

# Deer Specialist Group News

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## Rare and Endangered Deer Symposium held during 7th International Theriological Congress in Acapulco, September 1997

A deer symposium was co-organized by Dr. Lixing Sun and Don Moore during the 7th International Theriological Congress in Acapulco, September '97. 12 papers and 16 posters on deer biology were scheduled the day of the symposium, and many will be published as a group in the future. A summary of presentations follows:

Michael Smith presented a paper on "The importance of genetics to the conservation of deer" and Rick Purdue presented a paper co-written with Michael Smith entitled "Patterns of genetic differentiation among mainland and island populations of white-tailed deer"; abstracts are available from the author.

Lixing Sun's paper on "Social Organization of the Chinese Water Deer: Conservation Implications" was about social behavior of *Hydropotes inermis* at Poyang Lake Nature Reserve, Jiangxi, China. Males of this species were territorial during the mating season, but females were not, and during the non-mating season neither sex was territorial. The average group size was 1.45 (+/- .23 SE), with an increasing trend from the fawning to the mating season; groups of 2-3 individuals constituted 90.06% of all groups. Group size was greater in tall grass areas (mean=1.79) than in short grass areas (mean=1.49) during the mating season, which is an interesting finding for habitat/group size theory. A conservation implication of this observation is that local grass-cutting

### **Deer Specialist Group News**

Correspondence should be sent  
to:  
Dr. Chris Wemmer  
Chairman, Deer Spec. Group  
Conservation & Research Center  
1500 Remount Rd.  
Front Royal, Virginia 22630  
USA

OR:

Dr. Michael Green  
Vice-Chairman  
Deer Specialist Group  
World Conservation Monitoring  
Centre  
219c Huntingdon Rd.  
CB3 0DL Cambridge, England

practice may impose a subtle yet potentially significant effect through disrupting the natural social organization pattern of the deer. However, over-hunting remains the major problem facing conservation of this endangered species.

Susana Gonzalez presented a paper by Chris Wemmer entitled "Conservation status of the world's cervids", which updated participants on the status of the IUCN Deer Action Plan.

There were several papers on the endangered Pampas deer (*Ozotoceros bezoarticus*) of the South American grassland and savana habitats. Susana Gonzalez and her colleagues reported on "Pampas Deer Population Genetics -- Implications For Conservation". Their paper characterized the genetic structure of Pampas deer in six isolated populations from Brazil west to the most critically endangered isolated populations in Argentina. They found that the mitochondrial region examined had one of the highest diversities in any mammal (Gonzalez pers. comm.): in 54 deer sequenced there existed 45 different genotypes. Each isolated population had several genotypes, and shared none of them. These populations are well-defined in a phylogeographic concordant pattern. The authors' conservation-centered conclusion is that, even though present population sizes are small, this is due to human-related factors and habitat fragmentation rather than a historical bottleneck. Alejandro Vila presented two papers about the Pampas deer conservation effort being lead by Fundación Vida Silvestre Argentina at Campos del Tuyu Wildlife Reserve near Buenos Aires. The FVSA team tranquilized 7 Pampas deer in December 1995, and collected blood from the deer and local cattle. Serology for foot and mouth disease (ELISA), epizootic hemorrhagic disease of deer (AGID) and brucellosis was negative for all deer, but 3/7 presented low titers for Leptospirosis; other tests were pending at the time of the presentation. The FVSA team also

conducted aerial surveys for Pampas deer at Bahia de Samborombon, finding 112.08 +/- 18.74 animals. This was compared to previous work by Mariano Gimenez-Dixon who found larger numbers, leading the authors to conclude that the population has been declining at the rate of 4% per year. Some individuals may have moved to local cattle pastures, but the recovery of this population will be hindered if provincial reserves are not implemented. Don Moore and Dietland Muller-Schwarze reported on mortality of Pampas deer fawns in Uruguay and results of computer modelling of fawn and adult mortality. One-sixth of all fawn mortality has been caused by poaching by humans in the area, and modelling suggests that additive mortality (= "harvest") of only 3 male and 3 female fawns annually from a core population of 400 deer would increase the probability of extinction of this population within 100 years to over 20%. The authors presented recommendations for conservation of the species through control of anthropogenic mortality.

Peter Dratch presented an interesting paper by he and Amy Shima entitled "Forensic Identification of South American and Asian Deer Species." The US Fish and Wildlife Service Forensic Laboratory is mandated to assist all CITES signatory countries with problems of wildlife identification, and has successfully identified evidence from deer species in over 500 cases. The authors tested samples from 15 species of South American and Asian deer. Samples were tested for species by isoelectric focussing followed by staining for a panel of proteins that are found in both tissue and blood, and were tested for family by double diffusion using commercially available cervid antiserum. Musk deer was the only species that did not react with cervid antiserum, consistent with its classification in a separate family. The authors conclude that their methods should prove useful in wildlife law enforcement and

conservation genetics of these species.

Olga Pereladova and Antoine Sempere, and Professor Dang Huy Huynh, offered papers on endangered deer in Central Asia (Former Soviet states) and Viet Nam, but were not able to attend the Congress at the last minute. The Bukhara deer (*Cervus elaphus bactrianus*) is endangered, and populations have declined seriously from 900 animals in 1990; some areas cannot even be checked for deer due to civil unrest. Nine cervids are found in Viet Nam, of which 6 are endangered; these species are apparently declining due to ongoing hunting pressure and habitat loss.

Shingo Miura presented a poster for the afternoon poster session, entitled "The home range of the lesser Mouse-deer (*Tragulus javanicus*) as revealed by a radio tracking study. Home range size differed between sexes, with means of 8.6 ha for females and 12.4 ha for males. Preliminary observation of behavior during this study showed over 90% of observations were of solitary individuals, and that the species may not be nocturnal but may be inconspicuous in its diurnal behavior.

Jose Cartes and Victoria Rosati presented a poster on grey brocket deer (*Mazama gouazoubira*) distribution, diet and habitat use in Argentina. This species' populations are declining in the western chaco where it feeds on woody browse. The authors found that canopy cover, shrub density and shrub diversity were the most important variables related to grey brocket deer habitat use. Rosati and colleagues reported in another paper that, although wildlife use in the region is low and irregular, grey brocket are one of several mammalian species hunted for food and sport.

The FVSA group put together some very interesting posters, including "Advances in the knowledge about the Huemul in the Moyano Valley, Los Glaciares National Park", educational strategies for the conservation of Pampas deer

and Huemul in Argentina, and Pampas deer mortality around Bahía Samborombón. There was an inverse relationship between increasing cattle sign (an index to intensity of use) and huemul numbers in P.N. Los Glaciares, and despite protection as a natural monument, 52 Pampas deer died between 1993 and 1996, 48.1% due to anthropogenic causes. More information is available from Fundación Vida Silvestre Argentina, Defensa 245, (1065) Buenos Aires, Argentina.

Sonia Gallina, Joaquin Bello, Salvado Mandujano and others put together an excellent group of posters on the different subspecies of whitetail deer throughout Mexico. Topics included home range size and seasonal movements in scrubland habitat, association of whitetail deer (by cluster analysis and PCA) with vegetation types, and habitat use in tropical deciduous forest. The authors can be contacted at Instituto de Ecología, A.C. AP 63, CP 91000, Xalapa, Veracruz, Mexico.

*Reported by Don Moore, with thanks to all above authors who provided abstracts for this summary (apologies to those inadvertently not included here due to lack of abstract). The co-organizers would like to thank the Mexican organizing committee and student volunteers for an excellent job!*

## Peary Caribou Update - Canada

*Frank Miller  
Canadian Wildlife Service  
Environmental Conservation Branch  
Room 200, 4999-98 Avenue  
Edmonton, Alberta T6B 2X3*

Peary caribou face a precarious existence on harsh Canadian High Arctic Islands. Two recent winters (1994/95 & 1995/96) with extremely unfavorable snow/ice conditions have caused a precipitous decline in the number of Peary caribou on south-central Queen Elizabeth Islands (QEI) and possibly elsewhere throughout the entire QEI. The Peary caribou population on the south-central QEI has plummeted by 85% from an estimated ca. 3000 in 1994

to only ca. 450 in 1996, based on Canadian Wildlife Service studies. This 2-year loss all but wiped out two decades of recovery!

Although the most recent impact of winter 1996/97 on Peary caribou has not yet been evaluated, the winter started out

unfavorably for the caribou. The Government of the Northwest Territories Wildlife Division will carry out a systematic aerial survey in July 1997 to determine the fate of the Peary caribou on both the south-central and southwestern QEI. Those islands, which include the major islands of Melville (42,220 km<sup>2</sup>), Bathurst (16,090 km<sup>2</sup>), and Prince Patrick (15,830 km<sup>2</sup>) and their respective small satellite islands, form the entire "heartland" for Peary caribou on the QEI (ca. 416,000 km<sup>2</sup> collective-island landmass). The Peary caribou "heartland" represents less than 20% of the entire range but it held 80% of all the Peary caribou estimated on the QEI in 1961, when they were at their all-time known high - ca. 26,000.

The Recovery of Nationally Endangered Wildlife (RENEW) Peary Caribou Recovery Team has proposed that if <400 caribou are seen on the 1997 aerial survey or the survey yields an estimate for the entire "heartland" of <400 Peary caribou (calculated at the lower 70% CL) a capture program should be initiated. The capture effort would allow the preemptive development of rearing and reproduction procedures for Peary

caribou held in a restrictive "captive" environment (zoo enclosure). The team members believe that the capture of 25 Peary caribou, although not without risk of failure, would be desirable to help safeguard against the possible loss of this unique Canadian subspecies of *Rangifer*. Currently, the principal question in the perceived need for direct human intervention in the preservation of Peary caribou is whether the recent catastrophic annual losses are the result of variation in the natural climate or is this decimation linked to the initial stage of - anthropogenic climate change - on the Canadian Arctic Archipelago? If the Peary caribou are simply caught in an unfavorable, but temporary phase of natural climatic cycles that have always been part of their environment - they, in all likelihood, would persist unaided and eventually recover to safer and usable numbers. If recent losses are, however, linked to and a preamble of the subsequent consequences of anthropogenic weather changes - the continued well-being of free-ranging Peary caribou is in serious doubt - and, thus, justifies human intervention as a needed precautionary action.

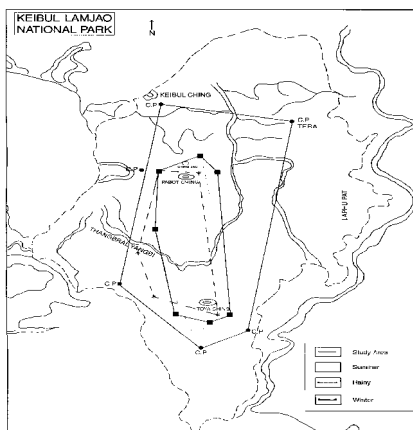


Fig. 1. Home Ranges of Sangai

## Deer Status in China

Dr. Richard B. Harris  
University of Montana  
218 Evans  
Missoula, MT 59801

During the past few years, I've conducted wildlife surveys in remote parts of the Tibetan plateau in Qinghai province, China. During the summers and autumns of 1988-1990, I was engaged in an (attempted) study of musk deer in the very southern-most portion of the province (roughly 32 degrees N., 96 degrees E). While there, I had the opportunity to observe large herds (200+) of white-lipped deer (*Cervus albirostris*), and thus gained some familiarity with that species.

During 1991-1992, I worked farther north, in an area known as Yeniugou ("Wild Yak Valley"; roughly 36 degrees N, 93-94 degrees E). That work is now all published, including *Mammalia* 1995, 59(2):197-212. When we first arrived in Yeniugou, our host, Mr. Cai Guiquan of the Northwest Plateau Institute of Biology (Chinese Academy of Sciences) in Xining, Qinghai believed that white-lipped deer were absent entirely from this area. (He'd not observed them during previous visits to the area, and Kaji et al. (*Mammal Rev.* 1989, Vol. 19, No. 1, 35-44) suggest that the species' distribution did not extend that far to the northwest.) However, during our 1991/1992 surveys, we observed white-lipped deer a total of 6 times. Group sizes were 1, 1, 6, 8, 7, and 9. These small groups appeared to be constantly "on the move" -- each time we attempted to repeat one of the observations (i.e. on the subsequent day), we were unsuccessful in finding them. As well, our local guide, a Kazakh herdsman who had grown up in the area, confirmed to me that white-lipped deer were seen only occasionally during his childhood in the valley. Local Kazakhs acknowledged the species as a resident - - but rarely seen -- part of the indigenous fauna. Needless to say, we were reluctant to estimate a total herd size based on this scanty information, and could only guess that the total abundance must be <100, and probably <50.

During September 1997, I had an opportunity to re-visit this area, along with a colleague, Chris Loggers (who, in "real life", works as a district biologist for the U.S. Forest Service in eastern

Washington state). This time, we observed no less than 80 white-lipped deer, including a single band of 77. The total observed might have been as high as 86, if all observations were of unique individuals. Again, they appeared to move frequently and over long distances, so judging duplication among the lone males observed was difficult. (As is my custom, I report only the number of animals "observed" if I have no rigorous way of estimating the total number of animals "present").

In any case, we have little doubt that white-lipped deer have increased in this area during the past few years. It is a welcome bit of good news, but should be tempered by the fact that this area remains essentially unmanaged and unprotected (despite the flurry of publications from me urging some action), and that populations such as this one of *C. albirostris* thus continue to exist largely at the whim of the itinerant poaching gangs that have access to the place. Lately, their attention has been concentrated on Tibetan antelope (*Pantholops hodgsoni*), which they've succeeded in eliminating from the valley altogether. With their rather late rut (and thus presence of velvet antlers well into September), these white-lipped deer are also vulnerable. But at least we can surmise that the past few years have been kind to this species here. (Another possibility is that a severe snowstorm in March 1996 that was centered further southeast -- presumably more the center of white-lipped distribution -- caused a movement northwest into the area).

## Conservation of Manipur Sangai

Dr. K.H. Shamungou  
D.M. College of Science  
Imphal 795 001, Manipur, India

There are three basic requirements to be strictly preserved in the Keibul Lamjao National Park (KLNP), for the survival of the world's most endangered cervid, the sangai (*Cervus eldi eldi*): (1) the thickness of *phumdi* (floating morass) in the home range area (Figure 1) must be maintained at about 1 meter; (2) the fodder and the shelter grasses must be preserved in a proportion of 1:1; and, (3) human presence in the breeding grounds must be prevented during rutting season. I have been concerned about these

factors since the 1980s. My earlier view was that as a result of the Loktak Project the thickness of *phumdi* was decreasing. A stage would eventually shortly arrive when the thickness of *phumdi* shrinks to about 80 cm or less, a condition that may not be able to support the weight of an adult deer (Shamungou, 1990 & 1992). The worst has come true. The *phumdis* and the vegetation profile around the center of activity of the deer (i.e. the Thanbralyangbi, Pabot and Toya hillocks) were seriously affected. (Ranjitsinh, DSG Newsletter #13, observed an improved condition of Keibul Lamjao when the real situation worsens.)

It looks as if the *phumdis* towards the Sagram were affected more strongly, but confirmation studies are still in progress. During my 11 field trips of 1995 - 1996, I found open water places that had been engulfed by drifting *phumdi*; a boat canal 4-5 feet wide at the entrance of the park had expanded several feet or shrunk to such a narrow gauge that it was difficult for a boat to row out. Similar stories were also told by the locals and staff. Here is an observation made on May 17, 1996 in the Hourou-phumlak area:

*The phumdi in this region is drifting. This is evident from the position of a piece of phumdi of about 20 x 50 sq. m. (marked A<sub>1</sub> in Figure 2). The same piece was located in the position marked A last year. Similarly the original site of a small tree (marked B<sub>1</sub> in Figure 2) was formerly at the position marked B. The reason for such a sluggish clockwise rotation of phumdi in this area may be the presence of Chinmei hill on the south and paddy fields on the west, both of which act as barriers. Otherwise the phumdi would have drifted out.*

The story on the Sagram side of the park is different. Here, on all three sides - east, north, and west - is open lake water. Therefore, a loose *phumdi* sheet could easily escape into the lake with or without animals on it. Such an unwanted scene is now happening and should be checked out immediately before the condition worsens. According to the park authority, as many as six *kai* (a pyramid shaped earthen tower, 4-5 meters high and 6 meters at the base) were constructed as measures to prevent the drifting of *phumdi*.

During the 1980s, the proportion of fodder to shelter grasses was approximately 1:1 (58% of fodder and 42% shelter plants). A short grass known as hup (*Learsia hexandra*) was extensively recorded in several places of

the park. The swampy nature of the place made this species sprout all year round, and provided green fodder to the deer throughout the year. Again, this grass and the stolons of Ishing kambong (*Zizania latifolia*) are quick colonizers of open water and form the floating base of the *phumdis*.

The rutting period of Sangai falls from late January to early April, the peak being late February to March. For a population of about 2 heads/sq. km the duration is rather short. However, this may be another special adaptation of the deer to this peculiar floating habitat. With increases of lake level during rainy season the settled *phumdi* are detach from the ground and float, a condition quite unsuitable for the deer to their rutting activities (usually thick *phumdi* are settled during dry months coinciding with the rutting season of the deer). Besides, any sort of human disturbance (fire, reed and vegetable collection, helicopter sound during census, etc.) in this period may frighten the deer and prevent them from breeding freely and successfully.

A threatened population of less than 100 head (143 animals consisting of 57 males, 65 females, and 21 fawns [Forest Department, 1996], and 43 animals consisting of 15 stags, 20 hinds, and 8 fawns [Ranjitsingh, 1996]) is now preserved in Keibul Lamjao. This is also an equally threatened habitat and with the present trend of destruction and disruption both the deer and the habitat may survive only as long as 2 - 3

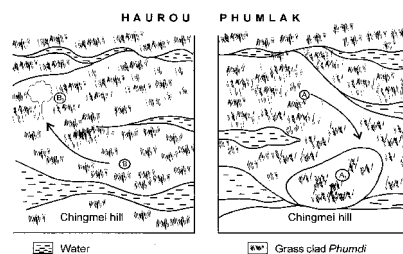


Fig. 2. *Phumdi* showing clockwise rotation.

decades. In this context, therefore, the park is to be recognized as one of the world's highest priority areas for conservation concern and the following multidisciplinary efforts to save this habitat and endemic species are deemed necessary.

- a. The creation of a permanent Water Level Management Plan of KLNP.
- b. The development of a rescue center near the park and a "second home" a short distance away.
- c. The initiation of a Captive Breeding

Center.

- d. The establishment of a Center of Research Studies.

## Bactrian Deer in Uzbekistan and Turkmenistan

*K. Lachenmaier*  
Landesjagdverband Baden-Württemberg, E.V.  
Kernerstrasse 9  
7000 Stuttgart 1, Germany

A hundred years ago, the Bactrian deer, *Cervus elaphus bactrianus*, was widely distributed in alluvial plains and gallery forests of Uzbekistan. Bactrian Deer is a somewhat distinct race of Red Deer and easily distinguished from Maral, *Cervus elaphus maral*, occurring in Uzbekistan too. The typical habitat of Bactrian Deer in the deserts and semi-deserts is the thick bushland and gallery forest along the rivers, namely the Amu-Darja and its tributaries. Together with the destruction of the gallery forest, numbers of Bactrian Deer declined drastically.

The situation in the early 1990s was not clear. Free-ranging populations in Tadshikistan could have been extirpated, and there was no information about populations in Afghanistan. Breeding stations for reintroduction in Uzbekistan

were reduced to only one last season, which then had to switch to undescribed "commercial activities" to survive.

Now a modern breeding station in Uzbekistan is planned, as Ivanovic reports in a German hunting-magazine (*Die Pirsch*, 16/97). With scientific and financial help from a French scientific institute for wildlife biology, a new enclosure with a breeding station is to be erected in Sarawschan Reserve not far from Samarkand. The growing breeding population should lead to the release of captive stocks into the wild. In several reserves, namely the Kaschkadarja region, the protection of Bactrian Deer is guaranteed.

Ivanovic also reports, that small scale trophy hunting of Bactrian deer occurs in neighbouring Turkmenistan. The Cites list II species can be hunted in a few, but

viable populations. Earnings from Trophy hunting are planned to force protection actions in GUS Republics of the region.

However, there are also doubts about the re-investment of hunting earnings into conservation. Bukreev and Lukarevski (1997), two former researchers in Turkmenistan's reserves describe the current practise of trophy hunting in the former Russian republic as a business of corruption and mismanagement. If continued, they write in *Russian Conservation News*, commercial hunting will soon lead to the complete extinction of Markhor, Bustard and Houbara Bustard in Turkmenistan. The Asian Leopard and Bactrian Deer face a similar predicament.

## Management Strategy for Taimyr Reindeer

*Victor Nikiforov*  
WWF Russian Programme Office

The World Wide Fund for Nature (WWF) is developing a project for sustainable management of the wild reindeer population of Taimyr, where reindeer represent a resource vital to the livelihood of several indigenous groups. The Taimyr reindeer project aims to produce a management plan and a regional agreement on reindeer use in concert with local indigenous peoples groups.

Taimyr Peninsula in Northern Siberia, Russia, is home to Eurasia's largest population of wild reindeer. The area has several indigenous groups such as Nganasan, Dolgan, Nenets, Evenk and Ent's whose culture and economy are based either on hunting of wild reindeer or domestic reindeer herding. While a stable management regime was established for Taimyr reindeer in the 70's and 80's, the change in regime has led to a large influx of hunters from outside and increased hunting from the Russian communities in the area (pressured by upheavals in the economy). Today, state control over hunting of wild reindeer is virtually non-existent. There are numerous problems associated with the traditional use of nature by small groups of indigenous people of the north. During the last 10-15 years a significant portion of indigenous people have been forced out of reindeer hunting by brigades of newcomers.

In areas of intensive migration of wild reindeer in Eastern Taimyr, domestic reindeer livestock has been dramatically reduced to an estimated 30,000-40,000 from former levels of 80,000-90,000. There is also difficulty in finding a market for reindeer meat and this also has negative consequences for the indigenous economy. In addition, there are serious pollution problems in parts of the area connected with industrial activity in Norilsk.

The complicated situation demands a careful analysis and a new model for reindeer population management in this enormous area. At present, people in the Taimyr Autonomous region debate whether the wild reindeer numbers 600,000-700,000 or only 250,000-300,000.

The project focuses on Taimyr, an area of 400,000 km<sup>2</sup> with a population of approximately 400,000. Of these, around 320,000 live in the industrial city of Norilsk and 40,000 live in the small towns of Dudinka, Khatanga and Dickson. The indigenous people connected to reindeer number in the thousands. The reindeer summer pastures north of the treeline are nearly unpopulated except for a few thousand Russians in Dickson and Cheluskin.

The WWF project is one of many international environmental projects that will receive a portion of the proceeds from a fundraising campaign - TV-Aksjonen '96 -

launched by five environmental organisations in Norway.

The project aims to:

-analyse the current population situation and pasture resources;

-analyse the economic potential in the wild reindeer population connected to hunting and recreation in the new market economy, uncover changes in domestic reindeer pasture use after earlier agricultural reforms and transition from "siida" (extended family household) to family economy household;

-make a comparative analysis of the role of wild reindeer hunting / reindeer herding to the five indigenous groups in their traditional economy; and

-make it possible to create organised and formal structures to manage wild reindeer and regulate usage among the user groups and the territorial units, draw borders between wild and domestic reindeer and ensure indigenous peoples priority rights to the natural resources.

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### Analysis of mitochondrial DNA variation in Red Deer from Hesse (Germany)

F. Jäger, W. Hecht, A. Herzog  
Justus-Liebig-University  
Veterinary Genetics and Cytogenetics  
Hofmannsstr. 10  
35392 Giessen, Germany

Genetic information in higher eucaryotes is subdivided into a nuclear and a mitochondrial compartment. The mitochondrial genome is small in size (approx. 16,500 base pairs versus  $3 \times 10^9$  base pairs in the nucleus). It is also apparently maternally inherited, and is essential for the cell's energy metabolism.

Mitochondrial DNA variation (i.e. variation in base sequence) is determined by the evolutionary forces of mutation and selection. The frequency and distribution of different haplotypes in populations are further influenced by drift and migration.

A total of 67 Red Deer samples from 10 different locations in Hesse were analyzed by PCR technique and restriction analysis of the mitochondrial DNA control region. Seven different haplotypes (AAA, BAB, BBA, AAB, BAA, CAA, ABA) were detected.

There is obviously no arrangement due to a geographical pattern. With a single exception, in populations bearing more than one variant, the haplotypes can be related to each other by one mutational step (e.g. AAA and AAB in Osthartz). In Reinhardswald, the Red Deer population exhibits 3 variants. The most common haplotype in this area (BAB) was not detected in any other population. We explain this finding as a result of the release of Hungarian deer into the area in the 1980s. Additionally, this variant requires at least two mutational steps, if it originated from the most common type AAA.

The most likely explanation for the observed distribution pattern is that genetic drift leads to a loss of variants in single populations. Therefore the genetic variation in a single population is always lower, than in the population as a whole. In contrast, the relatively high variation in Reinhardswald is due to migration of foreign animals into this area. This hypothesis is further strengthened by a deficit of heterozygotes at a nuclear enzyme coding locus in the Hessian population, which we observed in another study.

In view of the contemporary management of Red Deer populations in Germany we expect a pronounced decrease of genetic variation in Red Deer subpopulations, as long as they are kept strictly isolated.

## Corsican Red Deer on Corsica and Sardinia

Bruce Banwell  
"Ma Fiadh", 39 Lane Street,  
Ashburton, Canterbury, New Zealand

Arrangements had been made, through the respective embassies here in New Zealand, for my wife and I to be allowed the privilege of observing *Cervus elaphus corsicanus*, the Corsican Red deer, on both Corsica and Sardinia. This project was to be part of an overall ambition to view the entire spectrum of the species across the northern hemisphere from MacGillicuddy's Reeks in the west to the Rocky Mountains in the east.

The staff of the Parc Naturel Regional de Corse arranged for me to inspect the two main enclosures on the island of Corsica, firstly at Cateraggio, and secondly at Quenza. The third enclosure, established at Casabionda, contains eighteen animals, all being prepared for release in the wild and under the general policy of "the less human contact the better". This was very happily respected. There are forty-four head at Cateraggio, enclosed on a french prison farm and which is situated about halfway down the east coast of the island. At Quenza, a village near the larger town of Zonza at the southern end of the island, a further enclosure holds some twenty-four animals, all in excellent condition. The combined populations of these two enclosures, plus the eighteen at Casabionda total, therefore, eighty-six head, all descendants of the four animals, two stags and two hinds, sent to Corsica from Sardinia in 1985, some twenty years after this sub-species was declared extinct on that island.

The wild populations on Sardinia have been assessed by the counting of mating groups, each individual group being, in turn, assessed by the number of rutting stags. Just how accurate his rather old-fashioned method happens to be is

anyone's guess, but since arriving home I have, at the request of the Sardinian Forest Service, the body entrusted with the care of these deer, forwarded several papers from New Zealand on the pellet counting method. These are the work of L.C. Batcheler, a highly respected New Zealand biologist.

The Sardinian feral populations are considered to be six hundred head on the Monte Sette Fratelli Range Reserve to the east of Cagliari, a further six hundred head on the southern end of the Iglesiete Range, and another two hundred in the northern tip of the same range, near the town of Guspini. The latter two populations are situated to the west of the highway connecting Cagliari and the town of Cristano. There are a further thirty odd animals held for research purposes in an enclosure a few kilometres inland from the town of Capoterra and, according to our informants, a further ten small enclosures scattered over the island. I am quite confident that the overall population at present on Sardinia would be in excess of fifteen hundred head, suggesting that this species is now out of danger from extinction.

While visiting the Monte Sette Fratelli Reserve, my wife and I were treated to a visit to the interesting museum at the Forest Service Headquarters there, which presents a wide scope of the taxonomical features of this rare and interesting sub-species. We also spent some hours on the high clearings near the top of the ranges, sighting a feeding hind and hearing several other groups of animals in the dense cover. Intermittent roaring was noted.

In my opinion, given the present dedication and attention afforded these deer by the staff of the respective authorities continuing, this interesting and once severely threatened race of Red deer is now out of danger. There seems to be no reason why the wild Sardinian populations should not remain static, or increase, while the program on Corsica suggests further significant escalation in numbers there over the next few years, and ultimately leading to re-establishment in the wild. I was most impressed with the dedication of those charged with the responsibility of ensuring the survival of this unique race of deer, in particular the staff of the Parc Naturel Regional de Corse on Corsica.



## Description of *Cervus elaphus corsicanus*

Bruce Banwell

"Ma Fiadh", 39 Lane Street, Ashburton,  
Canterbury, New Zealand

**Body Size:** Rather small, probably marginally larger than the northern Chinese Sikas, stags reaching a maximum of 120 kilos, most of them probably between 90 and 100 kilos, while hinds lie within the scale of 60 to 80 kilos, most of them, however, in the lower range of that scale.

**Coloration:** In the majority of cases, the coat appears to be darker, or richer, in shade than is usual within the "Atlantics". Spotting is retained for a longer period amongst juveniles and is often faintly apparent in older animals as well, in particular along the rear flanks. Face and muzzle are of a darker shade of grey than is normal in Red deer of the atlantic races, with very distinctive rings of a lighter shade of brown surrounding the eyes. A margin of the same shade surrounds the nose and mouth. The rear and frontal surrounds of the ears are of a darker shade than I would consider normal for Red deer. The upper section of the caudal disc, that is above the tail, was rufous, falling away to pure white below the root of the tail and extending well down on the inside of the leg, almost to the hock. This area of white also extends part way along the belly. The traditional, blackish surround which encircles the caudal disc, is not as pronounced as is the case with some races of Red deer, for example, *Cervus elaphus atlanticus*, but, nevertheless, reasonably significant. The black band down the backbone, is perhaps, more pronounced in some animals than is the case in others, extending onto the root of the tail, but fading away to rufous on the lower portions of the tail itself. Legs and forward underparts were the usual greyish shade.

**Pelage:** The hair of the coat was quite long, the stags displaying rather impressive manes. The hair on the muzzle and facial areas is curled and longer than in most related races.

**Antlers:** There is an obvious absence of bez tines in almost every set of antlers, one example sighted in the

museum at Sette Fratelli, the only specimen noted carrying these additions. This set was considered to be the best from Sardinia. The largest set I could locate measured 75 cm in length, 64 cm in spread, 50 cm in span, and 14 cm in beam. Length over curve of the same skull measured 41 cm, the overall range being from 38 cm to 41 cm. There were signs of genetic malformations in a number of stags which, of course, can be expected in a restricted gene base, especially in the case of Corsica. These odd configurations within the populations of both islands include such examples similar to the horns of a Chamois with short, hooked main beams, totally devoid of tines. Others carry antlers similar to those of a Roebuck, extremely short with three diminutive points on each side. There is another formation with side-sweeping brow tines of exceptional length, one such specimen, while master stag at Quenza enclosure, causing mayhem amongst his adversaries while sorting out the matter of hierarchy.

**Other notable characteristics:** This race has very short legs in proportion to body size. They appear to have slightly larger ears than related sub-species. However, the tail appears to be normal size for Atlantics. The roar of the stag is deep in tone, but staccato like the Pannonian Maral, appearing to be restricted to the master stag. It is this feature that concerns me in regard to the method used on Sardinia to ascertain population levels. While at the enclosure at Cateraggio, observing a group of animals being fed grain, one notable feature was the tolerance of the master stag towards the calves feeding alongside him, in complete contrast to his obvious intolerance of their dams and other males.

**Footnotes:** Some of the aforementioned morphological characteristics appear to be very similar to those of the much larger Pannonian Maral of the Drava/Danube system. However, in other ways these Corsican Red deer resemble the Atlantic races. It appears they have occupied these islands for around 4,000 years, undoubtedly transplanted there by some earlier civilization. It is the opinion of some experts within this field, in particular an Austrian group, that there are certain similarities, or connections, with the Red deer of Bulgaria, the latter which I consider to be within the

spectrum of the Pannonian Maral. It is interesting to note some similarities with the Pannonian maral still existing including the roar and the pattern and coloration of the caudal disc. However, perhaps the environment presented by the topography, vegetation and climate of these Mediterranean islands has caused ecological changes, ultimately resulting in some characteristics now in line with the Western European Red deer, or Atlantic races, such as the longer and darker coat and the heavier mane.

### Summary of Approximate Status

#### CORSICA

(A) Cateraggio Enclosure . . . . .	44
(B) Quenza Enclosure . . . . .	24
(C) Casabionda . . . . .	18
<b>Total on Corsica . . . . .</b>	<b>86</b>

#### SARDINIA

(A) Sette Fratelli Range . . . . .	600
(B) Iglesias (south) . . . . .	600
(C) Iglesias (north) . . . . .	200
(D) Capoterra Enclosure . . . . .	20
(E) Other small enclosures . . . . .	~70
<b>Total est. on Sardinia . . . . .</b>	<b>1,500</b>

**Total est. population . . . . . 1,586**

# Pampas deer population trend in Bahía Samborombón, Buenos Aires Province, Argentina

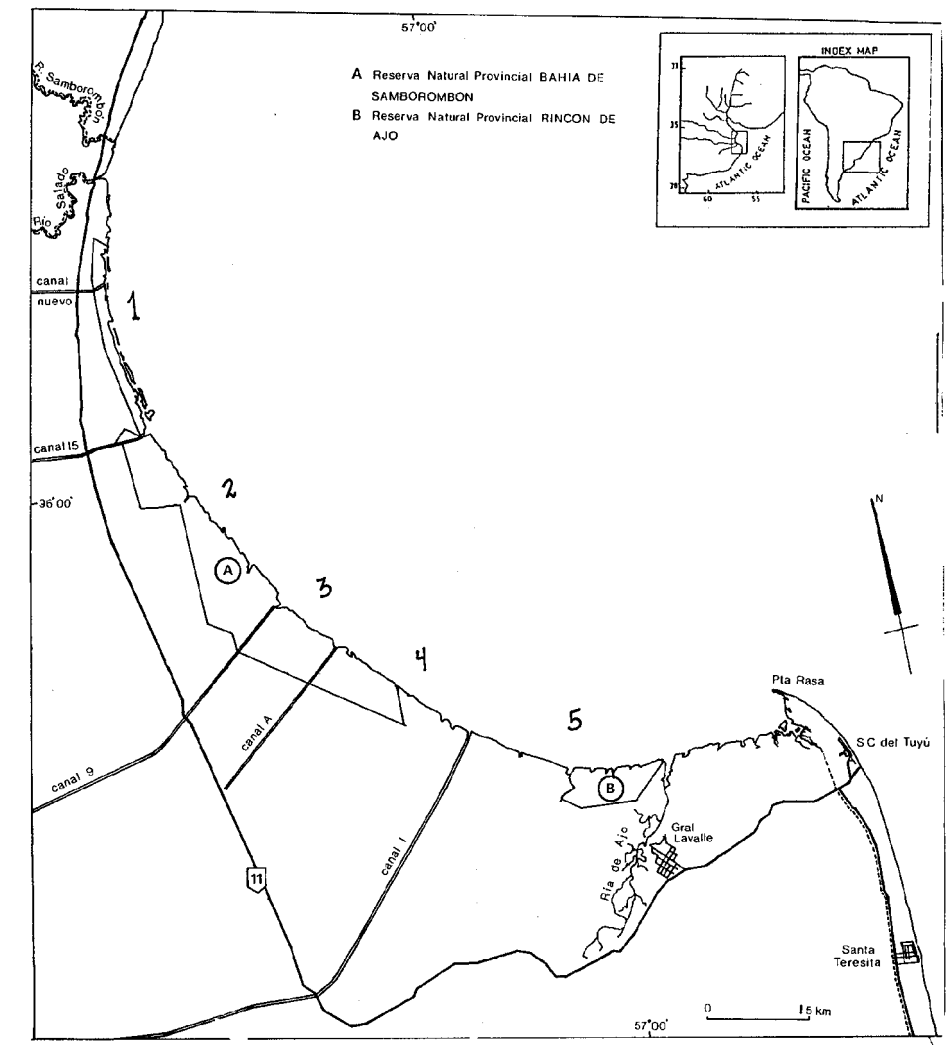
M.L. Merino & B.N. Carpinetti <sup>1</sup>

<sup>1</sup> Pampas Deer Project. Ministerio de Asuntos Agrarios de la Provincia de Buenos Aires. Calle 39 N° 1783 1/2. (1900) La Plata, Argentina

The Pampas deer (*Ozotocerus bezoarticus*) formerly occupied a wide range of natural grasslands in eastern South America, but has suffered substantial reduction in numbers and distribution (Jackson and Langguth 1987). In Argentina, the species (with two sub-species) is now confined to only a few sites. The main causes of decline are over-exploitation for hides, food and sport, but habitat destruction and modification have also made an impact. The more endangered sub-species (*O. b. celer*) may number less than 500 animals in the coastal population of Bahía Samborombón (Buenos Aires Province) and the inland population in parts of the San Luis Province (Merino 1994). There is little doubt that the species' survival here is due to the region's limited agricultural potential.

The objective of our study is to document change at distribution and abundance of Pampas deer in Bahía Samborombón by means of aerial counts. The results of the censuses are compared with data obtained for Gimenez-Dixon (1991) using similar methodology between 1984 - 1988 in the same area.

Bahía Samborombón is part of the Río Salado Depression; 150 km of coastline from Punta Piedras in the north to Cabo San Antonio in the south. The Bay is supplied by two main rivers (Salado and Samborombón) and by numerous smaller artificial waterways and rivers. The area is thus divided into 5 main zones: Zone 1 (Río Salado - Canal 15, 27.18 km<sup>2</sup>), Zone 2 (Canal 15 - Canal 9, 23.4 km<sup>2</sup>), Zone 3 (Canal 9 - Canal A, 7.2 km<sup>2</sup>), Zone 4 (Canal A - Canal 1, 18.6 km<sup>2</sup>), Zone 5 (Canal 1 - Ria de Ajó, 23.4 km<sup>2</sup>) (Fig. 1). Habitats comprise a mosaic of tall



**Figure 1.** Study Zones - Zone 1 (Río Salado - Canal 15); Zone 2 (Canal 15 - Canal 9); Zone 3 (Canal 9 - Canal A); Zone 4 (Canal A - Canal 1); Zone 5 (Canal 1 - Ria de Ajó).

grasslands, marismas and islands of higher ground with trees and shrubs. The latter serve as refuges for wildlife during floods.

Monthly aerial censuses were conducted on a CESSNA 172 throughout 1995, 1996 and 1997. Prior to these, four surveys were undertaken in July and November 1994 to test methodologies. During these flights, transects were covered at 300-m, 900-m, 1500-m and 2100-m inland from the coast. Because no deer were detected along the 1500-m and 2100-m transects (and confirmed by ground surveys), only the outer two were flown for the current study. The resultant flightpath was a belt transect stretching from the mouth of the Río Salado (35° 19' S 56° 47' W) to the Ria de Ajó (36°

20' S 62° 20' W). All flightpaths were fixed and transects were surveyed without replacement at a speed of 120 km/hr at an altitude of 80 m.

The number of deer was estimated by zone, using Jolly's (1969) method for aerial surveys (Krebs 1989). The distribution of animals in the area was expressed as the percentage number of animals counted per zone.

The distribution of the Pampas deer is restricted to a narrow strip, no more than 2 km wide, in which 70.3% of the population is concentrated. Moreover, over 50% of the entire population is concentrated in two well-defined areas, zones 1 and 5. The reason for this distribution could be the deer's sensitivity to changes brought about by the cattle-

ranching which takes place in the area between Ruta Provincial 11 and the coast.

The current estimated population for the area was 81.2 deer, showing a clear reduction of 37.3% compared with previous aerial census carried out by Gimenez Dixon (1991) between 1984 and 1988 (table 1).

The concentration of deer in zone 5 is due to the 40 km distance between the highway and the coast. This area is already an important refuge as access for humans is difficult and hunting pressure is consequently lower. Merino et al. (1993) detected a minimum of 5 animals hunted by poachers in two months for the whole of the bay; if this number remains constant an estimated 30 deer a year are hunted, which is 36.9% of the estimated population.

The distribution of the deer population is being fragmented. In 1988 (Gimenez Dixon 1991) found that 37.9% of the population was concentrated in zone 3, whereas at present it is only 3.84%; a similar situation existed in 1968 (Bianchini and Luna Pérez 1972). This can be attributed to severe pressures from cattle-ranching in the area, to hunting pressures and to the impact of development works on canal 9 which is north of zone 3.

This result, together with a substantial lower estimate for the deer population in comparison with previous studies, indicate the precarious condition of this ungulate in this part of Argentina.

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## Huemul surveys in protected areas of Southern Chile

Brian Ruckley

Raleigh International, Raleigh House, 27  
Parsons Green Lane, London SW6 4HZ,  
United Kingdom  
<http://www.raleigh.org.uk>

The huemul (*Hippocamelus bisulcus*), a medium-sized deer endemic to southern Chile and Argentina, is classified as endangered in the 1996 Red List. Recent estimates of its total population vary between 1,000 and 2,000, but there remains a great deal of uncertainty. Its main strongholds in Chile are remote coastal areas and isolated mountain valleys in the interior, making detailed study of its distribution and numbers difficult.

Raleigh International, the UK youth development charity, and CONAF, the Chilean forestry and protected areas authority, both IUCN members, are undertaking an ongoing program of surveys to develop the first comprehensive picture of huemul distribution in the interior of Chile's Region XI. The research has received

vital support from the British Council in Santiago and from the Whitley Animal Protection Trust. This constitutes the first large-scale, structured effort to assess huemul populations, other than CONAF's regular drive counts in Tamango National Reserve in the south of the region. The surveys, carried out by Raleigh's young volunteers under the leadership of UK wildlife biologists, are based on a pellet count methodology specifically developed by Dr. Robin Gill, a senior biologist with the UK Forestry Commission who is overseeing the project and acting as an advisor to both Raleigh and CONAF. The use of enthusiastic volunteer manpower enables large areas to be intensively surveyed, Raleigh's logistical support makes it possible to access remote areas and the leadership of the wildlife biologists ensures consistency and quality control in the data gathering.

To date, full surveys have been conducted in parts of Cerro Castillo National Reserve, Lago Jeinimeni National Reserve and Laguna San Rafael National Park. Biologists have also visited a number of areas outside protected areas. The evidence to date indicates that huemul populations are generally small, highly localized and many may be effectively isolated. The causes of the huemul's dramatic (and almost certainly continuing) decline since colonization of Chile by Europeans are likely to be varied, but a key current factor that appears particularly important is the marked correlation between the presence of livestock (particularly cattle) and the absence of huemul. This link appears so strong that in some parts of protected areas the degree of incursion by cattle is probably the primary determinant of huemul distribution. The surveys are planned to continue for the foreseeable future, and should gradually produce a much clearer idea not only of overall huemul populations, but also what the main threats to the continuing survival of the species are.

## A POPULATION SURVEY TECHNIQUES WORKSHOP

&

## COORDINATED FIELD SURVEYS for threatened South American deer

an initiative of the  
**IUCN-SSC DEER SPECIALIST GROUP (DSG)**

**Purpose:** To prepare a small elite force of South American field biologists to implement the first phases of the DSG Action Plan--namely to collect current and statistically sound data on deer and livestock populations, threats to these populations, and other environmental factors.

**Description:** The DSG action plan has noted the lack of reliable statistics for many populations of threatened deer. This program--the first step necessary to mitigate the problem in South America, consists of an intensive hands-on *workshop* to intensively train a small number of field biologists to survey critical populations of 12 species of deer. The hands-on workshop will give participants skills in using standardized census methodology, as well as a frame of reference with respect to the DSG Action Plan. It is intended as "a means to an end"--the end being the compilation of current statistics on the status of threatened deer of South America.

The workshop participants will then be modestly financed to conduct *field surveys* in targeted priority areas in their respective countries. The resulting data will be analyzed and interpreted at a future workshop in South America (in 1999). The results will be published as a symposium or workshop proceedings.

This program will provide quality information to assist wildlife decision-makers in conserving and managing protected areas and threatened deer.

**Desired Outcomes:** (1) foster competent skills in estimating ungulate populations using state-of-the-art methodology; (2) facilitate and reinforce international teamwork to conserve South America's threatened deer; (3) obtain reliable estimates of ungulate populations (deer and livestock) that can be compared between regions and habitats; and (4) assess threats and human impacts on local populations of deer and their habitats.

**Scientific Coordinators:** Susana Gonzalez (DSG Regional Coordinator, Latin America, Montevideo, Uruguay), Mauricio Barbante Duarte (Professor, UNESP, São Paulo, Brazil), Lic. Mariano Merino (University of Buenos Aires, Argentina).

**Instructors:** Dr. Chris Wemmer (leader), Dr. Rudy Rudran (tentative), Walfrido Thomas, Laurenz Pinder

**Qualifications of Candidates:** The ideal candidates will have a bachelors or masters degree in biological sciences; a keen interest in ecology; first-hand field experience as a researcher, field assistant, or protected area biologists. Individuals with relevant experience and the capacity to directly participate in management of the species in the region will be given priority.

**Selection of Candidates:** will be made by a commission of South American specialists knowledgeable of conservation issues in the region (Dr. Susana Gonzalez, Lic. Mariano Merino, Dr. Mauricio Barbante-Duarte).

**Location:** São Paulo and Pantanal region of Brazil (exact location to be arranged).

**Time:** December 1-11, 1998.

**Duration of Workshop:** 10 days

**Prospective Contributors:** Seed funds have been secured from the Friends of the National Zoo (FONZ) for the field surveys, but additional funding and in-kind support is being solicited for the workshop and surveys from the following organizations: Fundação de Amparo a Pesquisa do Estado de São Paulo (FAPESP), Brazilian Institute for the Environment and Natural Renewable Resources (IBAMA), American Zoo and Aquarium (AZA) Brazil Fauna Interest Group, USFWS Western Hemisphere Program (WHP).

**Applicants should submit a resume, 2 letters of recommendation, and a one page statement of interest explaining the relevance of the work to their job or planned career (in Spanish or Portuguese) to Dr. Susana Gonzalez, Inst. Invest. Biol., Clemente Estable, Av. Italia 3318, CP 11600, Montevideo, Uruguay. FAX: 59-82-475548; E-mail: sugonza@iibce.edu.uy**

### DSG REGIONAL COORDINATORS

#### INSULAR SOUTH-EAST ASIA

Mr. William Oliver  
Park End, 28A Eaton Rd.  
Norwich, Norfolk  
NR4 6PZ  
United Kingdom

#### SOUTH AMERICA

Lic. Susana Gonzalez  
Division Citogenetica-IIBCE  
Av. Italia 3318  
CP 11600 Montevideo  
Uruguay

#### AUSTRALIA AND NEW ZEALAND

Dr. A.W. English  
Dept. of Veterinary Clinical Studies  
University of Sydney  
Private Mailbag 3  
Camden 2570, Australia

#### MAINLAND ASIA

Dr. Michael J.B. Green  
WCMC  
219c Huntingdon Road  
Cambridge CB3 0DL  
United Kingdom

#### NORTH AMERICA

Dr. James Peek  
University of Idaho  
Dept. of Fish. & Wildlife  
Moscow, Idaho 83843

#### EUROPE AND NEAR-EAST

Mr. Klaus Lachenmeier  
Landesjagdverband  
Baden-Württemberg, E.V.  
Kernerstrasse 9  
7000 Stuttgart 1  
Germany