

BODY MASS DEVELOPMENT AND SURVIVAL RATE IN HAND- AND PARENT-REARED BOVIDAE AT AL WABRA WILDLIFE PRESERVATION (AWWP), QATAR

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Summary

*Several bovid species kept at Al Wabra Wildlife Preservation were evaluated for neonatal body mass development as well as their survival rate. Of special interest was the comparison of these parameters between hand- and parent-reared animals. For body mass development, a general pattern could be found, showing weight development stagnation shortly after birth, followed by linear growth. Post natal body mass of parent-reared animals and its development was in all 3 compared species found to be above hand-reared animals. Hand-rearing might be an effect of, not the reason behind this phenomenon. Survival rates in hand-reared individuals were higher than in parent-reared, not only as neonates but also as adults. Especially Beira antelopes (*Dorcatragus megalotis*) and Speke's gazelles (*Gazella spekei*) profited from hand-rearing, whereas the effect on Gerenuks (*Litocranius walleri*) and Phillip's dikdiks (*Madoqua saltiana phillipsi*) was smaller. It might be concluded, hand-rearing in populations with a critical health status being a protective measure that increases the survival of offspring. In species with less disease problems, handrearing may be less decisive for increasing offspring survival.*

Introduction

Species belonging to the family Bovidae, especially within the subfamily Antelopinae, are commonly kept in zoos. At Al Wabra Wildlife Preservation (AWWP), Qatar, they form the main mammal collection. With a large number of individuals of each species - including a large number of hand-reared animals (table 1) - and a strong emphasis on scientific record keeping, AWWP offers a huge data base. In this project we had a closer look at the body mass (BM) development of several bovids and compared the development between hand- and parent-reared animals for Beira antelopes (*Dorcatragus megalotis*), Phillip's dikdik (*Madoqua saltiana phillipsi*) and Gerenuk (*Litocranius walleri*) (table 1). Areas of interest were the overall growth pattern and possible differences in the development of hand- and parent-reared individuals. A second task was to evaluate survival rates of hand- and parent-reared animals, with a closer look at Gerenuks, Beira antelopes, Phillip's dikdiks and Speke's gazelles (*Gazella spekei*).

Methods

All bovid hand-reared records available at AWWP from 2001 up to January 2008 (table 1) were analysed relating to BM development minimum up to day 49 post natum (day 49 – day 97 p.n.in most cases). Where enough (minimum 5 hand-reared records per species) and continuous data for both

hand- and parent-reared animals were available, BM development was compared between these groups (only up to day 14 p.n., as parent-reared animals became harder to catch with every day, and data therefore became inconsistent). It had been attempted to weigh animals once per day, but that was not possible in all cases. Survival rates were analysed as well for those species in which at least 5 individual hand-reared records were available.

Table 1: Recorded hand-reared bovid species at AWWP up to Jan. 2008.

Scientific name	Common name	No. of hand-reared individuals
<i>Dorcatragus megalotis</i>	Beira antelope	6 * #
<i>Gazella bennettii</i>	Chinkara gazelle	2
<i>Madoqua saltiana phillipsi</i>	Phillips dikdik,	9 * #
<i>Gazella dorcas</i>	Dorcas gazelle	7
<i>Litocranius walleri</i>	Gerenuk	13 * #
<i>Gazella subgutturosa</i>	Goitered gazelle	4
<i>Gazella granti</i>	Grants gazelle	1
<i>Gazella gazella ssp.</i>	Arabian mountain gazelle	1
<i>Oryx beisa</i>	Beisa oryx,	1
<i>Gazella dorcas ssp. pelzelni</i>	Pelzeln's gazelle	1
<i>Gazella rufifrons</i>	Red-fronted gazelle	3
<i>Gazella soemmeringii berberana</i>	Soemmering's gazelle	3
<i>Gazella spekei</i>	Speke's gazelle	6 #
<i>Gazella thomsonii</i>	Thomson gazelle	1

* Comparison of body mass development of hand- and parent-reared animals

Comparison of survival rate of hand- and parent-reared animals

Results

BM development – general pattern

Most of the analysed growth curves showed a similar pattern – stagnation in weight development (varying from slight incline to slight decline in body mass) until the 2nd – 3rd day post natum followed by an approximately linear body mass increase up to the end of the observation (day 49 – day 97 post natum, varying by species), resulting in multiplying birth BM by 3 - 4 in 42 - 77 days (figure 1).

BM development – parent- vs. hand-reared

In 3 species (Beira antelope, Phillip's dikdik, Gerenuk) BM development was compared between parent- and hand-reared individuals (figures 2 - 4). Gerenuks were born weighting about 9 % of their estimated adult BM (mean hand-reared (h.r.): 8.66 %, mean parent-reared (p.r.): 9.6 %, estimated adult BM: 36 kg) (table 2). BM development of hand- and parent-reared individuals differed by 0.21 - 0.94 % of estimated adult BM. Amount of individuals: 13 hand-reared, 64 parent-reared. Beira antelope post natal BM lay at about 14.5 % of estimated adult BM (mean h.r.: 13.97 %, mean p.r.: 15.42 %; estimated adult BM: 10 kg) (table 2). BM development of hand- and parent-reared individuals differed by 1.45 - 4.78 % of estimated adult BM. Amount of individuals: 6 hand-reared, 73 parent-reared. In Phillip's dikdik BM of newborns was approx. 14 % of the estimated adult BM (mean h.r.: 14.11 %, mean p.r.: 14.35 %; estimated adult BM: 3 kg) (table 2). BM development of hand- and parent-reared individuals differed by 0.24 - 3.34 % of estimated adult BM. Amount of individuals: 9 hand-reared, 28 parent-reared.

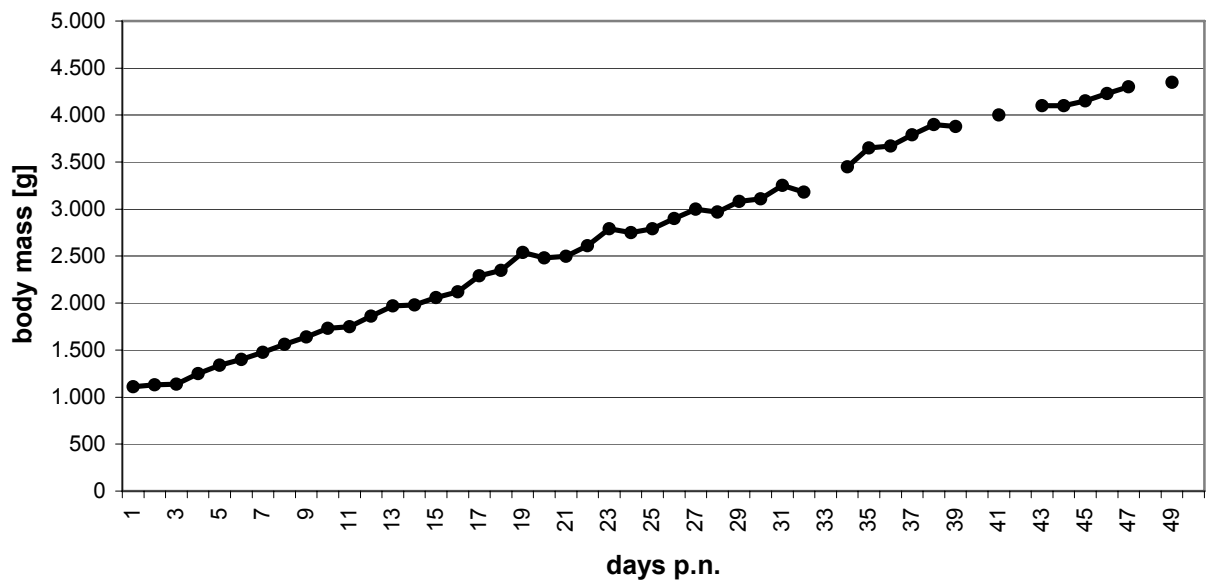


Figure 1: Post natum BM development in a hand-reared Arabian mountain gazelle.

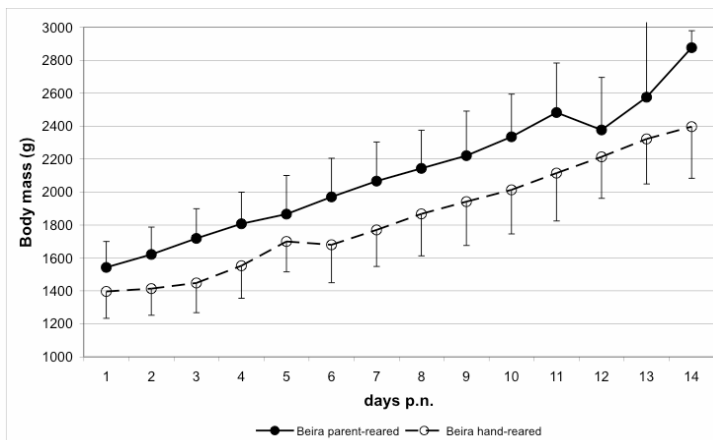


Figure 2: Post natum body mass development in Beira antelope.

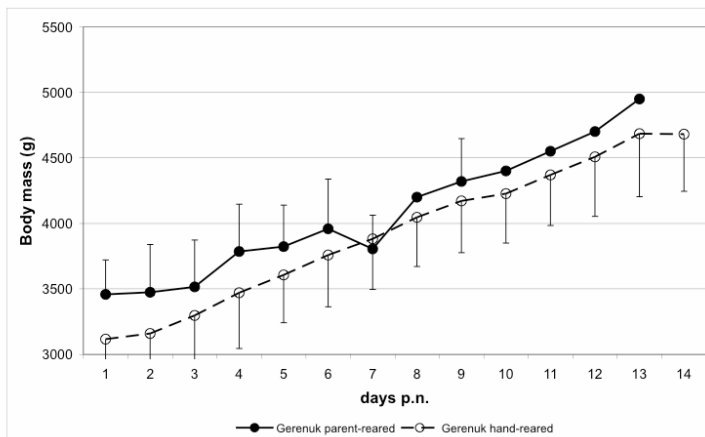


Figure 3: Post natum body mass development in Gerenuk.

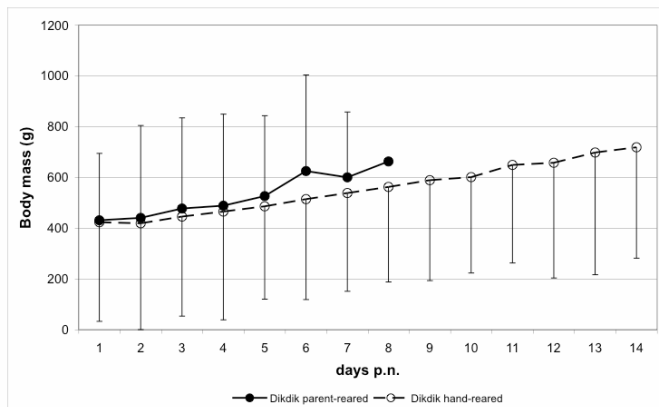


Figure 4: Post natum body mass development in Phillip's dikdik.

Survival rate

One hundred percent of the recorded hand-reared Beira antelopes survived week 1 as well as month 1 post natum. Sixty-seven percent reached their first birthday. Of the parent-reared Beira antelopes 97 % reached the end of week 1, 90 % the end of month 1 and 65 % the end of year 1. (figure 5). Amount of neonates: hand-reared = 6, parent-reared = 86.

In hand-reared Gerenuks 87 % reached end of week 1 as well as of month 1, 53 % the end of year 1. In parent-reared Gerenuks 74 % survived week 1, 65 % month 1 and 49 % year 1. (figure 6). Amount of neonates: hand-reared = 15, parent-reared = 74.

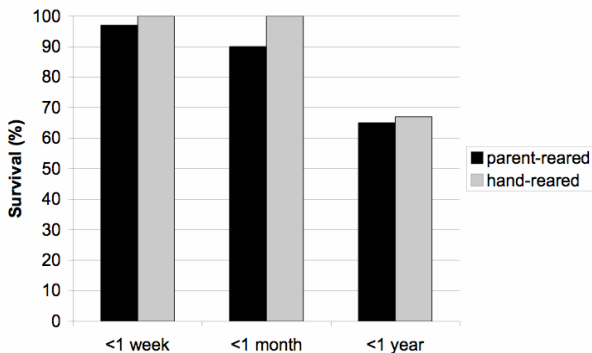


Figure 5: Survival rate of hand- and parent-reared Beira antelope.

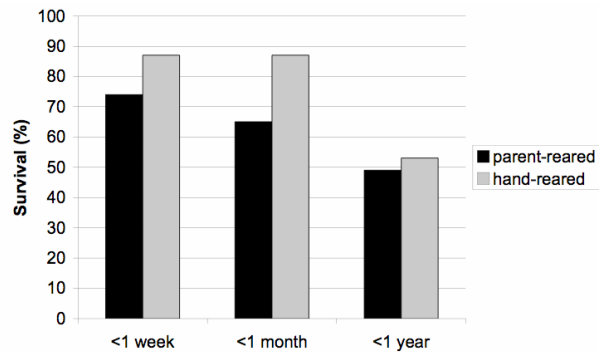


Figure 6: Survival rate of hand- and parent-reared Gerenuk.

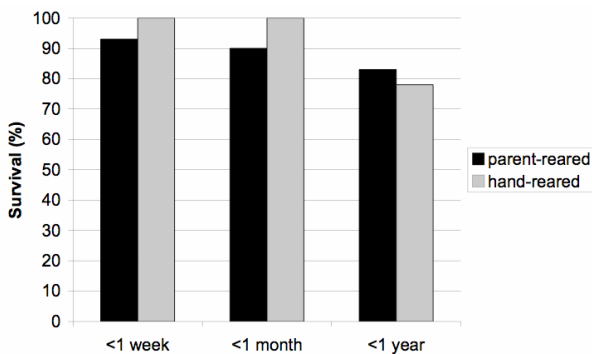


Figure 7: Survival rate of hand- and parent-reared Phillip's dikdik.

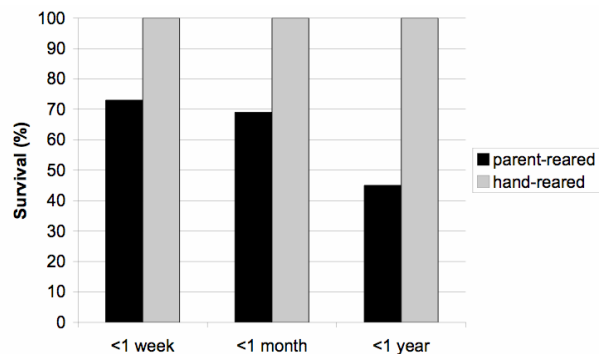


Figure 8: Survival rate of hand- and parent-reared Speke's gazelle.

For Phillip's dikdik: hand-reared: 100 % survived up to the end of month 1, 78 % reached their first birthday. Parent-reared: 93 % up to week 1, 90 % up to month 1, 83 % up to year 1 (figure 7). Amount of neonates: hand-reared = 9, parent-reared = 30.

For Speke's gazelles: Hand-reared: 100% up to year 1. Parent-reared: 73% up to week 1, 69% up to month 1, 45% up to year 1 (figure 8). Amount of neonates: hand-reared = 6, parent-reared = 176.

Table 2: Body mass in selected Bovidae.

Common name	Approx. body mass p.n. [kg]*	Approx. adult body mass [kg]
Beira antelope	1.2 - 1.5	9 - 11.5 ¹
Chinkara gazelle	1.4 - 1.6	23 m ²
Phillips dik dik,	0.4	2 - 6 ³ , f heavier than m ⁴
Dorcas gazelle	1.5 - 1.7	15 - 20 ⁴
Gerenuk	2.8 - 3.4	30 - 50 ¹
Goitered gazelle	1.1 - 1.5	18 - 33 ¹
Grants gazelle	3.8	35 - 50 f, 55 - 80 m ⁴
Arabian mountain gazelle	1.1 - 1.2	15 - 20 f, 20 - 35 m ¹
Beisa oryx	5.5	150 - 200 ¹
Pelzeln's gazelle	1.2 - 1.3	15 - 20 ¹
Red-fronted gazelle	2.6 - 2.9	20 - 35 ¹
Soemmering's gazelle	2.3 - 2.5	35 - 45 ¹
Speke's gazelle	1.2 - 1.5	15 - 25 ¹
Thomson gazelle	1.9 - 2.0	14 - 30 ⁴

* According to AWWP data.

1 Ultimate Ungulate (2009).

2 Wildlife Institute Of India (2009).

3 Fowler (1986).

4 Antelope & Giraffe Tag (2009).

Discussion

BM development – general pattern

A general pattern in post natum BM development could be found, as is exemplified in the growth curve of a hand-reared Arabian mountain gazelle (*Gazella gazella* ssp.) (figure 1). BM stagnates (sometimes even slightly drops) in the first few days p.n., which is followed by a linear BM increase. This pattern might be interrupted, as one would suspect, by illness for example.

BM development – parent- vs. hand-reared

In all 3 species the BM at birth of parent-reared animals was found to be higher than that of hand-reared animals. The biggest difference between hand- and parent-reared animals could be found in Beira antelopes. However, the lower BM is probably not an effect, but among the causes for hand-rearing (e.g. resulting from maternal neglect, illness, general weakness etc.). Some difficulties occurred with parent-reared weight records: While hand-reared animals were closely monitored and data material therefore is very consistent, parent-reared animals grew harder to catch by the day. Therefore the number of animals that were weighted each day decreased with age. As result, hand-reared growth curves are reliable, whereas those of parent-reared animals must be regarded purely as an indication or tendency (the more the further away from birth).

Survival rate

In all 4 species (Beira antelope, Gerenuk, Phillip's dikdik, Speke's gazelle), hand-reared animals showed higher survival rates than parent-reared animals (exception: Phillip's dikdik > 1 month and < 1 year). Overall highest survival rates and smallest difference between hand- and parent-reared animals could be found in Phillip's dikdik, the species with the lowest overall mortality. In contrast, in the species with the highest overall mortality, the Speke's gazelle, the protective effect of hand-rearing on survival was most pronounced. In populations with a critical health status, hand-rearing under veterinary supervision and under high-standard hygienic conditions might therefore represent a protective measure that increases the survival of offspring. For species in which different management efforts fail to decrease mortalities, hand-rearing might thus represent an important management tool (such as in the Beira antelope and Speke's gazelle, with endemic respiratory illness in the population, in our example here). In contrast, in species with less disease problems, handrearing may be less decisive for increasing offspring survival.

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