The primary concern in this study is whether the rearing type of females affects the rearing needs of their own offspring. A MANOVA indicates that there is a significant effect of the dam's rearing on the rearing type of the offspring ( $R=2.99$ ,  $p=0.0091$ ). Of reproductively successful mother-reared (MR) dams 55% of their infants are mother-reared also, 21.3% are hand-reared (HR) and 23.8% are partially hand-reared (PHR). A Tukey Honest Significant Difference test shows that there is a significant effect of mother-reared dams producing mother-reared infants. Conversely, of reproductively successful hand-reared dams, 53.7% of their infants are also HR, 31.5% are MR, and 14.8% are PHR, although this effect on the distribution of infants is not significant, there is a higher number of hand-reared infants being produced by hand-reared dams.

The implication that hand rearing may negatively affect female gorillas' breeding and rearing success in zoos begs for a better level of compliance with the SSP's recommendations for increased socialization and a closer look at the effects of socialization on reproductive success. Our results also point to the need for healthy and socially "normal" reproductive environments to produce successful dams and sires capable of continuing a healthy and sustainable population.

## References

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