DEER SPECIALIST GROUP NEWS

CO-CHAIR DSG
Dr. Susana Gonzalez
Genética de la Conservación– IIBCE
Av. Italia 3318
Montevideo, 11.600
Uruguay

CO-CHAIR DSG
Dr.William J. McShea
Conservation Ecology Center National Zoological Park-Conservation and Research Center
1500 Remount Rd.,
Front Royal, VA 22630 -USA

DSG VICE-CHAIR
Dr. José Maurício Barbanti Duarte
NUPECCE –UNESP-Brazil

SOUTHAMERICA COORDINATOR
Dr. Mariano L. Merino
Argentina.

NORTHAMERICA COORDINATOR
Dra. Sonia Gallina
Instituto de Ecología, México

ASIAN COORDINATOR
Orus Ilyas
India

EUROPEAN COORDINATOR
Alberto Ferreira
Portugal

RED LIST AUTHORITY NEW WORLD
Huemul Task Force-Chair
Dra. Patricia Black
Argentina

ELD´S DEER TASK FORCE ELD´S Chair
Budhan S. Pukazhenthi-USA

RED LIST AUTHORITY OLD WORLD SPECIES
Dr. Will Duckworthprk
PO Box 5573,
Vientiane, Lao PDR

INSIDE

Editorial


For the next quadrennial the Deer Specialist Group has expanded its network and membership by creating two departments, each focused on a region – old and new world. Susana González (IIBCE-Facultad de Ciencias) will focus on new world species and Bill McShea (Smithsonian Institution) will focus on old world species. Each department will have a Red List Authority: Patricia Black-Decima (Facultad de Ciencias Naturales e Instituto Miguel Lillo) to work with Susana González; Will Duckworth (Wildlife Conservation Society) to work with Bill McShea.

We have reorganized the membership and we are trying to establish more effective participative ways to involve the entire specialist in the different issues as the Newsletter edition, finances and communication.

Presently, there are two Task Forces focused on specific species: Huemul (Patricia Black-Decima, chairperson) and Elds deer (Budhan Pukazhenthi, chairperson); these groups will be continued. We hope to establish additional Task Forces focused on regions as the conservation and management need arises.

In this issue we are including four interesting original articles: "*Records and distribution of Gongshan and Leaf muntjacs in India*" by Anwaruddin Choudhury, and the others three came from the neotropical region, "*Habitat partitioning and biomass of four species of deer in the central region of the Brazilian Pantanal*" by Arnaud Desbiez and his team, an amazing report and pictures from a albino marsh deer sent by Ignacio Jiménez and his team from Iberá- Argentina, and the last one the most studied American species the white tail deer reporting by Mandujano and his team the "*Ecoregional classification of white-tailed deer subspecies in Mexico*".

Furthermore we are including the Deer Symposium abstract from the last 10th International Mammal Congress in Mendoza –Argentina.

Finnally we are giving more information regarding the "7th International Deer Biology Congress" will be hosted for the first time in South America in Pucón, Southern Chile. The congress is being organized by DSG members Werner Fleuck and Verónica Toledo (Universidad de Chile and Huilo Huilo Foundation), Andrés Charrier (Pontificia Universidad Catolica de Chile). Inquires about symposia or activities can be directed to the specialist group dsg-iucn@iibce.edu.uy.

Susana González and Bill McShea
Co-Chairs, Deer Specialist Group

Records and distribution of Gongshan and Leaf muntjacs in India

Anwaruddin Choudhury
The Rhino Foundation for Nature in NE India,
Add for corr: *7 Islampur Road, Guwahati 781 007, India*
Email: *badru1@sify.com*

Abstract

The Gongshan muntjac (*Muntiacus gongshanensis*) and leaf muntjac or leaf deer (*Muntiacus putaoensis*) are fairly recent additions to Indian fauna. Both occur in the northeastern state of Arunachal Pradesh, especially in the Mishmi Hills. The leaf muntjac; however, also extends up to Nagaland. The Gongshan muntjac generally occurs from about 1800 m to 3000m with some overlap with red muntjac at around 1800-2000 m elevation. The leaf muntjac generally occurs from 800 - 2500 m in Arunachal Pradesh and between 1700 - 3000 m in Nagaland. Namdapha National Park, and Mehao, Dibang and Kamlang Wildlife Sanctuaries are the key protected areas for Gongshan muntjac in India. The new sites have shown that the leaf muntjac occurs farther north along the Lohit River and its range very likely extends into the Zayu area of Tibet, China. Hunting for meat and construction of several large dams in the area are main conservation issues.

Keywords: Gongshan muntjac, *Muntiacus gongshanensis,* leaf muntjac, leaf deer, *Muntiacus putaoensis,* Arunachal Pradesh, north-east India

Introduction

Muntjacs *Muntiacus* sp. are a widely distributed group across south and south-east Asia. It is also an interesting group, with a number of recent discoveries of species from south-east Asia (Schaller and Vrba 1996; Rabinowitz *et al*. 1999). In India, the Indian or red muntjac is the most abundant deer species. Two of the fairly recently described species, Gongshan muntjac (*Muntiacus gongshanensis*) and leaf muntjac or leaf deer (*Muntiacus putaoensis*) were unknown in India till 1999-2000 (Choudhury 2003, 2007, 2008). In this article, we describe the distribution of these two poorly known species in India.

Occurrence of a different species of muntjac with darker coat colour was reported from higher areas of Lower Dibang Valley and Lohit districts since early 1990s. Those reports were surmised as Fea's muntjak *M. feae*, black muntjac *M. crinifrons* and tufted deer *Elaphodus cephalophus* by different researchers. Fea's muntjac was eliminated as a possibility in view of its range being located far away (in southern Myanmar) from the region, while the specimens lacked the white hair tuft of the tufted deer. The tentative

identification of the black muntjac was based on the preserved skins and heads (Choudhury 2003). George B. Schaller (pers. comm. at Guwahati in 2000) considered that the darker muntjac found in the area is the black muntjac, and the "Gongshan muntjac" is a synonym of the same. However, recent research indicated that the latter is a distinct species; which differs not only morphologically, but also in the structure of the chromosomes (Yang *et al*. 1995).

During field work in eastern Arunachal Pradesh, the Gongshan muntjac has been found to be common in the Mishmi Hills, with records from Anjaw, Changlang, Dibang Valley, Lohit, Lower Dibang Valley and Upper Siang districts. It generally occurs from about 1800 - 3000 m elevation with some overlap with the red muntjac at around 1800-2000 m elevation. Elsewhere in Arunachal Pradesh the red muntjac occurs up to 3000 m. Namdapha National Park, and Mehao, Dibang and Kamlang Wildlife Sanctuaries are the key protected areas for Gongshan muntjac in India. In India, the Gongshan muntjac occupies temperate forests, both broadleaf and conifer. There is habitat contiguity with Myanmar and China (Fig.1).

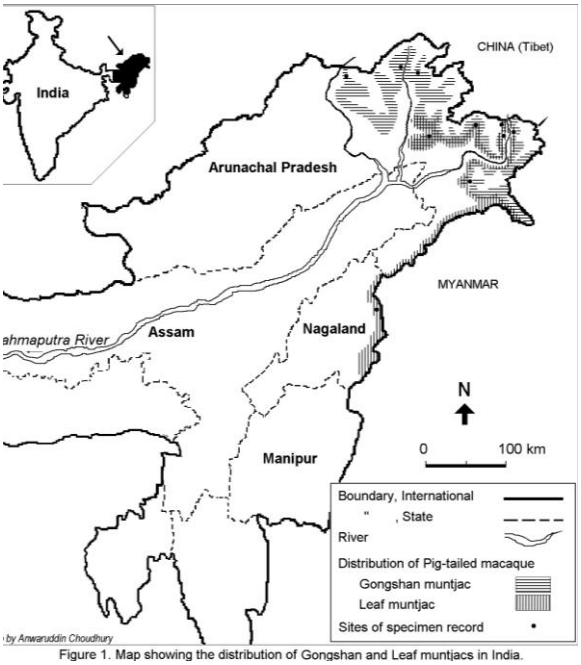

Figure 1. Map showing the distribution of Gongshan and Leaf muntjacs in India.

Figure 1. Map showing the distribution of Gonshan and Leaf muntjacs in India

Like the Gongshan muntjac, while surveying eastern areas of Arunachal Pradesh, I came across reports of a small deer resembling a muntjac from the Lohit and Changlang

districts, both from areas bordering Myanmar in 1993-1994. At that time *M. putaoensis* was not described, and since there was no good collection of muntjac species in Indian museums (except for red muntjac), comparison was difficult. Though I did not follow up with further surveys, I was intrigued by the stories of the small deer (Choudhury 2007).

Rabinowitz and Khaing (1998) reported a small muntjac in adjacent areas of northern Myanmar and later described it as *M. putaoensis* (Rabinowitz *et al*. 1999). In August 2001, I visited the collections at the Wildlife Conservation Society and American Museum of Natural History to examine the skulls of the leaf muntjac obtained from northern Myanmar by Rabinowitz and confirmed that the specimens from Lohit and Changlang were that of the leaf muntjac (undescribed at that time) (Choudhury 2003). Later, Datta *et al*. (2003) found evidence from elsewhere in Changlang district for the occurrence of this species.

During subsequent field works in eastern Arunachal Pradesh, it has been found that the leaf muntjac occurs as far west as the Lower Dibang Valley district (Choudhury 2007), in all probability up to the Dibang River. It is possible that it occurs west of the river as well, but this area has not been surveyed. The species appears to be widespread in Anjaw, Changlang, Lohit and Lower Dibang Valley districts and possibly also in Tirap district. In Dibang Valley district, it is only confined to lower slopes. In Arunachal Pradesh, the leaf muntjac generally occurs from about 800 - 2500m elevation.

But the surprise was its discovery in Nagaland in February 2004. My visit in 2004 was on an awareness campaign as part of OBC-WildWings Conservation Award. During discussion with local hunters and villagers in the Noklak area of Tuensang district, at least four hunters reported a small deer resembling the common red muntjac and living at higher elevations of the mountains that separate India from Myanmar. I searched Noklak town (26° 12' N, 95° 00' E) as well as neighboring villages. Everywhere in this region, the regular hunters were convinced that there is indeed a small muntjac that resides to the east, north-east and south-east of Noklak. After repeated search in these villages, I located a skull of a male at Pangsha village (26° 14' N, 95° 06' E). The elevation of the village was 1200 - 1300 m and leaf muntjacs were reportedly encountered or captured at 1700 - 3000 m in subtropical and temperate broadleaf forests (Fig. 2 and 3).

In Nagaland, I believe the species occurs farther south covering Saramati and at least up to the gorge of Tizu River that flows into Myanmar. This also indicates that the leaf muntjac has wider distribution across the western mountainous tracts of Myanmar as well as the intervening mountains between Noklak in Nagaland and Pangsu in Arunachal Pradesh (Fig. 1). The districts where it has been recorded in Nagaland are Tuensang, Kiphire and possibly Mon (all). Namdapha National Park, and Mehao and Kamlang Wildlife Sanctuaries, all in Arunachal Pradesh are the key protected areas for leaf muntjac in India. In Nagaland, the only protected area having this species is Fakim Wildlife Sanctuary.

In North-east India, the leaf muntjac occupies a wider range habitats in comparison to the Gongshan muntjac, from tropical broadleaf, and subtropical broadleaf to temperate broadleaf and conifers.

Figure 2 Skins of a Gongshan muntjac (left) and Red muntjac (right) in the upper areas of Dbang Valley district Arunachal Pradesh, north east India.
Figure 3 Frontal view of a Leaf Muntjac at a village in Anjaw district. Photos taken by Anwaruddin Choudhury.

Possible occurrence in China

Because of records from Kibithu (on the India-China border), Walong and Dichu,and habitat contiguity and similarity in terrain, vegetation and climatic conditions, I believe that the leaf muntjac will be found to occur farther north along the Lohit River in Zayu area of Tibet, China (Fig.1).

Overall both the species appear to be declining owing to hunting for meat all over their range in India. A 500 km^2 protected area has already been recommended as 'Saramati-Fakim' that would include the confirmed habitat of the leaf muntjac near Noklak (Choudhury 2001). Besides early declaration of this protected area, further surveys in eastern Arunachal Pradesh and Nagaland, adequate protection to existing protected areas and awareness campaign are strongly recommended.

Acknowledgements

The Ministry of Environment & Forests, Government of India (Man & Biosphere Programme), Oriental Bird Club (OBC-WildWings Conservation Award), S.S. Samant, S.N. Kalita, K.Namchoom, S.K. Raha, S.C. Jenew, R.K. Barthakur, T.R. Taku, Sheal Sharma, Empi Meya, Narayan Das, Sanjay Singh, K. P. Gupta, Suresh Melo, Dr T. Rahman, Longay Miso, S. Ahmed, Radhe Appa, D.R. Ram, Amonge Mili, M. Lama, Kundan Raut, C. Miso; Gaon Burha of Hunli; S. Miso, B. Tega, G. Tabronyu, V. Sonar, Y. Tega, Sajalu Tega, Man Bahadur Sonar, S. Biswakarma, Jerow Mipi, Baputi Mipi, Kanari Mipi, H. Mipi, Arun Mili, A. Mihu, Auto Miyu, Anoke Mihu, M. Mili, G. Thapa, Chhoje Lama, M. Milo, D. Mihu, Akuto, C. Sahni, Suleman Ansari, Ratul Talukdar, Hakim, Hashim; H. Shou, Chingla, M. Thangpong, Hiampai, Khmou, Hendo, Sujong, T. Imlong, Neisatuo Keditsu, Thomas Kent (Rengma), K. Sohe and T. Torechu.

At Wildlife Conservation Society and American Museum of Natural History, both in New York, I thank Kathleen Conforti, Program Manager and Bob Randall, Manager of loans and visitor services, for their help during my visit in August 2001. I also thank Alain Rabinowitz for kindly allowing me (through Kathleen) to examine the specimens in his chamber during his absence in August 2001. Thanks to George B. Schaller for his valuable discussion during his visit to Guwahati in February 2000.

References

CHOUDHURY, A.U. 2001. Some bird records from Nagaland, northeast India. *Forktail* 17: 91-103.

CHOUDHURY, A.U. 2003. *The Mammals of Arunachal Pradesh*. Regency Publications, New Delhi. 140 pp.

CHOUDHURY, A.U. 2007. Discovery of Leaf Deer *Muntiacus putaoensis* Rabinowitz *et al*. in Nagaland with a new northerly record from Arunachal Pradesh1. *J. Bombay nat. Hist. Soc.* 104 (2) : 205-208.

CHOUDHURY, A.U. 2008. Survey of birds and mammals in Dihang-Dibang Biosphere

Reserve. Final report to the Ministry of Environment & Forests, Government of India. The Rhino Foundation for Nature in NE India, Guwahati. 70 pp.

DATTA, A., J. PANSA, M.D. MADHUSUDAN & C. MISHRA. 2003. Discovery of the Leaf Deer *Muntiacus putaoensis* in Arunachal Pradesh: an addition to the large mammals of India. *Current Science* 84: 454-458.

RABINOWITZ, A.R. & S.T. KHAING. 1998. Notes on selected mammal species in northern Myanmar. *Oryx* 32(3): 201-208.

RABINOWITZ, A.R., T. MYINT, S.T. KHAING & S. RABINOWITZ. 1999. Description of the Leaf Deer (*Muntiacus putaoensis*), a new species of muntjac from northern Myanmar. *J. Zool.* 249: 427-435.

SCHALLER, G.B. & E.S. VRBA (1996): Description of the Giant Muntjac (*Megamuntiacus vuquangensis*) in Laos. *J. Mammalogy* 77(3): 675-683.

YANG, G. F., N. P. CARTER, L. SHI, & M. A. FERGUSON-SMITH (1995): A comparative study of karyotypes of muntjacs by chromosome painting. *Chromosoma* 103:642-652.

Habitat partitioning and biomass of four species of deer in the central region of the Brazilian Pantanal

Arnaud Léonard Jean Desbiez [1,2], Sandra Aparecida Santos [2] and Walfrido Moraes Tomas [2]

[1]*Royal Zoological Society of Scotland, Edinburgh, Scotland and* [2]*Embrapa Pantanal, Corumbá, Mato Grosso do Sul, Brazil*
e-mail: adesbiez@hotmail.com or arnaud@cpap.embrapa.br

Abstract
This study examined habitat partitioning between grey brocket deer (*Mazama goazoubira*), red brocket deer (*Mazama americana*), pampas deer (*Ozotoceros bezoarticus*) and marsh deer (*Blastocerus dichotomus*) and their respective biomass in a study area in the central region of the Brazilian Pantanal. Using line transects, densities were estimated and encounter rates in each habitat analysed. Habitat overlap between the four species is low: grey brocket deer select the forest edge, red brocket deer the forest, pampas deer and marsh deer both select open grasslands but pampas deer use dry open grasslands and marsh deer flooded open grasslands. The floodplain landscape has the highest deer biomass. At the time of the study, pampas deer has the highest biomass of all four species in the study area.

Keywords: *Blastocerus dichotomus, animal* density, habitat use *Mazama goazoubira*, *Mazama Americana*, *Ozotoceros bezoarticus,* wetland

Introduction

Four species of Cervidae are found in the Brazilian Pantanal: grey brocket deer (*Mazama gouazoubira*), red brocket deer (*Mazama americana*), pampas deer (*Ozotoceros bezoarticus*) and marsh deer (*Blastocerus dichotomus*) (Rodrigues *et al.* 2002). The pampas deer and marsh deer are considered endangered in Brazil (Fonseca *et al.* 1994). The pampas deer is found from central Brazil south to northern Argentina (Jackson 1987) and is listed as near threatened (IUCN, 2009), the marsh deer is found from southern Amazonian Peru to central Brazil and south to northern Argentina (Pinder and Grosse 1991) and is listed as vulnerable (IUCN, 2009). The red brocket deer is found from southern Mexico south through eastern Paraguay to northern Argentina and listed as data deficient (IUCN, 2009), while the grey brocket deer is found from Panama to northern Argentina (Eisenberg and Redford 1999) and listed as least concern (IUCN, 2009).This study examined habitat partitioning between the four species and their respective biomass in a study area in the central region of the Brazilian Pantanal.

Methods

Study Area - This study took place between October 2002 and November 2004 in the centre of the Pantanal, in the Nhecolândia region, at the Embrapa Pantanal Nhumirim ranch and five surrounding ranches (18º 59' S, 56º 39' W). These ranches are covered by a mosaic of flooded grasslands, savannas, scrub savannas, forests, and several permanent and temporary ponds. The study area was divided into three different landscapes: the floodplain landscape that is dominated by seasonally flooded grasslands and small pockets of isolated forest islands, the forest landscape that is characterised by semi-deciduous continuous narrow strips of forest and the Cerrado landscape that is characterised by scrub forest and open scrub grasslands.

Density estimates- Using line transects, densities of the four species of deer were estimated in each landscape (floodplain, cerrado and forest). Following procedures described in Desbiez (2007) a total of 2,174 km of transects were walked between October 2002 and November 2004. Densities were estimated using DISTANCE software (Thomas *et al.* 2006) for species with a minimum of 60 sightings. For the others densities were estimated through strip-transects using a 15 m width from the trail.

Biomass – Biomass was estimated by multiplying the average individual weight by the respective individual density (Eisenberg 1980). Average individual weight was obtained from the literature (Schaller 1983, Robinson and Redford 1986).

Habitat use and availability- Encounter rates for each habitat throughout the three landscapes were calculated to estimate habitat use. Each 50 m portion of the transect was categorized in five different habitat categories: 1-) open grasslands, 2-) scrub grasslands, 3-) scrub forest, 4-) semi-deciduous forest, and 5-) forest edge. On each transect, the encounter rates of deer at a fixed distance from the trail on each 50 m proportion of the transect was determined using the effective strip width determined by DISTANCE or using a conservative measure (grey brocket deer 15 m; red brocket deer 15 m; pampas deer 130 m; marsh deer 15 m). For detections to remain independent events, groups were considered as a single detection. The frequency of sightings took into account the number

of times each section was sampled to standardize the frequency of sightings. Habitat availability was estimated from the total proportion of 50 m habitat segments from the 21 transects.

Habitat selection - Manly's standardized habitat selection index for constant resources was used to compare habitat selection in the different landscapes. The index is based on the selection ratio *wi*. A w_i value larger than 1 indicates a positive selection for the resource and a value less than 1 indicates avoidance of the resource. The preference/avoidance of each species was tested for each habitat using a chi-square test adjusted by Bonferroni. Calculations were made with the extension adehabitat in the statistical package R (Ihaka and Gentleman 1996, Calenge 2006).

Habitat overlap - Piankas's index was used to calculate habitat overlap between the four species. Pianka's index ranges from 0 (no resources in common) to 1 (complete overlap). To determine the probability that overlap of the observed magnitude is greater or less than would be expected randomly, we did 5,000 Monte Carlo randomizations of different frequencies of habitat use to simulate possible overlaps among the 2 species. All calculations and simulations were carried out with the software EcoSim version 7.72 (Gotelli and Entsminger 2004).

Results

A total of 286 brocket deer where sighted, usually alone (N=204) sometimes in pairs (N=38) and very rarely three animals together (N=2).The highest density of grey brocket deer was in the cerrado landscape, while densities were lowest in the floodplain landscape (Table 1).

Table 1. Density estimates (D) (individuals/km^2), standard error (SE) of densities calculated using Distance and biomass (B) per landscape (kg/km^2) for deer from central Pantanal between July 2002 and October 2004. Low means the animal was rarely sighted during the study

Landscape	Grey brocket deer D±SE (B)	Red brocket deer D±SE (B)	Pampas deer D±SE (B)	Marsh deer D±SE (B)
Forest landscape	3.16±0.53 (47.4)	0.24 (6.24)	1.22±0.77 (36.6)	Low
Cerrado landscape	3.82±0.59 (57.3)	Low	0.22±0.11 (6.6)	Low
Floodplain landscape	0.39±0.47 (5.85)	Low	6.10±0.63 (183)	Low

Grey brocket deer encounter rates were highest at the edge of the forest (Table 2). They significantly selected the forest edge, scrub forest and scrub grasslands and avoided open grassland and forest (Table 3).

Table 2 Encounter rates (sightings/100km) of groups of deer in different habitats from the centre of the Pantanal between October 2002 and November 2004

	Grey brocket N= 169	Red brocket N= 10	Pampas N=276	Marsh N=4
Open grass lands	3.35	0	33.91	0.45
Scrub grass lands	15.86	0	0.33	0
Scrub forest	10.67	0	0	0
Forest	3.71	2.23	0	0
Forest edges	22.85	0	0	0

The red brocket deer was very rare in the study area and only sighted 10 times, always alone in the middle of the semi deciduous forest (Table 2). The forest was the only habitat they significantly select all other habitats were avoided. The pampas deer was the most sighted deer in the study area (N=870). They were found in groups of 1-3 in the forest landscape area (average group size 2; N=12), in groups of 1-5 individuals in the cerrado landscape (average group size 2.2; N=66), in groups of 1-13 individuals in the floodplain landscape (average group size 2.4; N=792).

Table 3. Habitat selection of 4 species of deer (GB: grey brocket deer; RB: red brocket deer; Pa: pampas deer; Ma: marsh deer) in the centre of the Pantanal between October 2002 and November 2004, where *wi* is the selection ration, SE *wi* is the standard error of *wi* and P chi-square probability with Bonferroni level 0.0125. A habitat is considered selected when: $w_i > 1$ and P < Bonferroni level 0.0125.

	Open grass lands	Scrub grass lands	Scrub forest	Forest	Forest edges
Habitat available	0.57	0.11	0.12	0.13	0.07
GB Habitat use	0.059	0.281	0.189	0.066	0.405
GB *wi*	0.104	2.555	1.575	0.506	5.783
GB SE *wi*	0.025	0.243	0.194	0.114	0.417
GB p	0	0	0.003	0	0
RB Habitat use	0	0	0	1	0
RB *wi*	0	0	0	7.692	0
RB SE *wi*	0	0	0	0	0
RB p	0	0	0	0	0
Pa Habitat use	0.965	0.019	0	0	0.016
Pa *wi*	1.693	0.171	0	0	0.233
Pa SE *wi*	0.024	0.093	0	0	0.136
Pa p	0	0	0	0	0
Ma Habitat use	1	0	0	0	0
Ma *wi*	1.754	0	0	0	0
Ma SE *wi*	0	0	0	0	0
Ma p	0	0	0	0	0

The highest density of Pampas deer was in the floodplain, the lowest in the cerrado landscape (Table 1). Encounter rates of groups of pampas deer was highest in the open grasslands which they significantly selected avoiding all other habitats. Perhaps due to the drought that was occurring during the period of the study, marsh deer were rarely seen, either alone (4) or in pairs (2), and always in the open grasslands. Besides the marsh deer and the pampas deer, all other species of deer had a very low habitat overlap (Table 4). The floodplain landscape has the highest deer biomass. Pampas deer has the highest biomass of all four species in the study area.

Table 4. Habitat niche overlap determined by Pianka's index Observed mean overlap niche was 0.280, after 5000 Monte Carlo simulations expected mean niche overlap was 0.286.

	Grey brocket	Red brocket	Pampas	Marsh
Grey brocket	X	0.077	0.172	0.015
Red Brocket		X	0	0
Pampas			X	0.985
Marsh				X

Discussion

Habitat selection of the four species in the mosaic landscape of the Pantanal reflected well the distribution of species throughout their range. Red brocket deer select thick forests through out their range (Weber and Gonzalez 2003) and in this study they were also found to select only semi-deciduous forests. The grey brocket deer requires vegetation cover but is not reported to be habitat selective (Dietrich 1993, Eisenberg and Redford 1999, Weber and Gonzalez 2003, Parry 2004, Reyna-Hurtado and Tanner 2005, Rivero et al. 2005). In the Pantanal, as in this study, the grey brocket deer is reported to select forest edge and scrub forest (Pinder 1997). The pampas deer is associated with native grasslands throughout its distribution in Argentina, Bolivia, Brazil, Paraguay, and Uruguay (Jackson 1987, Rodrigues and Monteiro-Filho 2000, Tomás et al. 2001, Weber and Gonzalez 2003) and selected only open grasslands in this study. The marsh deer also selected open grasslands. The low frequency of sightings of the species could be due to the drought occurring in the study area since the species is closely associated to marshy waters (Mauro et al. 1988, Pinder and Grosse 1991, Mourão et al. 2000, Weber and Gonzalez 2003) and during the study swampy areas had dried up.

Habitat partitioning between the four species was extremely high. The high overlap between the pampas deer and the marsh deer is misleading and if the open grassland habitat was subdivided into two categories: dry grasslands and flooded grasslands, overlap would be low. The marsh deer is usually found in or near water, while the Pampas deer is found in dry grasslands. Biomass of the four species will vary between years and locations throughout the Pantanal. During wet flooded years the biomass of marsh deer in the study area will probably increase, while the biomass of pampas deer will decrease. In other regions of the Pantanal with more gallery and riverine forest, densities of red brocket deer are higher than grey brocket deer (Desbiez and Santos, pers. obs). Other dimensions of niche partitioning for these four species, such as diet and activity have been explored in other regions and have also shown interesting differences (Pinder 1997, Rivero et al. 2005) and should be pursued in the Pantanal.

Acknowledgements

Funding for this study was provided by the European Union INCO PECARI project, Embrapa Pantanal and the Royal Zoological Society of Scotland (RZSS). We are very grateful the people living on the Embrapa Pantanal Nhumirim ranch for their dedication, help, and support.

References

CALENGE, C. 2006. The package "adehabitat" for the R software: a tool for the analysis of space and habitat use by animals. Ecological Modelling 197:516-519.

DESBIEZ, A. L. J. 2007. Wildlife conservation in the Pantanal: habitat alteration, invasive species and bushmeat hunting. Ph.D thesis. Durrell Institute of Conservation and Ecology (DICE), University of Kent, Canterbury.

DIETRICH, J. R. 1993. Biology of the brocket deer (Genus *Mazama*) in Northern Venezuela. Doctorate dissertation. University of Basel, Basel, Switzerland.

EISENBERG, J. F. 1980. The density and biomass of tropical mammals. Pages 35-55 *in* M. E. Soule and B. Wilcox, editors. Conservation Biology. Sinauer Associates Inc, Sunderland, Masschusets.

EISENBERG, J. F., K. H. REDFORD. 1999. Mammals of the Neotropics. The Central Neotropics, Ecuador, Peru, Bolivia, Brazil. The University of Chicago Press, Chicago.

FONSECA, G. A. B., A. B. RYLANDS, C. M. R. COSTA, R. B. MACHADO, Y. L. R. LEITE. 1994. Livro vermelho dos mamiferos brasileiros ameacadosde extinceao. Fundacao Biodiversitas, Belo Horizonte, Brazil.

GOTELLI, N. J., G. L. ENTSMINGER. 2004. EcoSim: Null models software for ecology. *in*. Acquired Intelligence Inc. & Kesey-Bear, Jericho VT 05465. http://garyentsminger.com/ecosim.htm.

IHAKA, R., R. GENTLEMAN. 1996. R: A language for data analysis and graphics. Journal of Computational and Graphical Statistics 5:299-314.

IUCN. 2009. IUCN Red List of Threatened Species. Version 2009.1. <www.iucnredlist.org>. Downloaded on 20 October 2009

JACKSON, J. E. 1987. Ozotocerus bezoarticus. Mammalian Species 295:1-5.

MAURO, R., G. MOURÃO, M. COUTINHO, M. SILVA, W. MAGNUSSON. 1988. Abundance and distribution of marsh deer *Blastocerus dichotomus* (Artiodactyla: Cervidae) in the Pantanal, Brazil. Revista de Ecologia Latino Americana 5:13-20.

MOURÃO, G., M. E. COUTINHO, R. MAURO, Z. M. S. CAMPOS, W. M. TOMÁS, W. MAGNUSSON. 2000. Aerial survey of caiman, marsh deer and pampas deer in the Pantanal wetland of Brazil. Biological Conservation 92:175-183.

PARRY, L. 2004. Large vertebrate communities of primary and secondary forests in the Brazilian Amazon. Masters thesis, University of East Anglia, Norwich.

PINDER, L. 1997. Niche overlap among brown brocket deer, pampas deer, and cattle in the Pantanal of Brazil. PhD. Thesis. University of Florida, Gainsville.

PINDER, L., A. P. GROSSE. 1991. Blastocerus dichotomus. Mammalian Species 380:1-4.

REYNA-HURTADO, R., G. W. TANNER. 2005. Habitat preferences of ungulates in hunted and nonhunted areas in the Calakmul forest, Campeche, Mexico. Biotropica 37:676-685.

RIVERO, K., D. I. RUMIZ, A. B. TABER. 2005. Differential habitat use by two sympatric brocket deer species (*Mazama americana* and *M. gouazoubira*) in a seasonal Chiquitano forest of Bolivia. Mammalia 69:169-183.

ROBINSON, J. G., K. H. REDFORD. 1986. Body size, diet, and population density of Neotropical forest mammals. American Naturalist 128:665.

RODRIGUES, F. H. G., I. M. MEDRI, W. M. TOMÁS, G. M. MOURÃO. 2002. Revisão do conhecimento sobre ocorrência e distribuição de mamíferos do Pantanal. *in*. Embrapa Pantanal, Corumba.

RODRIGUES, F. H. G., E. L. A. MONTEIRO-FILHO. 2000. Home range and activity patterns of pampas deer in Emas National park, Brazil. Journal of Mammalogy 81:1136-1142.

SCHALLER, G. B. 1983. Mammals and their biomass on a Brazilian ranch. Arquivios de Zoologia 31:1-36.

THOMAS, L., J. L. LAAKE, S. STRINDBERG, F. F. C. MARQUES, S. T. BUCKLAND, D. L. BORCHERS, D. R. ANDERSON, K. P. BURNHAM, S. L. HEDLEY, J. H. POLLARD, J. R. B. BISHOP, T. A. MARQUES. 2006. Distance 5.1 release 1. *in* Research Unit for Wildlife Population Assessment.

TOMÁS, W. M., W. MCSHEA, G. H. B. DE MIRANDA, J. R. MOREIRA, G. MOURÃO, P. A. LIMA BORGES. 2001. A survey of a pampas deer, *Ozotoceros bezoarticus leucogaster* (Arctiodactyla, Cervidae), population in the Pantanal wetland, Brazil, using the distance sampling technique. Animal Biodiversity and Conservation 24:101-106.

WEBER, M., S. GONZALEZ. 2003. Latin American deer diversity and conservation: a review of status and distribution. Ecoscience 10:443-454.

First report and photographic record of an albino marsh deer (*Blastocerus dichotomus*) for the Iberá region, Argentina

Eugenia Acevedo, Ignacio Jiménez*, Gustavo Solís and Ricardo Quintana.
The Conservation Land Trust. Estancia Rincón del Socorro. Corrientes. Argentina
*Corresponding autor: i_jimenez_perez@yahoo.es

Resumen: Se presenta la primera cita y registro fotográfico de un ciervo de los pantanos albino, el cual ha sido visto en varias ocasiones en la Ea. San Alonso, un área protegida estricta de 10,000 ha situada en el interior de la gran Reserva Provincial de Iberá de 1,300,000 ha, Noreste de Argentina.

An albino male marsh deer (*Blastocerus dichotomus*) was observed several times inside and around the *Estancia* San Alonso, a 10,000 strict reserve owned by The Conservation Land Trust (CLT) and sited inside the larger Iberá Provincial Reserve. The animal was originally seen by local *gauchos* (i.e. cowboys) in 2008 and then reported to CLT's conservation staff. During 2009, Ricardo Quintana, CLT's pilot, saw and photographed the animal from the sky on several occasions. On October 29th 2009, Quintana and local biologist Eugenia Acevedo saw the albino deer from a plane while radiotracking pampas deer, and then landed on the area to take the first close-up photographs of the animal. These pictures were taken at S 28° 22´ 03.4¨ W 57° 33´ 45.0¨ and 58 m.a.s.l. (Fig. 1)

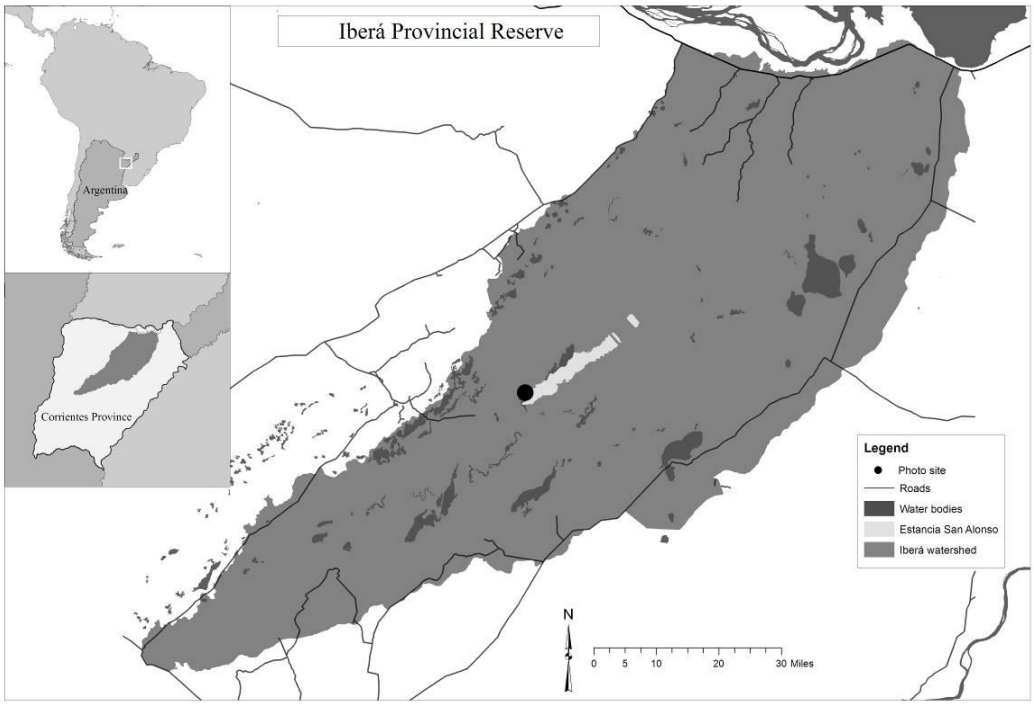

Figure 1. Map of Iberá Provincial Reserve and Estancia San Alonso showing the site were the albino marsh deer was photographed.

Though albinism has been recorded for many animal species, to our knowledge this is the first verified report of such trait on marsh deer (José Mauricio Barbanti Duarte, comm. pers.). The albino deer looked in good health condition and it is presently living on a well-protected area that is being regularly surveyed from land and air by field biologists and CLT's staff. The Iberá region is considered as an international conservation priority because it holds one of the largest and best preserved complex of wetlands, grasslands and small forests in South America (TNC et al., 2005). Iberá harbours one of the largest populations of Marsh deer, estimated in about 5,000 individuals (Di Giacomo and Jiménez, unpublished data; see also Becacceci 1994; Soria et al, 2003, for previous and less updated population estimates)

Figure 2 and 3. Taken by Eugenia Acevedo and Ricardo Quintana.

References

BECACCECI, M.D. 1994. A census of marsh deer in Iberá Natural Reserve, its Argentine strnghold. Oryx 28: 131-134.

SORIA, A., HEINONEN FORTABAT, S. Y S. FABRI. 2003. Estimación poblacional de ciervo de los pantanos en los Esteros del Iberá, Corrientes, Argentina. Pp. 349-355 En: Alvarez, B. (coord.). Fauna del Iberá. Universidad Nacional del Nordeste. Corrientes. Argentina.

THE NATURE CONSERVANCY (TNC), FUNDACIÓN VIDA SILVESTRE ARGENTINA (FVSA), FUNDACIÓN PARA EL DESARROLLO SUSTENTABLE DEL CHACO (DESDELCHACO) Y WILDLIFE CONSERVATION SOCIETY BOLIVIA (WCS). 2005. Evaluación Ecorregional del Gran Chaco Americano (Gran Chaco Americano Ecorregional Assessment). Fundación Vida Silvestre Argentina. Buenos Aires, Argentina.

Acknowledgements

We thank Olegario Segovia and Omar Rojas for their first sightings and reports of the "ciervo blanco del Iberá", and Malena Srur for the map used in this note. This research was funded by The Conservation Land Trust

Ecoregional classification of white-tailed deer subspecies in Mexico

Salvador Mandujano[1*], Christian. A. Delfín-Alfonso[2,3] and Sonia Gallina[1]

[1] Red de Biología y Conservación de Vertebrados, [2] Red de Medio Ambiente y Sustentabilidad, Instituto de Ecología A. C., Carretera Antigua Coatepec No. 351, Congregación del Haya, Xalapa 91070, Ver., México. [3] Facultad de Ciencias Naturales, Universidad Autónoma de Querétaro, Querétaro, México.
* Send correspondence to this author: E-mail: salvador.mandujano@inecol.edu.mx

Abstract: In this short communication we report a classification of the 14 white-tailed deer subspecies into three ecoregions (North-eastern, Pacific and Central, and Gulf-Southern) in Mexico. The classification was based in the association between related groups of subspecies in function with the principal vegetation types. This ecoregional classification could have management implications.

An ecoregion is defined as a relatively large area of land or water that contains a geographically distinct assemblage of natural communities and environmental conditions (WWF 1999). Because ecoregions are defined by their shared biotic and abiotic characteristics, they represent practical units to conservation planning at global, continental, country and regional scales (Dinerstain *et al.* 1995). For example, ecoregions has been suggested for mule deer *Odocoileus hemionus* (Heffelfinger *et al.* 2003). The 11 subspecies of mule deer are distributed throughout western United States and the northern Mexican states. With this wide latitudinal and geographic range, mule deer occupy a great diversity of climatic regimes and vegetation associations, resulting in a set of behavioural and ecological adaptations. Within the geographic distribution of mule deer, however, areas can be grouped together into seven ecoregions, within which deer populations share certain similarities. For the white-tailed deer *Odocoileus virginianus*, Deckman (2003) classified the 16 subspecies in the United States into six regions with contrasting ecological conditions and management opportunities. The diversity among the ecoregions presents different challenges to deer managers and guidelines for managing populations and habitats considering these differences.

The white-tailed deer is the most widely distributed cervid in the American continent (Hall 1981). Thirty eight subspecies of the white-tailed deer have been described, 14 of which are found in Mexico (Smith 1991). This deer inhabiting throughout Mexico, except on the peninsula of Baja California and in some areas of northern Chihuahua and Sonora (Gallina *et al*. 2009). As a consequence, this cervid occur in different plant communities: temperate pine, oak and fir forests, mixed oak – pine forest, shrub land, tropical dry forest, semi-evergreen and evergreen tropical forests, sub-aquatic vegetation and secondary vegetation (Mandujano *et al.*, in press). Thus, the different subspecies present morphological, behavioural and ecological adaptations to these contrasting habitats or ecoregions. For example, subspecies in the southern latitudes are generally smaller in body size than those in the north, and those inhabiting open habitats appear lighter in colour and the males developed larger antlers widely spreading, than those in heavily forested habitats (Kellogg 1956).

The white-tailed deer is one of the most important game species for subsistence hunting (Mandujano & Rico-Gray 1991, Naranjo *et al.* 2004) and its exploitation has increased notably in Wildlife Conservation, Management and Sustainable Utilization Units (UMA) in Mexico (Villarreal 2009). However, from a trophy management perspective, only five of the 14 white-tailed deer subspecies enter into the current international trophy record books, such as those organised by the Boone and Crockett Club and Safari Club International (SCI) (Villarreal-Espino 2002). The CEFFSNL (Consejo Estatal de Flora y Fauna Silvestre de Nuevo León, México) recently proposed to SCI the inclusion of nine hunting regions, with the objective of recognising all of the 14 different subspecies of white-tailed deer in Mexico on an international scale as different sport hunting trophies (Villarreal 2009). The hunting regions were defined on the basis of antler size, in such as way that males of the different subspecies are competitive within any given geographic region with particular ecological characteristics.

Considering the distribution map of this species (Hall 1981) and the floristic provinces (Rzedowski & Reyna-Trujillo 1990) (Figure 1), we estimated the surface that each subspecies occupied in the different vegetation types (Table 1). Later, using multivariate

cluster analysis we identified three groups of subspecies inhabiting contrasting geographic and vegetation types (Mandujano *et al.*, in press). We propose each group as different ecoregion: 1) Ecoregion I North-eastern include *O. v. texanus, O. v. miquihuanensis,* and *O. v. carminis* inhabiting principally xerophytic shrub land; 2) Ecoregion II Pacific and Central include *O. v. couesi, O. v. mexicanus, O. v. sinaloae, O. v. oaxacensis* and *O. v. acapulcensis* occurs in temperate pine-oak forest and

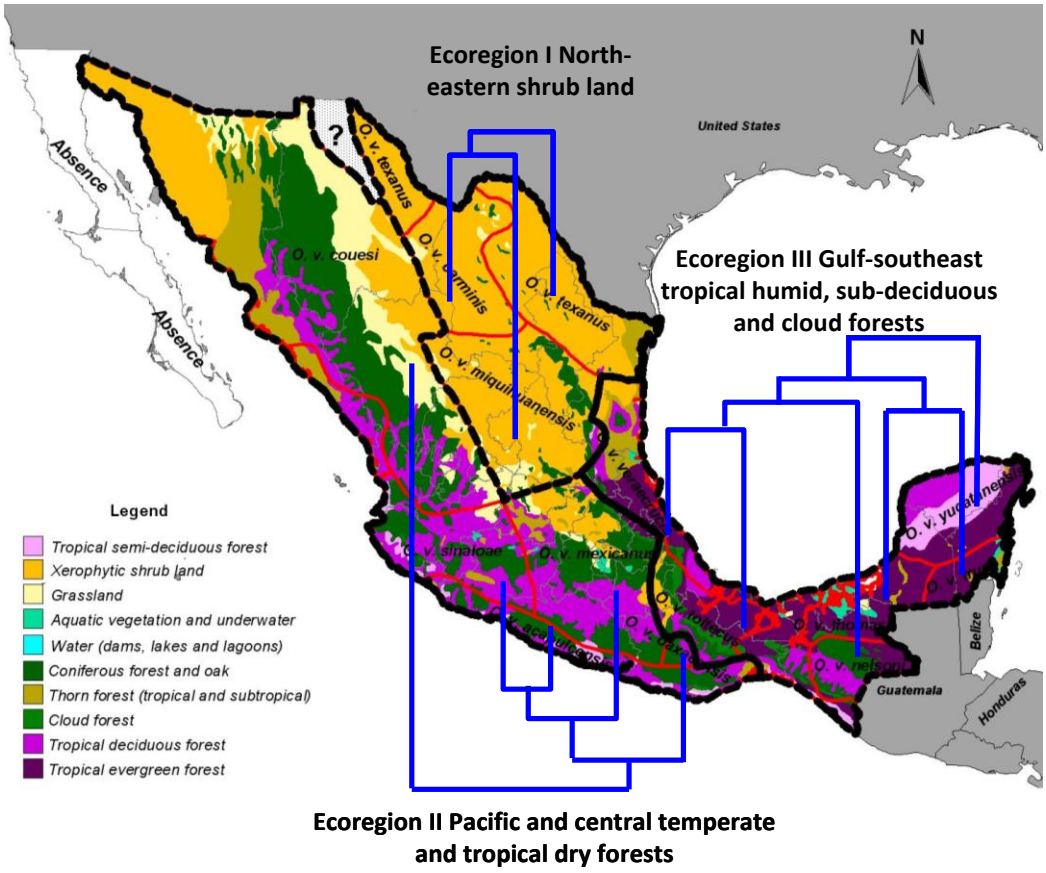

Figure 1. *Ecoregional classification proposal of subspecies of white-tailed deer in Mexico, using the map of distribution proposed by Hall (1981) and floristic provinces by Rzedowski and Reyna-Trujillo (1990).*

tropical dry forest; and 3) Ecoregion III Gulf and southern include *O. v. veraecrucis, O. v. thomasi, O. v. toltecus, O. v. nelsoni, O. v. truei* and *O. v. yucatanensis* associated with tropical rain forest, semi-deciduous forest, and cloud forest. In the Figure 1 we present a synthesis of the proposal ecoregions of white-tailed deer subspecies for Mexico.

Table 1. Distribution area (km^2) of each subspecies of white-tailed deer in different vegetation types according to the principal vegetation types in Mexico.

Subspecies	Temperate forest	Thorn forest	Cloud forest	Tropical dry forest	Semi-deciduous tropical forest	Tropical wet forest	Grassland	Xerophytic shrub land
acapulcensis	26,592	2,408	1,225	28,986	8,691		312	
carminis	1,429						4,107	88,487
couesi	173,891	56,989		57,725			110,364	149,177
mexicanus	66,415	6,501	1,970	55,707	811	4,183	4,833	28,955
miquihuanensis	18,259	1,608	142	2,038	350		12,839	139,986
nelsoni	15,814		949	10,749	24	12,747		
oaxacensis	5,232		105	2,483				
sinaloae	39,765	12,455	683	70,861	6,221		2,854	
texanus	1,111	8,820		237			2,787	153,911
thomasi	6,713	1,951	3,675	5,687	4,998	65,725	2,844	
toltecus	13,601		7,556	7,789		26,767		6,270
veraecrucis	3,751	17,268	1,524	13,140	123	28,339	674	9,597
yucatanensis		859		16,018	33,104	31,709		
truei		2,222		430		19,924		

These ecoregions could have management implications. For example, from a hunting perspective, the ecoregions embrace adequately the nine hunting regions propose by the CEFFSNL for Mexico (Villarreal 2009). Given the lack of data supporting the validity of the biogeographic limits of the subspecies, there should be strict control over the deliberate, or even accidental, movement of subspecies to localities where they have not been historically reported. From a translocation perspective, this classification suggests that it is more critical to move individuals of one subspecies outside of its ecoregion. For example, is common the translocation of individuals of *O. v. texanus* to regions dominate by temperate and tropical forests (Galindo-Leal & Weber 1994). Clear delineation of the boundary among subspecies is an issue that the Mexican governmental offices (SEMARNAT, DGVS, CONANP, CONABIO) and international agencies such as Safari Club International must address in order to maintain the integrity of the different geographical haplotypes and for trophy record books. Therefore, the classification in hunting regions and ecoregions could be a complementary issues to management this species.

The proposal ecoregions are based in actual definition and range of white-tailed deer subspecies. However, throughout the geographic range of white-tailed deer in Mexico,

we see a lot of variation in body size, pelage colour, antler shape, and other attributes (Kellogg 1956, Villarreal 2009). As was the case with mule deer (Heffelfinger *et al.* 2003), the geographic range of several white-tailed deer subspecies was drawn somewhat arbitrarily. In fact, the supposed differences between subspecies were often based on subjective opinions regarding characteristics or measurements of only one or a few specimens. Future studies on morphological, genetics and phylogeographic analysis, could provide robust data to support the delimitation of meaningful ecological management units on an ecoregion scale. Phillimore and Owens (2006) suggest that subspecies may be of considerable conservation value, as proxies for the sub-structure found within species. They suggest that the conservation value of subspecies is likely to be greatest in situations where molecular data is absent, a scenario that is encountered in the white-tailed deer in Mexico. However, there is an urgent need to integrate biographic models and molecular studies (e. g., Moodley & Bruford 2007) as a framework for the conservation of white-tailed deer at the national and continental scale. Thus, it is imperative to obtain data on the geographical variation of white-tailed deer throughout the country.

References

DECKMAN, D. 2003. North American White-tailed deer: distributions and subspecies. Whitetailes Unlimited, Inc. Sturgeon Bay, WI. 8 pp (on line: http://www.whitetailsunlimited.com/i/p/bk_distribution.pdf)

DINERSTEIN, E., D. M. OLSON, D. J. GRAHAM, A. L. WEBSTER, S. A. PRIMM, M. P. BOOKBINDER, P. MARNIE, and G. LEDEC. 1995. Conservation assessment of the terrestrial ecoregions of Latin America and the Caribbean. World Bank, Washington, D.C.

GALINDO-LEAL, C., and M. WEBER. 1994. Translocation of deer subspecies: reproductive implications. Wildlife Society Bulletin 22: 117-120.

GALLINA, S., S. MANDUJANO, J. BELLO, H. LÓPEZ-FERNANDEZ, and M. WEBER. 2009. White-tailed deer *Odocoileus virginianus* (Zimmermann, 1780). Pp. 101-118, In: González. S. (ed.), Neotropical Cérvidos. Deer specialist Group, IUCN. (en prensa).

HALL, E. R. 1981. The Mammals of North America. John Wiley and Sons. New York, NY. 1181. pp.

HEFFELFINGER, J. R., L. H. CARPENTER, L. C. BENDER, G. L. ERICKSON, M. D. KIRCHHOFF, E. R. LOFT, and W. M. GLASGOW. 2003. Ecoregional differences in population dynamics. Pp. 63-91, in: deVos Jr, J. C., M. R. Conover, and N. E. Headrick (eds.), Mule deer conservation: issues and management strategies. Berryman Institute Press, Logan, UT.

KELLOGG, R. 1956. What and where are the whitetails?. Pp. 31-55, *in*: W. P. Taylor (ed.), The deer of North America. The Stackpole Company, Harrisburg, Pennsylvania.

MANDUJANO, S., and V. RICO-GRAY. 1991. Hunting, use, and knowledge of the biology of the white-tailed deer, *Odocoileus virginianus* (Hays), by the maya of central Yucatan, Mexico. Journal of Ethnobiology 11: 175-183.

MANDUJANO, S., C. A. DELFIN-ALFONSO, and S. GALLINA. Comparison of geographic distribution models of white-tailed deer *Odocoileus virginianus* (Zimmermann, 1780) subspecies in Mexico: biological and management implications. Therya 1 (1): in press.

MOODLEY, Y., and M. W. BRUFORD. 2007. Molecular biogeography: towards an integrated framework for conservation Pan-African biodiversity. PLoS ONE 5: e454

NARANJO, E. J., M. M.GUERRA, R. E BODMER, and J. E. BOLAÑOS. 2004. Subsistence hunting by three ethnic groups of the Lacandon forest, México. Journal of Ethnobiology 24: 233-253.

PHILLIMORE, A. B., and I. P. F. OWENS. 2006. Are subspecies useful in evolutionary and conservation biology? Proceedings of the Royal Society B 273: 1049-1053.

RZEDOWSKI, J., and REYNA-TRUJILLO, T. 1990. Divisiones florísticas. Escala 1:8’000,000. En: Tópicos fitogeográficos (provincias, matorral xerófilo y cactáceas). Atlas Nacional de México. Vol. II. Instituto de Geografía, UNAM. México.

SMITH, W. P. 1991. *Odocoileus virginianus*. Mammalian Species 388: 1-13.

VILLARREAL, J. 2009. Propone el CEFFSNL regionalización cinegética de venados

cola blanca mexicanos para libro récords internacionales del SCI. Boletín Cuenca Palo Blanco, CEFFNL 4: 3-7.

VILLARREAL-ESPINO, O. 2002. El *grand slam* del venado cola blanca mexicano, una alternativa sostenible. Archivos de Zootecnia 51: 187-193.

WORLD WILDLIFE FUND. 1999. WWF in action. Ecoregion-based conservation. [WWF's Global Conservation Programme 1999/2000]. Available from: http://www.panda.org/resources/publications/sustainability/global/eco-based.html (accessed June 19, 2002).

Deer Symposium -10th International Mammal Congress in Mendoza –Argentina.

Deer Symposium: Mauricio Barbanti Duarte, Mariano Merino, Sonia Gallina, Jesús Maldonado, Susana González y Patricia Black.

Management and Conservation strategies for the Neotropical deer

Dr. Susana González
Unidad de Genética de la Conservación, IIBCE-Facultad de Ciencias/UdelaR, Montevideo, Uruguay, *Deer Specialist Group- SSC-IUCN*

Deer are one of most diverse large mammal group containing more than 60 species. The Neotropics are one of this family's hotspots for diversity, however the evolution and taxonomical classification of the Cervidae in this region remains unclear because the fossil record is sparse and incomplete. The deer, of South America's tropic and sub-tropics face a multitude of threats, especially over hunting and habitat destruction. They play a vital role in vulnerable ecosystems throughout the Neotropics as ecological

keystones critical to seed dispersal, structuring habitat, and maintaining wild food chains. Furthermore, Neotropical ungulates are of fundamental socioeconomic importance to rural communities who rely on them for sustenance and for income from the sale of wildlife products – although such commercial and subsistence use is often unsustainable. We will be including in the symposium key issues of the Deer species in the Neotropics. This will focus on three major topics: (i) identifying and addressing major knowledge gaps, (ii) panel on deer taxonomy, and (ii) how can biologists better contribute to regional, national, and local management and conservation or deer.

Advances in the study of argentine deer during the last decade and impact on their conservation.

Mariano L. Merino. División Zoología Vertebrados del Museo de La Plata. UNLP, CICPBA. Paseo del Bosque s/n. La Plata (B1900FWA), Buenos Aires, Argentina.
mlmerino@fcnym.unlp.edu.ar

At present, fifty-one species of deer are recognized worldwide, 16 of which correspond to Neotropical species; in Argentina, deer are currently represented by eight species in the genera *Mazama* (3 spp.), *Hippocamelus* (2 spp.), *Blastocerus*, *Ozotoceros* and *Pudu*. These species inhabit a wide variety of environments, and some of their populations face serious survival problems. All of the Argentine species are categorized as threatened according to the red lists, both at national and international level. This has prompted intense conservation efforts during the last 20 years, allowing new approaches to diverse aspects of knowledge of these species and generating information that may be used through adaptive management as feedback and reliable support for effective conservation tasks. This work presents an updated account of the population status of Argentine deer. The relationships between the generation of information on diverse aspects of deer biology by the scientific community, the conservation measures and their implementation, are analyzed. The advances made at different levels in both research and conservation measures are discussed with respect to the national conservation plans and the action plan elaborated by the IUCN Specialist Group. On the basis of the latter analysis, information voids that should be the focus of future research are detected.

Mazama temama Status and Distribution

Sonia Gallina Tessaro[2] **Joaquín Bello Gutiérrez**[1] **y Carlos A. López González**.
[1]División Académica de Ciencias Biológicas, Universidad Juárez Autónoma de Tabasco Km. 0.5 carretera Villahermosa- Cárdenas, Entronque a Bosques de Saloya CP 86039 Villahermosa, Tabasco, México. joaquin.bello@cicea.ujat.mx,
[2] Instituto de Ecología, A.C., km 2.5 Carretera Antigua a Coatepec No. 351, Congregación el Haya, Xalapa, Veracruz, CP 91070, Mexico.sonia.gallina@inecol.edu.mx

Brocket deer *Mazama temama* is a least known deer in the neotropic. Our objective was to analyze the current information to determine their status and distribution in México and Central America. *M. t. cerasina* occurs in north and central Belize, Guatemala, El Salvador, Costa Rica, Nicaragua and Honduras. *M. t. reperticia* in Panama, and northern Colombia, but this one needed to be confirmed. In México there are records along the states of the Gulf of Mexico and the Pacific Ocean: Tamaulipas, San Luis Potosí, Veracruz, Oaxaca, Chiapas, Tabasco, Campeche and Quintana Roo, also it is found in Queretaro. Total population size is unknown. The density found in few localities in Mexico, in the tropical forests was 0.09 deer/km² and 0.25 deer/km², in a protected area of Q. Roo was 1.7 deer/km²; and in a cloud forest 0.32 deer/ km². There are no reliable estimates for Central American countries and Colombia. Abundance indexes have been estimated from track counts (0.1 to 0.6), in areas where the species is the only Mazama, but where it is sympatric with *M. pandora* the index for both species was > 1.8 track/km. Brocket deer is considered representative of well-preserved tropical forest sites, but it can be found in transformed sites such as secondary forests and croplands. Habitat fragmentation by human activities and natural disasters, such as wildfires and hurricanes could be factors that influence their distribution. Hunting for cultural activities and food affect their population levels, behavior and habitat use. Other threats include tourism, and pest control in bean crops. It is necessary to get more information on their habitat status, distribution and abundance and the importance for local communities in terms of use, harvest pressure and crop pest control to know the real status because it may be endangered in some localities

Figure: "Temazate Rojo"(Mazama temama), taken by Joaquin Bello

Figure: "Temazate Gris" (Mazama pandora), taken by: Rosa Maria González Marín

Is *Mazama americana* a superspecies?

Jose Mauricio Barbanti Duarte*, Vanessa Veltrini Abril, Elias Alberto Gutierrez Carnelossi, Maurício Barbosa Salviano, Marina Suzuki Cursino, Javier Adolfo Sarria-Perea, Alexandre Vogliotti, Allyson Diaz Koester, Eveline dos Santos Zanetti & Susana González
Núcleo de Pesquisa e Conservação de Cervídeos, Faculdade de Ciências Agrárias e Veterinárias, Universidade Estadual Paulista. CEP 14884-900 Jaboticabal – SP, Brazil
barbanti@fcav.unesp.br

How many deer species do we have in South America? It is not an easy question to solve with the actual knowledge, especially due to the complex taxonomy of the genus *Mazama*. However, the red brocket (*Mazama americana)* constitutes the most amazing case of a cryptic species system of the Cervidae. There is a great chromosome and molecular variation between animals from different regions of South America. The goal of the project is to analyze the complex taxonomy of the red brocket group by examining some karyotype variants (cytotypes) to determine phylogeographical patterns and the speciation processes involved. The research is being carried out in the field and in the captive breeding facilities of UNESP. In the field we are surveying two populations in Brazil using radio telemetry and camera traps, with the aim to describe if there are ecological differences between them. In captivity we are crossing some of these cytotype variants to evaluate the fertility status of the hybrids and to discover if there is post zygotic reproductive isolation between them. Up to now we successfully produced seventeen F1 animals (hybrids and pure). The preliminary results showed differences between pure and hybrid animals in terms of fertility and functionality of the ovary and testis. The synaptonemal complex of the spermatocytes showed anomalous chromosome pairing in the hybrids. The ovaries of the hybrids showed malfunction with anomalous corpus luteum and unviable oocytes during in vitro fertilization. Meanwhile, there are no significant differences in the activity patterns between the two surveyed field populations of the species. These preliminary results support that chromosome differences between populations can generate post reproductive isolation explaining the existence of cryptic species, justifying to consider the status of the red brockets *Mazama americana* in the superspecies concept.

Neotropical deer: current situation and IUCN Red List conservation recommendation.

Black-Décima, Patricia. Facultad de Ciencias Naturales e Instituto Miguel Lillo, Universidad Nacional de Tucumán, Miguel Lillo 205, 4000 Tucumán, Argentina. pblack@csnat.unt.edu.ar

The Global Mammal Assessment (GMA) completed in 2008 updated the information available and conservation recommendations on the now recognized 18 species of Neotropical deer. This represents an increase of 4 species, all in the genus *Mazama.* A great deal of new information has been provided although much is still lacking; 4 species were removed from the category Data Deficient and reclassified, although 3 still remain. Red List recommendations changed for 6 species and stayed the same for 8. The new Red List categories show the following situations for the species: Endangered: 1; Vulnerable: 8; Near Threatened: 1; Least Concern: 5; Data Deficient: 3. These statistics reveal the dangerous situation of over half of Neotropical deer species; the principal threat is habitat loss, cited for 17 species, followed by over-hunting and poaching in 12 cases. Further important threats are predation by domestic and feral dogs (8 cases) and fragmentation of populations as a result of habitat loss. In general, the most threatened deer are the largest (4 species), with the exception of the North American species of *Odocoileus*, and the smallest (6 species). The most threatened species is the huemul (*Hippocamellus bisulcus*), which is in a very dangerous situation with only 1000-1500 individuals remaining; the vulnerable species include swamp deer (*Blastocerus dichotomus*), taruca (*H. antisensis*), 4 small species of brocket deer (*Mazama* sp.) and the 2 species of pudu (*Pudu* sp.), while the pampas deer (*Ozotocerus bezoarticus*) is near threatened. The principal recommendations cited for the conservation of these species are development of management plans for the respective species and further research to define better distribution, abundance and population status. Other recommendations include conservation education of local populations, strengthening of controls over protected areas and captive breeding for the most endangered.

The 7th International Deer Biology Congress

7IDBC will be held in the Huilo Huilo Reserve, township Panguipulli, **southern Chile, August 1-6, 2010**.

The organizers are Verónica Toledo (Universidad de Chile and Huilo Huilo Foundation), Andrés Charrier (Pontificia Universidad Catolica de Chile), and Werner Flueck (National Council for Scientific Research - CONICET, Argentina).

The congress will cover all aspects of deer science. Session topics will include:

1. Evolution and Conservation Genetics
2. Reproductive physiology
3. Antler biology
4. Nutrition
5. Behavior: free ranging and captive deer
6. Health and disease
7. Population dynamics: reproduction and mortality factors
8. Deer production
9. Management

Ecosystem maintenance for healthy deer populations
Overabundant and invasive species
Threatened species: ex-situ and in-situ
The role of hunting in management
Welfare and husbandry of farmed deer

10. Conservation of Neotropical Deer

The confirmed plenary speakers and their topics include:

Robert Warren (USA): *Deer overabundance*; **Ludek Bartos** (Czech Republic): *Behavior*; **David Saltz** (Israel): *Captivity and reintroduction*; **Chunyi Li** (New Zealand): *Antler biology*; **Gordon Dryden** (Australia): *Nutrition*

Workshop:

Policies and Management of overabundant deer (native or exotic) in protected areas. Confirmed invited speakers: keynote address by **Graham Nugent** (New Zealand), **John Parkes** (Australia), **Michael Bilecki** (US National Park Service), **William McShea** (USA), **John Waithaka** (Canada).

Proposals for workshops and other activities are open for consideration by the Scientific Steering Committee.We invite you to visit and pre-register at http://IDBC.deerlab.org

The Organizing Committe

New Coming soon...

NEOTROPICAL CERVIDOLOGY

Four years ago the Neotropical section of the IUCN/SSC Deer Specialist Group initiated an ambitious project: to compile and update our knowledge of all native deer species of Latin-America. The aim is to publish a book summarizing the state-of-the-art of our knowledge on Neotropical deer. Drs. José Maurício Barbanti Duarte (UNESP) and Susana González (IIBCE-UDELAR) are the main editors. Each co-author and chapter editor is an expert in his/her own right. All participants are experienced professionals in the field in deer research. The book has 41 chapters and 400 pages.

José Maurício Barbanti Duarte & Susana González

- 2010