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# Field survey on Tamaraw (*Bubalus mindorensis*) - Present population size and herd behavior in wild

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**ABSTRACT:** Tamaraw, an endemic species on the Philippine island of Mindoro, is a critically endangered animal listed by IUCN. Although the population size of tamaraw has been monitored by the Department of Environment and Natural Resources of the Philippines annually from 1999, there is no academic report on the wild tamaraw population. Therefore, we investigated the present tamaraw population size and herd behavior in their natural habitat. The study area covered about 4,000 ha of natural grassland located in Mts. Iglit-Baco National Park, with 16 strategically located observation sites. The tamaraw population was counted using the Intensive Concentration Count Method or Simultaneous Multi Vantage Point Counts for five consecutive days in April, 2006. Fresh fecal samples of tamaraws were also collected from seven observation sites to determine prevalence of endoparasites. A total of 263 individuals were observed, consisting of 162 adult (62%), 52 juveniles (estimated ages of 1-4 years: 20%) and 49 yearlings (19%). Out of the 263 individuals, 29 (11%) were observed solitary, of which the majority were adult males (15/29). On the other hand, the remaining 234 tamaraws formed 71 groups consisting of 2-7 head per group. Out of 65 groups successfully sexed for adult animals, 63 (93%) had one or two adult cows with or without calves and 36 (55%) had one adult bull. From 15 fresh fecal samples, *Coccidia* eggs were detected in 10 cases and *Fasciola* eggs in 3 cases. These results demonstrated that 1) the tamaraw population is still in the critical ranges and there is a considerable deviation in the sex ratio of adult animals and in the proportion of juveniles to yearlings, 2) the tamaraw usually form families consisting of one bull with one or two cows, with the consequence of some solitary bulls, and 3) further analysis is required on the prevalence of endoparasites in the tamaraw.

**Key words:** Tamaraw, Population, Herd behavior, Endoparasite.

**INTRODUCTION** - Tamaraw (*Bubalus mindorensis*), or small wild buffalo, is an endemic animal species on the Philippine island of Mindoro. In the early 20th century, the population was estimated at approximately 10,000, however over-hunting and exploitation resulted in a rapid reduction of individuals. The tamaraw was categorized as endangered in 1986, and since 2000 as critically endangered, by the International Union for Conservation of Nature and Natural Resources (IUCN, 2006). Although the population size of tamaraw has been monitored annually by the Department of Environment and Natural Resources (DENR) of the Philippines since 1999, there is no academic report on the wild tamaraw population. Therefore, our objective was to investigate the present tamaraw population size and herd behavior in their natural habitat.

**MATERIAL AND METHODS** - The study was conducted in the tamaraw conservation area, which covers approximately 4,000 ha of natural grassland located in Mts. Iglit-Baco National Park (altitude range 600-1,000m), with 16 strategically located observation sites. The study area consisted of hilly terrace covered with perennial herbage and small dispatched forests around the valley. The tamaraw population was counted using the Intensive Concentration Count Method or Simultaneous Multi Vantage Point Count Method. The individual and herd behavior were observed during five consecutive days in April 2006, from 5:30 to 7:00 AM and 5:00 to 6:30 PM, and following data were collected; sex (male, female, or unidentified), age based on body size (adult estimated as more than 5 years old, juvenile estimated as 1-4 years old, and yearling estimated under 1 year old), time of observation, and observation site. Individuals that may have been double counted from the plural observation sites were checked and verified in order to estimate the actual population size. Prevalence of endoparasites was also investigated. Fresh tamaraw fecal samples were collected from seven observation sites, stored in 10% formalin, and served for the detection of endoparasites using the flotation and sedimentation methods (Happich and Boray 1969).

**RESULTS AND CONCLUSIONS** - A total of 263 individuals were observed, consisting of 162 adults (62%), 52 juveniles (20%) and 49 yearlings (19%) as shown in Table 1. There were more adult females than adult males (53 *vs.* 102).

Table 1. Individual numbers of tamaraw in Mts. Iglit-Baco National Park (2006).				
	Adult	Juvenile	Yearling	Total
Male	53	8	2	63
Female	102	12	1	115
Unidentified	7	32	46	85
Total	162	52	49	263

Out of the 263 individuals, 29 (11%) were observed as solitary animals, of which the majority were adult males (15/29). The remaining 234 tamaraws formed 71 herd groups, consisting of 2-7 head per group. Out of 65 groups successfully sexed for adult animals, 63

(93%) had one or two cows with or without calves and 36 (55%) had one bull as shown in Table 2.

From 15 fresh fecal samples, *Coccidia* eggs were detected in 10 cases with flotation method and *Fasciola* eggs in 3 cases with sedimentation method (data not shown).

Table 2. Classification and frequency of tamaraw herd groups, based on composition of male and female adults, and further classified by the presence or absence of offspring.

Group type (Bull : Cow)	Number of herds with:				Total
	Juvenile & Yearling	Juvenile	Yearling	No offspring	
1:1	1	4	4	7	16
1:2	4	5	5	4	18
1:3	0	0	1	1	2
1:0	0	2	0	0	2
0:1	8	3	12	0	23
0:2	2	1	1	2	6
Unidentified	0	3	0	1	4
Total	15	18	23	15	71

These results demonstrated that, 1) the tamaraw population is still in the critical ranges and there is a considerable deviation in the sex ratio of adult animals and in the proportion of juveniles to yearlings, 2) the tamaraw usually form families consisting of one bull with one or two cows, with the consequence of some solitary bulls, and 3) further analysis is required on the prevalence of endoparasites in the tamaraw.

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