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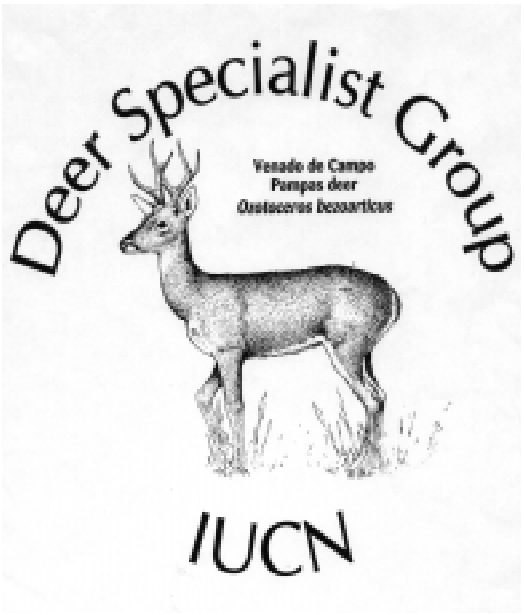
INSIDE



EUROPE

The preservation of Iberian red deer *(Cervus elaphus hispanicus)* from genetic introgression by other European subspecies.

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Resumen: El ciervo de la península Ibérica es una subespecie bien diferenciada dentro de *Cervus elaphus* que, aunque muy numerosa en efectivos, en la actualidad se encuentra amenazada debido a la introgresión genética de ejemplares procedentes de otras poblaciones de Europa, que son importados para aumentar el tamaño de los trofeos de caza en las poblaciones españolas. En los últimos dos años hemos llevado a cabo un proyecto de investigación con el fin de encontrar marcadores genéticos específicos de la subespecie ibérica, que pudieran ser utilizados por la Junta Nacional de Homologación de Trofeos de Caza (JNH) para rechazar las cuernas de ciervos no autóctonos. El rechazo a la homologación de este tipo de ejemplares hace que pierdan su valor en el mercado cinegético y por tanto disuade a los propietarios y gestores de importar ciervos extranjeros. El proyecto ha conseguido recientemente su objetivo y la JNH ha decidido comenzar esta misma temporada a someter al test a los mayores trofeos. Pensamos que este tipo de estrategia, basada en la localización de cuellos de botella en el manejo de una especie o sus productos, donde se pueda ubicar algún tipo de filtro cualitativo, puede ser aplicable a otros muchos casos de conservación de especies en el mundo.

The red deer of Iberia (including Spain and Portugal) is a well defined subspecies out of the more than 20 that occur throughout the distribution range of red deer in the Palearctic Region. According to some authors, the Iberian subspecies might represent a relic of the red deer populations that inhabited Europe before the last Ice Age, naturally separated from the northern populations by the Pirinees mountains.

Today, most red deer populations are subjected to hunting management. Big game management has been intensified in Spain during the last 20-30 years. One main consequence has been the fencing of many properties with high mesh fences that prevent the movement of deer. Fences allow the independence of management practices, thus favouring investments intended at improving the number and quality of animals of the enclosed population. Hunting management, either including fencing or not, has been reported by our research group to affect the genetic composition of populations, by reducing heterozygosity and allelic variability. These findings strongly recommend the broadcast to managers of adequate practices, compatible with the preservation of genetic health of deer populations.

Population fragmentation and hunting management under inadequate criteria are current threats to Spanish red deer populations, but there is another, even more serious threat. With the goal of increasing the value of trophies, some owners have decided to introduce red deer specimens from other European populations. This practice is highly dangerous to the genetic conservation of the Iberian subspecies. Some local administrations in Spain do not allow the introduction of deer from outside the Iberian Peninsula. However, since foreign deer are already present in some properties in Spain and Portugal, this restriction is not enough. These foreign deer, once in Iberia, can reproduce within the local populations and can be legally moved from one area to another within Spain and Portugal. In some hunting estates, foreign deer have been hybridized with the Iberian ones under controlled conditions, and hybrids are offered to other hunting estates that purchase them in order to “improve the

quality" of their populations. It is virtually impossible to check whether a population includes foreign deer, mostly because hybrids of a second generation and beyond are almost indistinguishable from pure Iberian deer, and there are no laws to allow authorities to force the owners to remove foreign deer from their populations.

Two years ago, we began a scientific project with the objective of contributing to the preservation of Iberian red deer against the genetic introgression by other European red deer subspecies. We realised that preventing the introduction of foreign deer is almost impossible without the collaboration of landowners. Land managers pursuit the economic and social profitability of their exploitation, where top hunters expect to get outstanding trophies, which can deserve a place among the highest ranking trophies of Spanish red deer. Our strategy to preserve Iberian red deer was based on that fact.

The ranking of trophies is controlled by the Spanish Trophy Measurement Body JNH, which depends on the Ministry of the Environment. With the persuasion that red deer specimens from other countries should not be accepted in the Spanish rank because of the obvious differences including greater size, the JNH used to reject the most evident cases of trophies not belonging to Spanish deer. Their obvious problem was to differentiate a native pair of antlers from foreign ones, especially when they belong to hybrid specimens, and then obtaining evidences to reject them. We realised that this strategic filter in the big-game business in Spain might offer us the key to preserve the Iberian subspecies. To achieve this goal, the objective of the project was to develop a genetic tool that could be used by the Spanish Trophy Measurement Body JNH, to test whether any particular trophy belongs to the Iberian subspecies of red deer. This would enable the JNH to reject those trophies that present genetic characteristics of foreign subspecies, even after several reproductive crosses with native deer. We hoped that the use of this genetic test, at least for the highest ranking trophies, would dissuade owners from importing foreign deer.

To develop the genetic procedure, we have analysed DNA pools from several uncontaminated populations of Iberia, as well as from several Central- and Northern European populations. Firstly, samples were compared by using Random Amplified Polymorphic DNA (RAPD) techniques to identify specific genetic markers. This procedure generated a "fingerprint" pattern that can be used in characterizing strains or species. In our case, diagnostic differential bands were observed in the profiles, excised from the gels, PCR reamplified with the same primer and, then, cloned into the pCR2.1-TOPO vector (TOPO TA CloningÒ from Invitrogen™) and sequenced in both directions by an automatic sequencer. Five different sequences were studied, and one of them resulted a specific Cervidae sequence when compared with sequences in public nucleotide data base as GenBank or EMBL. Because this sequence is present in a great variety of cervid species and showed differences at structural level as well as at the nucleotide sequence level, we designed a set of several primer pairs to amplify specific loci from different red deer subspecies using our nucleotide sequence data. With this regard, two sorts of genetics markers were developed. The first one is a dominant multilocus marker, that is, presence/absence of bands depending on the subspecies studied (similar to a DNA "fingerprinting" but by PCR amplification) and, the second one, a variant of the RFLP-PCR assays (codominat marker) using different restriction enzimes. These two procedures shown a range of different genotypes as a result of subspecific polymorfisms in *Cervus elaphus* and other related taxa.

We have recently informed to the JNH on the availability of such specific primers, which are now being prepared for publication, and on the possibility of testing

the Iberian origin of red deer antlers. Very recently we have known that the JNH has decided to start right now, in the current hunting season, to subject top trophies to our test before proceeding to accept them as belonging to Iberian red deer, which are very good news.

We are going to continue the project with the roe deer (*Capreolus capreolus*) which suffers from a similar situation of hybridization with specimens from Central and Northern Europe. With the persuasion that human activities on game species may be a serious threat to the conservation of natural diversity, we think that similar strategies may be used in other cases all over the world. A key feature of our project was to identify a bottleneck in the management process of a species or its products, and then design a test to check somehow the quality of the original product in agreement with competent authorities.

Financial support for the project came from the Government of Extremadura region, and from the Ministry for the Environment of Spanish Government. Many individual persons collaborated by providing deer samples, and the JNH and the CIC delegation in Spain helped in many phases of the project.

ASIA

Status and distribution of deer species in Kumaon Himalayas, Utter Pradesh, India.

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Resumen

Los bosques de Kumaon Himalayas que se localizan en Uttar Pradesh-India, cubren un área de 21,032 km². Esta extensión se encontraba originalmente cubierta por extensos bosques de roble (*Quercus* spp.), en los últimos dos siglos se ha establecido una importante alteración del ambiente debido especialmente a las actividades humanas que han determinado una severa fragmentación de los bosques.

Este cambio dramático en la composición de especies y reducción de los ecosistemas forestales, a nivel del paisaje, ha sido generalmente asociado con cambios en la distribución y abundancia de la fauna indígena. En particular las especies de mamíferos nativos frecuentemente experimentan un descenso en la distribución y abundancia como consecuencia de la degradación y reducción de su hábitat.

Para analizar los efectos de la fragmentación del hábitat y documentar el estatus actual de tres especies de cérvidos *Muntiacus muntjak, Cervus unicolar* y *Moschus moschiferus* que ocurren en los parches del bosque de roble en Kumaon Himalaya, se realizó un monitoreo extensivo. Fueron seleccionados 19 sitios para investigar el estatus y distribución de estas especies. Los datos incluyeron visualización directa y métodos de estimación indirecta como observación de fecas y huellas. La abundancia total y relativa así como las específicas de cada sitio, para cada una de las especies monitoriadas, provee una información útil como linea de base para futuros monitoreos de la tendencia en las densidades poblacionales de estas especies.

Para conservar todas estas especies, tanto el número como el tamaño de las áreas protegidas debe aumentar. También es necesario regular las actividades humanas ya que la presión antropogénica actual en los parches de roble no protegidos impedirian el aumento de la abundancia de las poblaciones locales de ciervos.

The Kumaon Himalayas covers an area of 21,032 km² and lies between 28° 43’ 55” & 30° 30’ 12” N latitude and 78° 44’ 30” & 80° 45”E longitude. Located in Uttar Pradesh, India, it is comprised of the Almora, Pithoragarh and Nainital districts. The region was originally covered by

extensive oak forests (*Quercus* spp.), but significant changes in land use brought about by man during the last two centuries have led to severe forest fragmentation. Large areas have been replaced either by chir-pine (*Pinus roxberghii*) or terrace cultivation in the interest of maximising economic gains.

Such dramatic landscape level changes in species composition and reductions in the expanse of native forest ecosystems have often been associated with changes in distribution and abundance of indigenous fauna. In particular, native mammalian species have frequently been shown to experience a decline in distribution and abundance as a consequence of habitat degradation and reduction. The large-scale, landscape level changes experienced by the natural habitats of the Kumaon Himalayas have adversely affected the native animal communities. This is especially true for deer species, given the relatively large size of their home ranges. Considering this, we conducted extensive surveys to document the current status of three deer species known to occur in extant oak patches in Kumaon Himalaya, namely barking deer (*Muntiacus muntjak*), Sambar (*Cervus unicolar*), musk deer (*Moschus moschiferus*).

The Kumaon Himalayas presents a variety of habitat types, ranging from moist deciduous forests at lower altitudes, such as that found in the Siwalik hills, to alpine meadows which are found at higher elevations in the Himalayan mountains. Extensive tracts of *Shorea robusta* (sal) forest dominate the Siwalik hills and extend up to an altitude of 1200 m. Beyond this elevation pine forests dominate the landscape up to 2400 m. Oak forests are found at middle altitudes in the Himalayan hills, occurring between 1300 and 3200 m. The temperate broad leaf forests of the region include species such as *Tsuga demosa, Taxus baccata* and *Betula utilis* and occur between 3200 and 3500 m. Above 3500 m lies the alpine zone which is dominated by shrubs and grasses.

19 sites were selected in Kumaon for investigating the current status and distribution of deer species (Table1). These data include recordings of direct sightings as well as indirect evidence, such as pellet groups along existing forest trails. Pellet groups were enumerated on either side of a given trail in 10 m radius circular plots at 100 m intervals. Our findings regarding the current status and

Table 1. Direct and indirect evidences of different deer species recorded at surveyed sites in Kumaon Himalaya.

	Deer species		
Site code & name	**Barking deer**	**Sambar**	**Musk deer**
1.Kunjakharak	+	+	-
2. Binayak	+*	+	-
3. Mukteshwar	+	+*	-
4. Gager	+	+	-
5. Maheshkhan	+*	+*	-
6. Jageshwar	+*	-	-
7. Sitlakhet	-	-	-
8. Pandavkholi	+*	+	-
9. Sunderdhunga	-	-	-
10. Pindari	-	-	+
11. Gasi	+	-	-
12. Binsar	+*	-	-
13. Gandhura	+*	-	-
14. Daphiyadhura	+	-	-
15. Majtham	+	-	-
16. Duku	+	-	-
17. Sobla	+	-	-
18. Munsiyari	-	-	-
19. Mechh	+	+	-

Status: "+" = Indirect evidence only, "+*" = Direct and indirect evidences, "-" = No evidence

distribution of these deer species are as follows:

Barking deer: Direct and indirect evidences of barking deer were recorded from 15 sites. Pellet group density (mean pellet group density/ha±S.E.) of barking deer was highest at Binsar (88.6±16.3) and lowest at Gandhura (1.02±1.0). The overall mean pellet group density was highest for barking deer (22.6±6.0). This species is a selective browser that feeds on buds, tender shoots and fruits. It prefers dense tree cover at low to medium altitudes and inhabits forested valleys with high understories and thick ground cover.

Sambar: Sambar prefer medium altitudes with dense tree cover. This species appears to be the most affected by habitat alteration considering that direct or indirect evidence of its presence was only recorded from seven oak patches. The extensive tall tree habitat required by sambar may be responsible for it's disappearance from many fragmented oak patches, since anthropogenic activities of local people in the Kumaon Himalayas region have lead to the loss of large, contiguous closed-canopy oak forests. Pellet group density (pellet groups/ha ±SE) was highest at Mahesh khan (39±20.4) and lowest at Manch (3.18±3.1). Overall pellet group density was found to be 21.7±9.5.

Musk deer: We did not record any direct sighting of musk deer, however pellet groups were recorded in the Pindari area. Musk deer live solitarily or in pairs and are generally found in birch forests just below the alpine zone. They always prefer thick canopy cover with steep slopes. This species is highly endangered primarily due to poaching for musk pod, which has a very high international market value.

The overall as well as site-specific relative abundance values of each species provide a useful baseline index for future monitoring of trends in population density.

Conservation problem: It is clear from our surveys that the deer species of Kumaon Himalayas have already disappeared from many remnant habitat patches and additionally their continued survival is further jeopardised by habitat degradation, poaching and many other threats. Due to excessive tree cutting for fuel wood and fodder, the remnant oak forests in the region continue to be degraded and shrink in size as pine forests encroach.

Poaching is wide spread throughout Kumaon. We came across many cases of illegal hunting during our surveys. Poaching is most severe in the Sunderdhunga and Pindari glaciers regions, where local people hunt the Musk deer and Himalayan black bear for musk pod and bear bile respectively, which they then sell in Nepal and Tibet for a handsome return. In Sitlakhet and Pandavkholi, locals kill barking deer for their own consumption. In the Pithoragarh district, poaching pressure is very high near the Askot Wildlife Sanctuary in part due to the juncture of international boundaries with Nepal and Tibet, and its proximity an old trade route between India and China. These routes are still being utilised for poaching animals, including Musk deer and the Himalayan black bear. Furthermore, in Gandhura, a local tribe known as "Van Rawat" is confined to the Askot Wildlife Sanctuary and is partially dependent on wild animals for meat.

Illegal hunting in Kumaon is very common and many households in the region possess a gun. In Manch locals kill wildlife illegally for meat which they consume themselves or sell to other villagers. In Munsiyari locals kill wildlife for subsistence. Also, disturbingly, in Milam glacier tourists still

pay high prices to poach musk deer. This tourism related poaching pressure remains very high here, where illegal hunting has already wiped out all three of these deer species from many of the remaining oak patches in the Kumaon Himalayas.

Conservation strategy: Protected areas currently cover very little of the Kumaon Himalayas where there are two wildlife sanctuaries; Binsar and Askot, which encompass 600 km² and 45 km² respectively or approximately 3.06% of the total land area of Kumaon. Both sanctuaries experience very high anthropogenic pressures and conserve only barking deer leaving sambar and musk deer unprotected. In order to conserve all deer species, the number and size of protected areas must be increased. Areas such as Kilbary, Binayak and Kunjakharak in the Nainital district or Pindari and Sunderdunga regions in the Almorah district have very high conservation potential and therefore should be declared as wildlife sanctuaries. Creation of these sanctuaries will ensure conservation of all three deer species in Kumaon Himalayas. There is also a need to regulate human activities such as cutting, lopping, grazing and poaching in all remaining unprotected oak patches, so that existing anthropogenic pressures may be reduced, allowing the local deer populations to increase in abundance.

Persian Fallow deer (*Dama dama mesopotamica*) census in Ashk Island, Iran

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Resumen

El «Persian Fallow Deer» es una de las subespecies de cérvidos de las más raras del mundo, estando catalogada como en peligro, categoría EN D (IUCN, Red list 2000).

Con el objetivo de establecer planes de manejo es necesario, conocer el número de poblaciones silvestres. Nuestro grupo del Departamento de Medio Ambiente ha utilizado el censo terrestre para contar «Persian Fallow Deer» en Ashk Island. El censo terrestre fue realizado por tres grupos de 21 personas entre las 8 am a las 16 pm el día 10 de Septiembre de 2002. Los grupos partieron de distintos puntos y cubrieron toda el área de la isla. Durante esta actividad se censaron en esta Isla por conteo directo 211 «Persian Fallow Deer» (93 machos, 83 hembras 35 crías).

Persian Fallow Deer (Fig. 1) is one of the rarest deer of the world (Cowan & Holloway 1974) and it is classified as endangered subspecies in EN D category (IUCN, Red list 2000). Talbot (1960); Haltenorth (1959,1961); Chapman & Chapman (1975,1980); Muller (1978); Pemberton (1990); Karami (1993); Karami & Heidemann (1994) and Hemami & Rabiei (2002) described the history, biology and status this deer.

Wildlife experts should know the number of wildlife populations in areas for doing wildlife management. Different

Fig. 1: Persian Fallow Deer in Ashk Island (Rabiei 2002)

methods of wildlife censusing and estimating are used by wildlife experts in the world. Staff of the Department of the Environment (DOE) have used ground census to count the Persian Fallow Deer in Ashk Island.

Study Area: Ashk Island with an area of approximately 2550 ha is in the Lake Uromiyeh National Park in north west of Iran. In 1977, 3 Persian Fallow Deer (1 male + 2 female) were introduced in this area and between 1981 and 1990 49 Persian Fallow Deer (21 male + 28 female) were released in this Island (Table 1). The original area of all these deer is Dez and Karkheh Wildlife Refuges.

Method: Ground censusing was done by 3 groups of 21 staff of the Department of the Environment (DOE) and Environmental Office of Azarbayejan-e-Gharbi province, from 8 am to 16 pm on 10th September 2002.Group 1 (11 persons) moved from the north of the Island towards the south and their main task was to count the number of deer passing by. When this group reached group 2 (7 persons) in map grid 4140000, they formed a group of 18 persons to cover a wider area as shown on the map. This new group continued moving towards the south again until they reached the Guard Station which is shown with a green flag. In the mean time group 3 (3 persons) located in the southern border of the Island moved towards north meeting the new group (18 persons) at the same Guard Station.

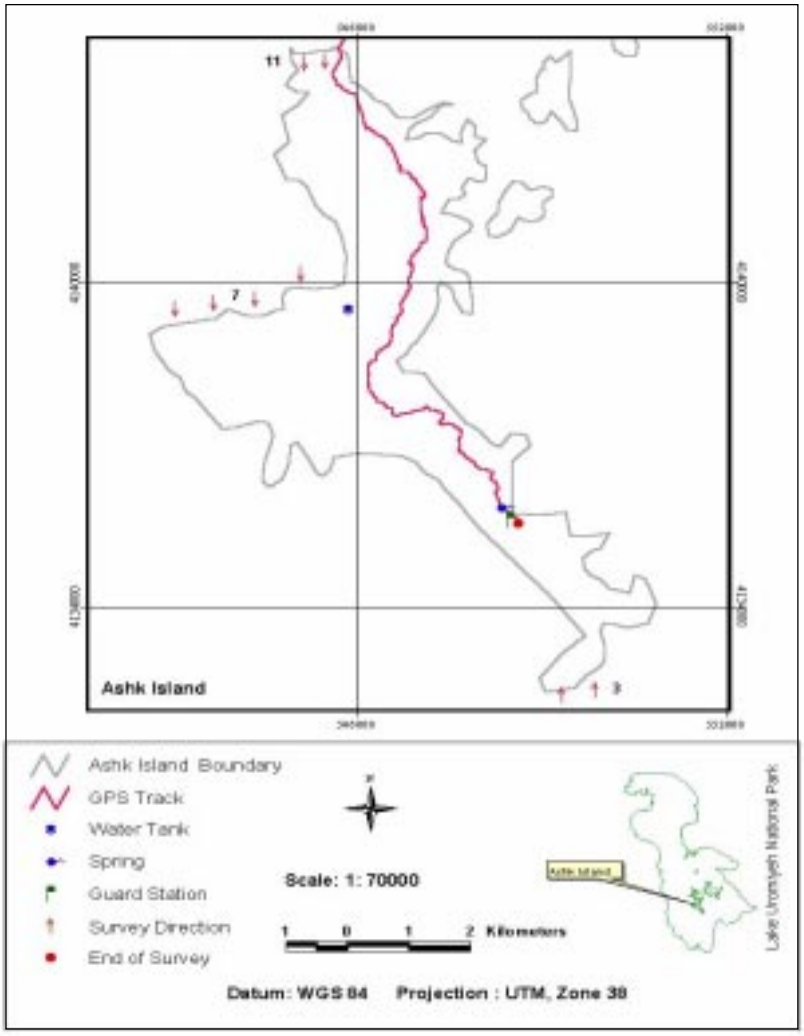

Table 1: Number of Persian Fallow Deer introduced in Ashk Island, by year

Year	Male	Female	Total
1977	1	2	3
1981	3	4	7
1982	4	4	8
1983	1	4	5
1984	3	4	7
1989	10	12	22
	22	30	52

Results and Discussion: During this census we directly counted 211 Persian Fallow Deer (93 male + 83 female + 35 calf) in this Island. This strategy of census shows that data obtained is valid and verified as a "Minimum Population Count".

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SOUTH AMERICA

Estimating Pampas Deer Population in Emas National Park, Brazil.

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Resumen

La densidad poblacional del venado de las pampas fue estimada en el Parque Nacional de Emas (PNE) utilizando la metodología de "muestreos por distancia" (Distance sampling). Se realizó una transecta setenta veces, usando un vehículo a una velocidad de 40 km/h, totalizando 2.264 km. La densidad estimada de venados fue de 1,00 venado/ km^2 (95% IC: 0,78 a 1,4 venados/km^2) y la densidad de grupos fue 0,44 grupos/km^2 (95% IC: 0,34 a 0,57 grupos/km^2). La estimación de tamaño de la población total para PNE fue de 1.300 individuos. Otras estimaciones de la densidad de la especie presentaron resultados muy variables, que pueden deberse a las diferencias entre las áreas, pero principalmente también debido a la diferencia de las metodologías utilizadas.

In the Brazilian savanna (Cerrado biome), population surveys of large vertebrates are rare, restricted to few species and locations. At Emas National Park (ENP), the Pampas deer (*Ozotocerus bezoarticus* L. 1758) population has been subject to some surveys conducted through different methods (Schaller & Duplaix-Hall, 1975; Pinder, in Merino *et al*., 1997; Frutuoso, 1999). ENP has an area of 131,868 ha (IBDF/ FBCN, 1981), and is located near Mineiros, Goiás state, Brazil. The vegetation in the park is composed mainly of grassland, which facilitates the visualization of animals of medium to large body size. Here, I present density estimates for the pampas deer population in ENP using the distance sampling technique.

An accidental fire completely consumed the grasslands at ENP in August, 1994, just before the surveys, facilitating the observations. I counted deer from linear transects between August, 1994 and May, 1995. The existing dirt roads were used as transect lines. The problems with the use of roads as transect line can be minimized because the Park were burn in time the research was done (and there was not fire breaks – stripes burned along the roads) and pampas deer is not attracted by roads, as carnivores and peccaries, which use the roads to their movements. One route was surveyed seventy times using a vehicle at a speed of 40 km/h, totaling 2,264 km. The length of each survey varied from 20 to 36 km. Cluster size and the perpendicular distance from the transect line was esteemed for each observed deer cluster, as described in Burnhan *et al.* (1980). Previously to the study, tests with objects at varied distances were done to calibrate the estimates. The records were clustered in distance classes of 0-50 m, 51-100 m, 101-150 m, 151-200 m, and 201-300 m. I excluded the observations beyond 300 m from the transect line (4% of the records). The calculations were made using the software DISTANCE (Laake *et al.*, 1993).

I obtained 205 records of pampas deer, totalizing 437 individuals. The best-fitted model for the density estimates was a half-normal estimator. The density of pampas deer was 1.00 deer/ km^2 (95% CI: 0.78 to 1.4 deer/km^2) and the group density was 0.44 groups/ km^2 (95% CI: 0.34 to 0.57 groups/km^2). The population size estimate for entire ENP was 1,300 individuals. Other estimates of the pampas deer's density for the ENP ranged from 0.63 to 1.5 deer/km^2. Pinder (*in* Merino *et al*., 1997) reported a density of 0.63 deer/ km^2, while Schaller & Duplaix-Hall (1975) estimated the density between 0.75 and 1.00 deer/km^2, using transects surveyed by foot. The densities estimated by Frutuoso (1999) were 1.5 deer/km^2, using terrestrial strip census by vehicle, and 0.18 deeer/km^2, using aerial strip censusing. The variation among the estimates probably reflects the variety of methods used to survey the pampas deer population at ENP, as well as the differences in period of the year, sampling

size and intensity. Areas recently burned attract pampas deer because the higher food availability and quality represented by regenerating vegetation, which can persist for a few months after fire (Rodrigues, 1996). I conducted the survey when the ENP was totally burned. Consequently, the habitat condition was homogeneous throughout the park and the effect of attraction after fire at restricted sites didn't exist. However, other factors, such as wet meadows, may have influenced the deer distribution and density estimates. On the other hand, the Frutuoso's (1999) terrestrial surveys probably overestimated deer density, as narrow burned strips located at one side along the roads were used to prevent fire spreads. These strips of burned vegetation may have attracted deer to closer distances from the transect lines, influencing the estimates.

The pampas deer population at Reserva Ecológica do IBGE, Distrito Federal, also in the Cerrado biome, was surveyed through terrestrial strip census by Leeuwenberg & Lara-Resende (1994), including only grasslands. The density was estimated as 1.28 ind./km^2. The authors also tried to calculate density by plotting on a map the visual records of pampas deer, obtaining an estimate of 1.22 ind./km^2. In Pantanal wetland, Schaller (1983) and Pinder (*in* Merino *et al*., 1997) found respectively 0.33 deer/ km^2 and 0.68 deer/km^2, near Miranda, southern Pantanal. Mourão *et al*. (2000), using double-count technique to correct visibility errors from aerial survey obtained an estimate of 0.25 groups/ km^2 and 1.67 ± 0.85 deer/ km^2 for the entire floodplain (140,000 km^2), and 0.57 group/ km^2 in areas of slightly higher elevation of Central Pantanal. The highest density estimate for pampas deer in Brazil was found in Campo Dora ranch, Nhecolândia region of central Pantanal, with values varying from 5.53 ± 0.68 deer/ km^2 (by foot, off-road) to 9.81 ± 3.8 deer/ km^2 (by vehicle, following roads), both using distance sampling technique (Tomas *et al*., 2001). The estimates from Argentina obtained through aerial surveys are 0.75 deer/ km^2, at Baía Samborombóm (Merino & Moschione, 1995 *in* Merino *et al*., 1997), 1.3 deer/ km^2 at San Luis (Merino & Giullietti *in* Merino *et al*., 1997), and 0.39 deer/km^2 in northern Argentina (Merino & Beccaceci, 1999). In Uruguay, the density estimates are very high, ranging from 6 deer/km^2 (Lombardi *et al*., 1995 *in* Merino *et al*., 1997) to 26 deer/ km^2 (Gonzales, 1994 *in* Merino *et al*., 1997).

In spite of the several pampas deer density estimates available, comparisons are very difficult, because of the variety of methods used. A study comparing different methods of pampas deer estimation could help us to evaluate the differences among areas. Such studies are in development in Emas National Park, comparing pampas deer and other vertebrate density estimates obtained by terrestrial transects using Distance technique, aerial survey using double-count technique and capture-mark-recapture techniques. Emas National Park is one of the most important areas in the Cerrado biome for pampas deer conservation. However, the isolation of the park from other grassland areas due to intensive agriculture, can threaten this population. So, monitoring is essential to evaluate its conservation status and population trends, especially by using standardized sampling protocols.

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Utilización de *Ozotoceros bezoarticus* por pobladores rurales de los bajos submeridionales de Santa Fe, Argentina

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Abstract: This communication presents folkloric uses of pampas deer in the northern of Santa Fe province, Argentina. The information was gathered from 15 interviews carried out with local people, of which 20% were active hunters. The animal or its products (meat, skin, antlers) have food source, ornamental and other uses. Hunting is unsustainable for pampas deer. The inclusion of local human populations in conservation of this species is analyzed.

En los bajos submeridionales de Santa Fe, Argentina, la utilización por parte de la comunidad local del venado no había sido estudiada hasta el presente. En esta nota se da a conocer información sobre esta utilización y en base a ésta, se proponen alternativas de conservación que contemplen las necesidades de los pobladores locales.

El trabajo se realizó en el área de distribución de *Ozotoceros bezoarticus* en el norte de la provincia de Santa Fe, Argentina (Pautasso et al., 2002). Se efectuaron 15 entrevistas a pobladores rurales.

La mayor parte de los entrevistados (90%), cazan o cazaron venados, aprovechando principalmente la carne, especialmente la de las hembras, ya que la del macho posee un fuerte olor. Posiblemente, ésta sea la causa del sesgo hacia las hembras que presentan los registros de mortalidad por cacerías (Pautasso y Peña, 2002). Los venados son un buen recurso pues proveen un volumen importante de carne al cazador, si se los compara con la que proporcionan otras especies cinegéticas de la zona (**tabla 1**).

Con tientos del cuero se confeccionan boleadoras y lazos. Además el cuero del macho es utilizado para repeler a la yarará (*Bothrops* spp.). Algunos pobladores mantienen restos de cuero en sus viviendas para evitar que las víboras se acerquen a ellas. Algo similar se ha reportado para *Mazama gouazoubira, Blastocerus dichotomus* y *Odocoileus*

Tabla 1. *Masa corporal promedio, frecuencia y método de captura de algunas especies de aves y mamíferos aprovechadas por su carne en el área de estudio. La frecuencia de captura, siguiendo a Giraudo y Abramson (1998) son: Muy capturados (MC), Comúnmente capturado (CC), Poco capturado (PC) y Ocasionalmente capturado (OC). En mamíferos la masa corporal es tomada de Redford y Eisemberg (1992) y en aves se siguió a del Hoyo et al. (1992, 1996, 1997).*

Clase	Especie	Aspectos de la captura		Masa corporal
		Frecuencia	Método	
Aves	*Rhea americana*	CC - PC	Boleadoras y armas de fuego	20 - 25 kg.
	Nothura maculosa	PC	Armas de fuego	0,164 - 0,340 kg.
	Rhynchotus rufescens	OC	Armas de fuego	0,700 - 1,040 kg.
	Phalacrocorax olivaceus	OC	Armas de fuego	1,814 kg.
	Ciconia maguari	OC	Trampas	-
	Mycteria americana	OC	Trampas	2 - 3 kg.
	Jabiru mycteria	OC	Trampas	8 kg.
	Zenaida auriculata	CC	Hondas	0,095 kg.
	Columbina picui	CC	Hondas	0,045 - 0,059 kg.
Mamíferos	*Chaetopractus villosus*	CC	Perros	3,42 kg.
	Dasypus hybridus	MC	Perros	1,5 kg.
	Dasypus novemcinctus	CC - OC	Perros	3,91 kg
	Pecari tajacu	OC	Perros y armas de fuego	20,4 kg.
	Ozotoceros bezoarticus	OC	Boleadoras y armas de fuego	35 kg.
	Myocastor coypus	CC - MC	Trampas	4,99 kg.
	Hydrochaeris hydrochaeris	OC	Armas de fuego	43,0 kg

virginianus (Giai, 1976; Silva y Strahl, 1994).

Los cráneos de machos y las astas, son guardados en las viviendas como adorno. En otras ocasiones éstos son obsequiados a parientes o amigos foráneos. Por otra parte hubo cuatro testimonios de colectas de juveniles en el campo para intentar su cría.

Este último uso no se consideró de mayor importancia, por tratarse de referencias históricas y aisladas.

La captura de venados con rifles se lleva a cabo por habitantes locales y pueden intervenir personas foráneas. La caza con boleadoras parece ser restringida, por la dificultad en su empleo. Las jornadas dedicadas a esta modalidad de caza son motivo de reunión y distracción, por ello se puede considerar este método como un medio de recreación para el poblador. El uso de lazos es más limitado y sólo se ha conocido un caso de captura.

El 20% de los entrevistados asumió que aún caza venados, el 47% cazó alguna vez pero ya no lo hace y el porcentaje restante (33%) nunca cazó ciervos. Muchos factores motivan la cacería, pero ésta se ve limitada por la escasez de animales y su difícil captura. Contrariamente a lo que sucede con otros mamíferos como los Dasypodidae que, aunque oferten un menor volumen de carne (tabla 1), su captura es más sencilla y su abundancia mayor por lo que son más perseguidos.

Si bien aún no se cuenta con información sobre la densidad de venados, preliminarmente consideramos que la presión cinegética no sería sustentable. Existen indicios que sugieren que esta población se encuentra en un estado crítico. Sólo se conoce la ocurrencia de la especie en unas 23000 hectáreas (Pautasso et al. 2002) y, por otro lado, en las prospecciones terrestres efectuadas entre 1997 y 2002 (N=14), sólo se obtuvieron registros directos en un 21,4% de las mismas. Aún cuando se cace ocasionalmente, y pocos pobladores admitieron que aún lo hacen, esto puede estar afectando severamente a una población ya degradada por otros factores.

Los problemas de conservación de venados, según la visión de la comunidad rural, reflejó lo siguiente: en el 100% de las entrevistas se mencionó a las inundaciones, a este problema le siguió la cacería (42,8%), las epizootias (14,3%) y los predadores (7,1%). El hecho de que en gran frecuencia los entrevistados asumieron que la caza afecta a esta población relictual, puede facilitar el proceso de erradicación de la misma. Debido a los escasos recursos (falta de financiamiento) para acceder a la zona de estudio, sólo se está trabajando con una parte de la población rural mediante la educación y concientización. Algunos pobladores que se comportan como líderes, se han dispuesto a controlar la caza. Debido a que estas personas, en general, son un ejemplo a ser imitado por otros locales, es de suma importancia que los organismos de conservación apoyen esta iniciativa. El estado provincial está a cargo del control de la cacería, pero cuenta con pocos recursos y escaso personal, por ello su intervención en el área es esporádica. Esta situación motiva aún más la necesidad de involucrar a la comunidad rural en el proyecto de conservación.

La cacería de fauna silvestre está muy arraigada en la comunidad rural, pero no es asumida por el estado como una actividad legal. De las especies tradicionalmente cazadas (tabla 1) sólo la presión ejercida sobre la Paloma Torcaza (*Zenaida auriculata*) es legal. A pesar de esto la caza no fue erradicada y sólo se lograron conflictos entre los cazadores y el organismo de control. El concepto de actividad ilegal, conduce a que no haya ningún tipo de orientación cinegética, por lo tanto, aunque con distintas frecuencias, se cazan tanto especies amenazadas como otras fuera de peligro.

Según Ulloa et al. (1996) para que se considere viable, una alternativa, debe partir de estrategias propias, ser aceptada por la comunidad, no obstruir procesos culturales o económicos y no generar procesos diferentes que culturalmente no sean posibles de asumir, sea por concepciones o por prácticas cotidianas. Consideramos que la cacería de venados debe erradicarse, pero esta

prohibición debería acompañarse de la legalización de la presión cinegética de algunas especies no amenazadas. La ocasional persecución de venados podría direccionarse hacia el Ñandú (*Rhea americana*) que posee una productividad superior, y podría ayudar a programar una cosecha sostenible. Por otra parte el método más frecuente de captura es con boleadoras, artículo de importancia tradicional, por lo que la veda de venados no aparejaría un empobrecimiento cultural, al menos en este aspecto. Para llevar a cabo iniciativas de este tipo, se deben iniciar estudios sobre fauna cinegética, con la colaboración del poblador rural, por lo tanto es necesario mayor diálogo entre los cazadores y el organismo de control. Ordenar la caza es una de las alternativas más viables para lograr la integración entre dos culturas y llevar a cabo un programa de conservación a largo plazo.

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Emergency Pampas deer capture in Uruguay

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Resumen

El venado de campo fue el mamífero representativo de las praderas uruguayas. La dinámica biológica y los aspectos sanitarios de las especies silvestres nativas recién comienzan a ser motivo de interés y estudio, debido a los problemas de conservación. Debido a la preocupación por un incremento de casos de Brucelosis en el departamento de Rocha, las autoridades sanitarias del Uruguay, consideraron importante hacer una evaluación de la población silvestre de venado de campo. La captura de animales es fundamental para poder realizar la evaluación serológica de la especie, siendo un procedimiento invasivo especialmente en los ciervos que son muy sensibles a los efectos del estrés. Dado la delicada situación de conservación de la especie, el Grupo Especialista de Ciervos/UICN se ofreció a encargarse del procedimiento de la captura y colecta de muestras. Se extrajeron muestras para: a) evaluación serológica por parte del MGAP; b) establecer un banco de células en nitrógeno líquido (fibroblastos y leucocitos) por parte de la División. Citogenética-IIBCE-Fac. Ciencias y c) parasitología (fecas) Facultad de Veterinaria-Regional Norte. A su vez se realizó la biometría, estimación de la edad y estado reproductivo de los ejemplares. Los ejemplares fueron todos marcados con caravanas y diez de ellos con radio collares, permitiendo efectuar el seguimiento por dos años.

The Pampas deer formerly occupied a range of open habitats of pampas, grasslands and cerrado, with a wide geographic distribution in southeastern of South America from 5° to 41° S. A recent morphological study supports the recognition of 2 separate subspecies in the Uruguayan northwestern grassland (Salto Department) and the Uruguayan east grassland (Rocha Department) (González *et al*., 2002).

The Pampas deer population in the Rocha Department is mainly located in a private ranch named "*Los Ajos*" in which cattle ranching are the main activity. This population was recently classified as a new subspecies ***Ozotoceros bezoarticus uruguayensis,*** being the most endangered of the subspecies with 350 individuals. Last year ***Brucella abortus*** was reported in 30% of the livestock on several ranches in Rocha Department, including the Los Ajos ranch. The local ranchers and the governmental Minister of Sanitary Authorities decided to test wild animals, specifically the pampas deer, for brucellosis. In South America, epidemiological studies on wild animals are rare. However, in Brazil and Argentina, which have been documented with high incidence of brucellosis in livestock, negative serological results were found for burcellosis in ***Ozotoceros bezoarticus leucogaster*** and ***Ozotoceros bezoarticusc celer***. Because pampas deer have been found to be free of burcellosis even when in association with infected cattle, and because the Uruguayan population is an important relic population of the subspecies, we asked the authorities to let us take charge of the capture and sampling procedures. They gave us only three weeks time to carry this out. They did not have adequate funding to cover all the expenses required. Pampas deer must be handled very carefully during capture, as they are easily killed or injured during capture.

The main goal of this project was to perform a safe pampas deer capture with the objective to obtain samples for serological, genetic, biometric and demographic data and to attach radio tag to a number of individuals for further observation.

Materials and Methods

Capture method: Two capture methods were tried: *Fast-setting nets*, and *Fixed nets* using horses to drive in the pampas deer. The captures took place from 27 to 29 October 2002.

Sample collection

Biometry: Each individual was measured and weight. The age was estimated (examining the dentition) and the reproductive stage.

Blood: The extraction was performed with vacutainer. From each individual was extracted 4 tubes of 3 ml of blood, 1 with heparin, 1 with EDTA and 2 without anticoagulant for serological test.

Skin: The surface was cleaned with soap, and ethanol. With sterile scissors a small fragment was cut approximately 5cm x 0,5 cm, and put in a tube with Mc.Coy's medium with high antibiotic concentrations and refrigerated.

Ectoparasites and feces: Each individual was examined collected the ectoparasites and stored in tubes with ethanol 70%. The feces were collected from the rectum for parasitological test.

Tagging: All the individuals were tagged with Allflex ear tags and ten were put radiocollars transmitter Wildlife Material Inc. de 150-151 Mhz.

Field Lab: In the lab the samples were spin at 2500 rpm for ten minutes and the serum and plasma. The samples were label and classified for the different purposes (cytogenetics, molecular genetics, serology and cell bank). Leukocytes and skin cell bank: The cell bank was established in División Citogenética del IIBCE-Facultad de Ciencias. To criopreserve the cell we followed Duarte *et al.*, 1999 protocol.

Results and Discussion

The fast-setting nets were not an appropriate method for the field conditions (wetland and marshy area). The van was unable to drive in the land conditions and the pampas deer saw the net during the assemblage. For this reason were not possible to capture animals using the fast-setting net. We decided to assembly the fixed net in enclosures with high pampas deer density. We asked the assistance of the ranch employees, that riding horses help to drive the animals to the fixed net. When the animals were trapped in the net, the veterinarians acted quickly to restrain the animal and injected it with anesthesia. For each animal, the handling process (sampling collection, tagging, biometry) was completed within one hour. In total the team captured 16 individuals (8 males: 8 females). The total mortality during capture was 12.5%. The serology tests were performed in the ministerial laboratory (DILAVE- MGAP). All individuals tested negative for **Brucellosis** and **Foot and Mouth Disease.** All of the animals were tagged with ear tags for individual identification. Ten of the deer were also equipped with radio collars and will followed for the next two years.

Important lessons should be learned from this experience with pampas deer capture and handling. In the future, pampas deer captures should be carefully planned and personnel should be appropriately trained before any captures are carried out. This project provides the first radio-telemetry study of this subspecies, and this tracking will provide useful information about deer movements and habitat use for the next two years.

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