

# CREATING A PUBLIC UNDERSTANDING OF THE BIOLOGY OF THE BABIRUSA (*Babryrousa babyrussa*) WITHIN A CARING ZOO ENVIRONMENT

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**Abstract:** Studies on babirusa, carried out largely in zoos throughout the world and dealing with various biological and veterinary aspects, have yielded data which offer hypotheses which can be examined and tested by the observation of babirusa in the wild. This paper will review the results of these studies and present them within the context of generating interest in and awareness of the biology of the babirusa and the environment within which it lives.

**Keywords:** Babirusa, *Babryrousa babyrussa*, Suidae, Zoo conservation.

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## 1. Introduction

Studies of the anatomy, behaviour, physiology, and veterinary medicine of the babirusa have contributed to our understanding of the biology of the animal. The first part of this paper seeks to illustrate by means of examples how studies of the babirusa are currently being carried out. The second part addresses the topic of reporting the results of research studies. The information generated by research can often be translated into ideas and suggestions for the improvement of zoo practice with respect to enclosure design, nutrition, reproduction and veterinary care. However, it is more important that the next step is also addressed, namely the knowledgeable and interesting display of information to the general public.

But what is a babirusa? It is pig of unusual appearance (Fig. 1), the current opinion with regard to its place within the Suidae having been reviewed within the recently published account of the status survey and conservation action plan for the pigs, peccaries and hippos (Oliver, 1993). Endemic to the Indonesian islands of Sulawesi, Buru and the Sula and Togian groups (Macdonald, 1991; Macdonald, 1993) the subspecies from the northern part of Sulawesi is now represented in 29 zoos world wide. A studbook has been established for the species and active research of its biology has been stimulated (Plasa, 1992). The research activity of recent decades has concentrated lar-

gely on material available in museums and zoological collections; only a few studies being carried out in the field (Macdonald, 1991; Macdonald, 1993).

## 2. Anatomy

Reanalyses of the soft tissue anatomy of the limbs and digestive tract of the babirusa have revealed mistakes of identification in earlier work and the results have reversed the earlier suggestion that the babirusa was constructed in a significantly different way from the pig (*Sus scrofa*); in general the muscular anatomies of the two species are very similar (Macdonald *et al.*, 1985; Kneepkens *et al.*, 1989) and the stomach of the babirusa does not resemble that of the ruminant (Langer, 1988). Other anatomical studies, of the canine teeth in the skulls of wild-caught adult male babirusa, had led to the conclusion that the upper canines might be used in combat between males (MacKinnon, 1981). One adult was thought to use the curved maxillary canine to hook over one of the lower canines of his opponent, thereby disarming him. It was believed that this would then allow him to use his own lower canine to inflict injury on the throat or face of the disarmed opponent. However, recent X-ray analyses of the male skull demonstrated that the maxillary canine has a relatively shallow socket and would be unable to withstand large leverage forces (Macdonald *et al.*, 1993).

### 3. Behaviour

Studies of the agonistic behaviour of babirusa have so far revealed no evidence that the adult males normally use their teeth during male-male interactions. The boars were seen to go through a series of aggressive behaviours which could be categorised (Macdonald *et al.*, 1993). The ultimate form of agonistic behaviour was described as “boxing”, and involved the two males raising themselves off the ground until both were standing on their hind legs facing one another, leaning and paddling against the chest and shoulders of their opponent (Fig. 1A). Their snouts were held as high as possible. Females did not employ the same strategy. Ironically they did use their teeth, in this case their chisel-like incisors to nip at the forelimb or foot of the opponent.



Figure 1A - “Boxing” behaviour demonstrated by two adult male babirusa. Note they are stretching their noses as high as possible and paddling with their forefeet.

Both sexes were able to stand on their hind limbs, however, the female being seen to have the ability to balance on her hind limbs in order to browse the leaves of trees in her enclosure (Fig. 1B). Care of the skin would seem to be implied by the wallowing activity seen often in the heat of the tropics (Fig. 1C); it is an option largely denied that animals in European zoos due to current pen design.



Figure 1B - Adult female balancing on her hind legs while browsing the leaves of a tree.



Figure 1C - Male babirusa bathing in a muddy pond in the late morning tropical heat.

#### 4. Physiology

The reproductive physiology of the babirusa is poorly understood. Observations of animals in zoological collections suggest that the continual presence of the boar within the same enclosure may depress the production of young. By way of contrast, however, the separation of the male and female into adjacent pens, with mixing restricted to during oestrus seems to promote fecundity (Vercammen, 1991). Both the presence of several boars within a single pen of females, or individual boars with sight and scent of one another in adjacent pens of females also appear to stimulate competition and enhanced reproductive activity. The relatively small size of the female reproductive tract is consistent with the small size of the litter which ranges from one to three young after a gestation of about 158 or 159 days (Vercammen, *op. cit.*). However, video recording of the delivery of babirusa piglets has demonstrated that those which are too weak to survive the night are consumed by the mother, and are thus never recorded by the staff when they come on duty. There is an unconfirmed report from the field that the babirusa can produce four fetuses (Patry, 1990).

#### 5. Veterinary

The increased number of babirusa in European and American zoological collections has led to a greater awareness of the need to gather observations related to their husbandry and care. For example the rapid growth of the teeth of the male is such as to require them to be routinely cut in order to prevent them from growing into the forehead. The chronic relatively poor condition of feet has been noted but remains to be investigated. Increasing interest in other parts of the animal's skeletal anatomy has recently drawn attention to the presence of undiagnosed spondylosis and the European coordination of research on the species has revealed the presence of intra-abdominal tumours.

#### 6. Care within zoos

Zoos and their keepers, by their very nature, care for their animals as individuals. For example, attention might be expected to be paid to the structural weakness of the upper canine and its socket with regard to the specific design of fencing. The ability of the animal to stand on its hindlegs implies that cut branches might be set in holders and on trees above ground level in order to allow the animal to stretch to

browse. The ability of the animals to interact in a series of interesting ways without causing one another serious damage suggests that holding them in larger group sizes might be explored.

Increasingly, however, the attention of zoo staff is being called away from the individual to the care of the species as a whole. In a corresponding way, there are changes and an adjustment underway in the role of the zoo, moving it gradually from that of a park exhibiting the range of forms of animal species in the world towards something more akin to an informed teaching and research institution (Macdonald and Leus, 1993). Progressively, the current and prospective status of groups of animals, such as the pigs, are being evaluated and species are being classified as "rare", "vulnerable", "endangered" or "critically endangered" (Oliver, 1993). World-wide the zoo community is being invited to participate in and increasingly concentrate their resources on the captive breeding of species which fall within these categories. Taxon advisory groups (TAGs) are increasingly liaising with workers in the field to help ensure the conservation of species. Effective conservation of the available genetic variability depends upon more thorough collection and dissemination of information about their numbers and distribution in the wild as well as the biology of individual species. Crucially, however, funding and other support of these activities can be expected to rely heavily upon information and the explanation offered to the general public about what is going on within the zoo in this regard and why. Greater effort will be required of the zoos in the future to show and tell the public more of the details of the biology of the babirusa, and to illustrate how and why the animal is being conserved within zoos for its eventual return to a restored natural environment.

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