

Some notes relating to the observation of tamaraw (*Bubalus mindorensis*) in the Mt. Iglit-Baco National Park, the Philippines, in 2003

Několik poznámek z pozorování buvola tamaraua (*Bubalus mindorensis*) v národním parku Mt. Iglit-Baco, Filipíny, v roce 2003

Josef SUCHOMEL

Institute of Forest Ecology, Mendel University of Agriculture and Forestry Brno, Zemědělská 3, CZ–613 00 Brno, Czech Republic; suchomel@mendelu.cz

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Abstract. An extremely rare bovid, the tamaraw (*Bubalus mindorensis*), was observed in the period 2–5 February 2003 in the central part of the Mt. Iglit-Baco National Park (Mindoro, the Philippines). The observations are added with photographs, information on the effect of domestic species of herbivores on the local populations of tamaraw and on its developmental trends according to data obtained in the park administration at San Jose. Information collected is discussed with available literature sources.

INTRODUCTION

The tamaraw, *Bubalus mindorensis* (Heude, 1888), is a little known and very rare bovid species endemic to the Mindoro Island (the Philippines). In the wild, it is almost extinct and only four individuals are kept in captivity! Thus, the species ranks among the rarest and the most threatened mammals of the world and its observations, although only accidental, belong to very unusual moments. Very little information on its ecology and behaviour in the wild is available in the literature (e.g. TALBOT & TALBOT 1966, KUEHN 1986, LUSTRIA & CALLO 1992). We can also find some discrepancies in the assessment of the number of a free-living population (ANONYMOUS 2002, IUCN 2004). Published photographs of this species (both in the wild and in captivity) are relatively rare (e.g. TALBOT & TALBOT 1966). Particularly in recent decades, photos of this species are nearly missing. CUSTODIO et al. (1996) provide general characteristics of the species. Studies of the tamaraw coming from recent years are aimed at cytogenetic, molecular and phylogenetic analyses (TANAKA et al. 1996, 2000) or on veterinary (MASANGKAY et al. 1993a, b, HERRERA et al. 1993, FERANIL & MAALA 2001, SANTIAGO et al. 2001) and physiological (MAJID et al. 1995, SOLIS et al. 1995, 1998, FLOR et al. 1998, MASANGKAY & ARVESU 1998) problems as well as on reproduction parameters of animals raised in captivity (SOLIS et al. 1996, SARABIA et al. 1998). Since 1993, all these papers have been based on the material of several animals (up to seven) kept in captivity in the Gene Pool Breeding Station in the Mt. Iglit-Baco National Park. Studies and observations concerning the ecology of the species in the natural environment are only of older date (e.g. TALBOT & TALBOT 1966, KUEHN 1986, LUSTRIA & CALLO 1992). The latest significant paper on the species is related to the rediscovery of the type specimen (BRAUN et al. 2002).

METHODS

The tamaraw was observed in the Mt. Iglit-Baco National Park in the period 2–5 February 2003. Animals occurring both in the wild and in captivity were studied in the Gene Pool Breeding Centre, Mount Iglit-Baco National Park (75,445 ha) situated in the centre of the Mindoro Island, in the Calintaan and Sablayan municipalities of the Occidental Mindoro Province and in the Bongabonga Municipality of the Oriental Mindoro Province, 12° 35' – 12° 56' N, 121° 00' – 121° 19' E (ANONYMOUS 2003). The park is a topographically broken area covered 90% by grassy communities dominated by high-stalked species of *Imperata cylindrica* (dry sites) and *Saccharum spontaneum* (moist sites) growing on foots of mountains and short-stalked species of *Paspalum*, *Themeda* and *Alloteropsis* genera growing on upper parts of mountain ridges. The rest falls on the vegetation of bamboo (*Dinochloa* spp.) and forests with 24 species of trees consisting predominantly of the genus *Dipterocarpus* growing mainly along rivers. The plant communities are of secondary character originating in the course of the 20th century. Original communities consist of lowland and mountain tropical forests which were preserved only in fragments (CUSTODIO et al. 1996).

Observations were carried out at dusk when the animals were active (another recommended time was sunrise). Lookouts were used which were situated on tops of hills in the vicinity of Mount Iglit at the altitude of about 1000 m a. s. l. enabling a good view of the surrounding landscape. Thus, individual animals were quite well detectable in tall grass. Animals were searched out by local guards of the park who were involved in regular monitoring of tamaraws and were familiar with paths of particular individuals. Powerful telescopes were used for monitoring of the animals. Since the highest number of tamaraws in the park occurs just in the vicinity of Mount Iglit on an area of about 8,000 ha (Lustria & Callo 1992, Custodio et al. 1996), four observation points used for the regular monitoring of the species population were established in the locality.

RESULTS AND DISCUSSION

Observations were made in the above period between five and six p.m. when it was possible to record as many as 9 individuals during one day. Guards of the park noticed that during monitoring they could record about 6–10 animals per day and in the period between March and April when controlled burning of grass was carried out by the park administration it was possible to see even 20–30 tamaraws within one day.

The observed animals were at a distance of several hundred meters from each other, responded very cautiously and never showed a tendency to group into herds. According to the literature,

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Fig. 1. A young male of tamaraw named “Kalibasib” born in 1999 is the only of two calves born in captivity so far (Gene Pool Farm, Mindoro, the Philippines); all photographs were made in February 2003.

Obr. 1. Mladý samec tamaraua “Kalibasib”, narozený v r. 1999, je jediným ze dvou dosud narozených mláďat v zajetí (Gene Pool Farm, Mindoro, Filipíny); všechny fotografie byly pořízeny v únoru 2003.

Fig. 2. An adult male of tamaraw has got short and wide horns markedly wrinkly on their surface being in the form of a capital “V”. It refers to an interchangeable feature (Tamaraw Information Corner at TCP Office in San Jose).

Obr. 2. Dospělý samec tamaraua má krátké a široké rohy, umístěné do tvaru velkého V, jež jsou na povrchu výrazně zvrásněné. Jde o nezaměnitelný znak (Tamaraw Information Corner at TCP Office in San Jose).

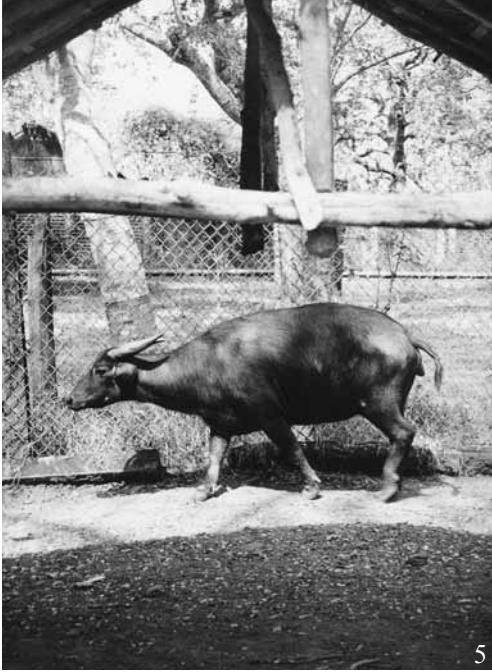
Fig. 3. Horns of an adult female are somewhat more slender and smooth on their surface as compared with males and so they can be well distinguished (Tamaraw Information Corner at TCP Office in San Jose).

Obr. 3. Rohy dospělé samice jsou poněkud štíhlejší a hladší na povrchu než u samců, čímž je lze od samců dobře rozeznat (Tamaraw Information Corner at TCP Office in San Jose).

Fig. 4. A typical adult male of tamaraw (Gene Pool Farm, Mindoro, the Philippines).

Obr. 4. Typický dospělý samec tamaraua (Gene Pool Farm, Mindoro, Filipíny).





however, herds can be sometimes found (KUEHN 1986). Females could be distinguished quite easily from males according to the shape of their horns if they occurred close enough (see Figs. 2, 3). One female was accompanied by a grown up calf. Animals observed stayed almost exclusively on extensive grassy areas in the vicinity of Mt. Iglit, although according to TALBOT & TALBOT (1966), tamaraws searched preferably for sites where open areas met with margins of forests and sources of food and water occurred together. Thus, it appears that at present, vegetation of tall grasses provides a sufficient shelter and food basis for the species similarly as forest stands did in the past.

A number of paths trampled out by tamaraws and used also by the park guards were examined. On the paths, footprints and excrements of various age ordinarily occurred which gave evidence that animals regularly and often used the paths. Based on the paths it was possible to find out that the species even rather well climbs because some of them led through very steep slopes. Footprints and excrements were also found in the vicinity of the park guard station at an altitude of over 1000 m a. s. l where the animals came at night. The information is of interest because the majority of tamaraws sites are situated at an altitude of 100 to 600 m a. s. l. (RUBIO & CASTILLO 1992) and only some individuals get up to 2000 m (CUSTODIO et al. 1996).

The number of animals including females with calves and the high frequency of observations seem to be optimistic, however, the actual state of the tamaraw population in the wild is very low. According to the park administration carrying out yearly census, within the Tamaraw Conservation Project some 253 animals were found in the wild as of April 2002 (DIVA pers. comm.). If this is true then official estimates amounting 30 to 200 individuals in the wild may be underestimated (IUCN 2004). Nevertheless, it is of interest that these discrepancies in estimated numbers of tamaraws between the IUCN and the Philippine PAWB TCT (Protected Areas and Wildlife Bureau – Tamaraw Conservation Project) exist at all. While PAWB TCT officially demonstrates a slight increase in the population of this extremely threatened bovid (2000 – 154 ind., 2001 – 187 ind., 2002 – 253 ind.) (ANONYMOUS 2002, DIVA pers. comm.) the IUCN reports a permanent decline since 2000 (IUCN 2004). It is a question why the discrepancy exists and therefore it would be suitable to specify the numbers already on the ground of urgency to know the number of this critically threatened species in the wild.

In addition to the observation of tamaraws, the study was aimed at movements of domestic herbivores in the park as potential food and space competitors of the species. However, during

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Fig. 5. An adult female of tamaraw in profile (Gene Pool Farm, Mindoro, the Philippines).

Obr. 5. Dospělá samice tamaraua z profilu (Gene Pool Farm, Mindoro, Filipíny).

Fig. 6. The typical habitats of tamaraw in Mindoro Island are places where forests alternate with pastures (Mount Iglit-Baco National Park, Mindoro, the Philippines).

Obr. 6. Typickým biotopem tamaraua na ostrově Mindoro jsou místa, kde se střetávají lesy s pastvinami. (Mount Iglit-Baco National Park, Mindoro, Filipíny).

Fig. 7. Tamaraw can be observed most frequently on grassy plains in the vicinity of Mt. Iglit (Mount Iglit-Baco National Park, Mindoro, the Philippines).

Obr. 7. Nejhojněji lze tamarauy pozorovat na travnatých pláních v okolí hory Mt. Iglit (Mount Iglit-Baco National Park, Mindoro, Filipíny).

Fig. 8. Male adults of tamaraw hold in captivity are very curious but considerably less aggressive than females (Gene Pool Farm, Mindoro, the Philippines).

Obr. 8. Dospělí samci tamarau, chováni v zajetí, jsou velmi zvědaví, ale podstatně méně agresivní než samice (Gene Pool Farm, Mindoro, Filipíny).

a short stay in the park the presence of domestic animals was not detected at all. This also corresponds with the behaviour and frequency of occurrence of the tamaraw.

According to literature (CALLO 1999), tamaraw avoids places where domestic animals (mainly buffaloes and cattle) stay. This fact is obviously caused by the higher competitive ability of domestic herbivores and due to it tamaraw is spaced out from its original sites. Thus, regular observations of a number of tamaraws in the park can give evidence on the long-term absence of domestic herbivores which is of course favourable for the occurrence of the species. However, the situation is obviously different on the SE border of the park, in the vicinity of the Gene Pool Breeding Centre where domestic hoofed mammals occur, because this part of the reserve serves as a pasture for cattle (CALLO 1999). However, during a two-day visit in the Centre and its vicinity, no cattle was noticed, but of course, it occurred rather abundantly outside the park boundary (mainly goats, pigs and buffaloes). Thus, the cattle is very likely to occur also in the reserve.

To complete the information, the Gene Pool Breeding Centre was visited, where the last four tamaraws in captivity can be found. The centre was established in 1979 and originally 20 animals were brought there from the wild (CUSTODIO et al. 1996). However, most of them had died by 1993 due to poor treatment, diseases and parasites which gave evidence on ignorance and lack of experience with captive breeding of the species (OLIVER 1993, CALLO 1999).

In the period of my visit, one adult female, two adult and one young male born in 1999 (the second individual of the species born in captivity at all) were present in the centre. In addition to breeding purposes, the group is also used for ecological, ethological and reproduction studies (see above). During my short visit, it was possible to observe only some elements of behaviour. The behaviour of tamaraw in captivity was studied by MOMONGAN & VALDE (1993). One of the features of the behaviour in captivity is aggressiveness to unfamiliar persons. I could witness the fact myself. Particularly the female was active in this respect. It attacked a fencing whenever I approached. Males responded much more calmly. Higher aggressiveness of females corresponds with findings described in the literature (CUSTODIO et al. 1996), being attributed to a mother instinct.

With respect to the immediate danger of extinction of the tamaraw, more attention has to be paid to the species in the future, regarding both protection and research. In addition to the study of the wild-living population it is necessary to fill numerous gaps in the knowledge of biology and behaviour of the bovid in captivity related to its rather difficult breeding, in order to be able to create a secondary population which could increase the chance of the species survival. This paper was supported by a grant (MSM 6215648902).

SOUHRN

Extrémně vzácný druh tura, tamarau (*Bubalus mindorensis*), byl pozorován v období mezi 2. a 5. únorem 2003 v centrální oblasti národního parku Mt. Iglit-Baco (Mindoro, Filipíny). Pozorování jsou doplněna fotografiemi, informacemi o vlivu domácích druhů býložravců na místní populaci tamarau a o jejím vývojovém trendu, podle dat získaných na správě parku v San Jose. Získané informace jsou diskutovány s dostupnými literárními prameny.

REFERENCES

- ANONYMOUS, 2002: Tamaraw conservation project. – <http://www.pawb.gov.ph/programs/tamaraw.htm>
ANONYMOUS, 2003: Mount Iglit-Baco National Park. – <http://sea.unep-wcmc.org/sites/pa/1031v.htm>

- BRAUN A., GROVES C. P. & GRUBB P., 2002: Rediscovery of the type specimen of *Bubalus mindorensis* Heude, 1888. *Mammal. Biol.*, **67**: 246–249.
- CALLO R. A., 1999: Can tamaraws in their natural habitat coexist with cattle and carabaos? *Canopy Int.*, **25**(4): 2–3.
- CUSTODIO C. C., LEPITEN V. M. & HEANEY L. R., 1996: *Bubalus mindorensis*. *Mammal. Species*, **520**: 1–5.
- FERANIL J. B. & MAALA C. P., 2001: Scanning electron microscopy of the hair of the tamaraw (*Bubalus mindorensis* Heude 1888) and Murrah buffalo (*Bubalus bubalis* Linnaeus). *Philipp. J. Vet. Med.*, **38**(2): 57–64.
- FLOR J. A. C. G., LIMCUMPAO J. A., MOMONGAN V. G. & TORRES E. B., 1998: Haematological values and serum electrolyte levels of captive mature tamaraw [tamarau] (*Bubalus mindorensis*). *Philipp. J. Vet. Med.*, **35**(1–2): 46–59.
- HERRERA J. R. V., MASANGKAY J. S., MOMONGAN V. G. & LIMCUMPAO J. A., 1993: Serum antibody profile of captive Tamaraw (*Bubalus mindorensis*) to selected bacteria and viruses. *Philipp. J. Vet. Med.*, **30**(2): 63–64.
- IUCN, 2004: *2004 IUCN Red List of Threatened Species*. – <http://www.redlist.org> [downloaded on 30 September 2005].
- KUEHN D. W., 1986: Population and Social Characteristic of the Tamarao (*Bubalus mindorensis*). *Biotropica*, **18**(3): 263–266.
- LUSTRIA U. M. & CALLO R. A., 1992: Tamarau (*Bubalus mindorensis* Heude) census in Mt. Iglit, Occidental Mindoro and gene pool farm. *Sylvatrop. Tech. J. Philipp. Ecosyst. Natur. Res.*, **2**(1): 81–90.
- MAJID M. A., MOMONGAN V. G., PENALBA F. F., BARRION A. A. & CASTILLO E. M., 1995: Body conformation and blood protein/isozyme polymorphisms of tamaraw (*Bubalus mindorensis*). *Asian Australasian J. Anim. Sci.*, **8**(2): 119–122.
- MASANGKAY J. S., NAMIKAWA T., MOMONGAN V. G. & ESCALADA R., 1993a: The use of xylazine for the restraint of captive tamaraw (*Bubalus mindorensis*). *Philipp. J. Vet. Med.*, **30**(1) 37–38.
- MASANGKAY J. S., DUCUSIN R. J. T., MOMONGAN V. G., NAMIKAWA T. & ESCALADA R., 1993b: Chronic toxic hepatitis in captive tamaraw (*Bubalus mindorensis*). *Philipp. J. Vet. Med.*, **30**(2): 75–78.
- MASANGKAY J. S. & ARVESU G. M., 1998: Physical and chemical properties of the urine of captive tamaraw [tamarau] (*Bubalus mindorensis*). *Philipp. J. Vet. Med.*, **35**(1–2): 41–45.
- MOMONGAN V. G. & VALDE G. I., 1993: Behavior of the endangered tamaraw (*Bubalus mindorensis* Heude) in captivity. *Asia Life Sci.*, **2**(2): 241–250.
- OLIVER W. L. R., 1993: Threatened endemic artiodactyls of the Philippines: status and future priorities. *Int. Zoo Yb.*, **32**: 131–144.
- RUBIO P. R. & CASTILLO M. L., 1992: Characterization of Tamaraw range in Mts. Iglit-Baco National Park, Occidental Mindoro. *Pterocarpus*, **7**(1): 37–59.
- SANTIAGO FLORES M. L. A., MAALA C. P. & MASANGKAY J. S., 2001: A preliminary report on the hair medullary patterns in the adult male tamaraw (*Bubalus mindorensis*, Heude). *Philipp. J. Vet. Med.*, **38**(2): 105–106.
- SARABIA A. S., ESCALADA R. F. & MOMONGAN V. G., 1998: Some reproductive parameters in female tamaraw (*Bubalus mindorensis*). *Philipp. J. Vet. Med.*, **35**(1–2): 74–75.
- SOLIS C. D., KAWAMOTO Y., TANAKA K., MASANGKAY J. S., MAEDA K., NAMIKAWA T. & MAEDA K. I., 1995: The tamaraw (*Bubalus (B.) mindorensis*) hemoglobin phenotype and comparison among the Asian buffaloes based on isoelectric focusing. *Anim. Sci. Technol.*, **66**(12): 1014–1018.
- SOLIS C. D., FLOR J. A. C. G., ARMSTRONG D., CITINO S., ESCALADA R., AMIDO G., BARRIO A. N. DEL., MASANGKAY J. S. & DEL BARRIO A. N., 1996: A preliminary study on the collection, evaluation and processing of the tamaraw (*Bubalus mindorensis*) semen. *Philipp. J. Vet. Med.*, **33**(2): 81–84.
- SOLIS C. D., KAWAMOTO Y., TANAKA K., MASANGKAY J. S. & NAMIKAWA T., 1998: Transferrin polymorphism in the tamaraw (*Bubalus mindorensis*) and comparison among the Asian buffaloes using polyacrylamide gel electrophoresis. *Philipp. J. Vet. Med.*, **35**(1–2): 37–40.
- TALBOT L. M. & TALBOT M. H., 1966: The tamaraw (*Bubalus mindorensis*). Observations and recommendations. *Mammalia*, **30**: 1–12.

- TANAKA K., SOLIS C. D., MASANGKAY J. S., MAEDA K. I., KAWAMOTO Y. & NAMIKAWA T., 1996: Phylogenetic relationship among all living species of the genus *Bubalus* based on DNA sequences of the cytochrome b gene. *Biochem. Genet.*, **34**(11–12): 443–452.
- TANAKA K., MATSUDA Y., MASANGKAY J. S., SOLIS C. D., ANUNCIADO R. V. P., KURO O. M. & NAMIKAWA T., 2000: Cytogenetic analysis of the tamaraw (*Bubalus mindorensis*): A comparison of R-banded karyotype and chromosomal distribution of centromeric satellite DNAs, telomeric sequence, and 18S-28S rRNA genes with domestic water buffaloes. *J. Heredity*, **91**(2): 117–121.