Canid Conservation in the Neotropics

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Conveners: Claudio Sillero (University of Oxford, UK), Andrés Novaro (WCS, Argentina) and Karen DeMatteo (University of Missouri-St. Louis, USA)

The Neotropics harbour 11 species of canidae, nine of which are endemic to this ecozone. These include the Critically Endangered Darwin's fox (*Pseudalopex fulvipes*), and the Near Threatened bush dog (*Speothos venaticus*), maned wolf (*Chrysocyon brachyurus*), Sechuran fox (*P. sechurae*) and short-eared dog (*Atelocynus microtis*). While most Southern Cone species are well studied, there is a dearth of information on some of the forest-dwelling species, which are the most threatened by habitat loss. The purpose of this workshop was to present recent information on the biology and conservation of canids in the Neotropical region and discuss their current distribution, status, threats, canid-human conflict and other issues affecting these taxa.

Presentations:

Setting up conservation priorities for threatened Neotropical canids.
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Contemporary canids are the most widely distributed family of the Carnivora, with members on every continent besides Antarctica. The Neotropics support 11 out of 35 extant canid species, of which nine species, and four genera (*Chrysocyon*, *Otocyon, Pseudalopex, Speothos*), are restricted to South America. Another South American endemic, the Malvinas fox (*Dusicyon australis*), was the only Canidae to go extinct in recent history. While most Neotropical canids are widely distributed, several *Pseudalopex* species in the Southern Cone are persecuted as livestock raiders, others have very restricted distributions. The Darwin's fox (*Pseudalopex fulvipes*) is endemic to coastal forests in southern Chile, the hoary fox (*P. vetulus*) is endemic to Brazil's cerrado, whereas the Sechuran fox (*P. sechurae*) is a restricted to the costal deserts of north Peru and south Ecuador. Due to its small population size and disjunct distribution the Darwin's fox is listed as Critically Endangered by the IUCN, and four species are listed as Near Threatened. The short-eared fox (*Atelocynus microtis*) and bush dog (*Speothos venaticus*) are two forest specialists of particular concern, due to the rapid fragmentation of their forest habitats and our insufficient understanding of their biology. This review will set the scene for a debate on research and conservation priorities for these threatened species in the Canid Conservation in the Neotropics Workshop.

Ecological variability and adaptability to anthropogenic alterations in Pampas foxes.
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The Pampas fox, *Lycalopex gymnocercus*, is a medium-sized South American fox, widely distributed and actively persecuted by men for preying upon livestock. Until a few years ago the information about it was scarce; its taxonomic situation continues uncertain and management measures are based on poor population monitoring. Recently several studies have been carried out on Pampas foxes in Buenos Aires Province, one of the most modified regions of Argentina. Our objective is to review the state of knowledge on the species and, considering the typical ecological plasticity of canids, analyze the variations in its diet, habitat use, activity patterns and spatial organization. We reviewed data from five areas. Trophic ecology was the most analyzed topic (all sites) and fox diet showed similarities between areas with a similar degree of modification. The principal prey items were rodents, orthoptera, coleoptera and birds; carrion was important in two areas (providing a supplementary food of anthropic origin). In the four areas where habitat use was studied foxes tended to prefer natural habitats in spite of the fact that these were, in some cases, densely vegetated (ej: *Celtis tala* woodland). Foxes were most nocturnal in modified areas, and their activity patterns (analyzed

only in two areas) appeared to be affected more by human disturbance than by seasonal patterns or prey activities. Home range size (213,3±136.8 ha) did not vary between two areas with different human impact, although some variation was observed in its use and in the size of spatial groups, which ranged from pairs to small groups. Although the information about Pampas foxes is not abundant, these results show its capacity of adjusting behaviorally and ecologically to the environmental variations introduced by men. On the other hand, the preference for natural habitats suggests that there may be a limit to its flexibility.

Comparative ecology of the hoary fox and the crab-eating fox in the Brazilian cerrado.
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The hoary fox (Pseudalopex vetulus) is a small canid (2.5 – 4 kg), endemic to open landscapes of Cerrado. In contrast, the crabeatingfox (Cerdocyon thous) is larger (5 – 8 kg) and presents a wider distribution. We studied foraging group size, parental behavior, and food habits of these species in cattle farms in Goiás State, Center-West Brazil. Foraging group size and parental behavior were studied by direct observation of wild animals, and food habits through scat analysis, from January 2003 to November 2008. Crab-eating foxes foraged in pairs or family groups more frequently in the wet season and individually more frequently in the dry season whereas hoary foxes foraged mostly individually throughout the year. Crab-eating foxes presented a more diversified diet that included seasonally available food items such as fruit, insects (Orthoptera and Coleoptera) and vertebrates (Cricetidae and Squamata), while hoary foxes ate predominantly termites (Isoptera). Two families of crab-eating foxes and five families of hoary foxes were found along the study. Crab-eating foxes never allowed observations for long periods during parental care, but in hoary foxes, parents were observed chasing away intruders (domestic dogs and people) from the nest and males were observed bringing food (fruit and vertebrates) to the cubs. The seasonal variation in foraging group size of crab-eating foxes may be related to food resources availability and distribution and to the exploration of different food items in each season. The predominantly insectivorous diet of adult hoary foxes does not constrain providing food for the cubs, once parents bring larger food items to the nest. Presently, we aim to capture and monitor foxes to know their home-range and juvenile dispersal period, and to describe the influence of domestic dogs on their ecology/health. Until now, six crab-eating foxes and one hoary fox were captured, but no one is being monitored.

Population ecology of the maned wolf of central Brazil.
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The maned wolf inhabits the savannah-like Cerrado of Brazil. Although the large degree of conversion and degradation of Cerrado habitat poses a threat to this wide-ranging carnivore, little is known about maned wolf population ecology. Emas National Park (ENP) and its agricultural surroundings harbour a key maned wolf population for central Brazil. Here, we captured maned wolves and monitored them using radio-telemetry in ENP over a 13-year period. We used live capture data in combination with closed mark-recapture models to obtain estimates of population density. Radio-telemetry data yielded information about spatial organization of the population. Based on being located alive or dead over the years, we used open population mark-recapture models to obtain the first systematic estimate of survival rate for the species. With 5.19 individuals/100 km², ENP supported 60 to 70 adult maned wolves[1]. While adults were organized in mating pairs with common territories of approximately 80km², members showed little intra-pair sociality, maintaining a mean distance of >0.5 km when located simultaneously[2]. Mean survival rate of adult maned wolves was 0.63 (SE=0.06). Survival rate fluctuated over time, but it did not differ between sexes, nor was it significantly different from sub-adult survival rate of 0.64 (SE=0.15). The maned wolf population of ENP and its surroundings seems well adapted to the mosaic of natural and agricultural landscapes characteristic of the region. However, the expansion of sugarcane poses unknown threats to this open habitat species. Generally occurring at low population densities, even relatively large reserves alone do not protect long-term viable maned wolf populations. Therefore, long-term conservation of the species depends on land

management outside of reserves. Information on demographic rates allows for well-informed population viability analyses to predict the maned wolf's future under different land use change scenarios.

[1] Silveira, L., Furtado, M.M., Tôrres, N.M., Sollmann, R., and Jácomo, A.T.A. 2009. Maned wolf density in a Central Brazilian grassland reserve. Journal of Wildlife Management 73:68–71.
[2] Jácomo, A.T.A., Kashivakura, C.K., Ferro, C., Furtado, M.M., Astete, S.P., Tôrres, N.M., Sollmann, R., and Silveira, S. in press. Home range and spatial organization of maned wolves in the Brazilian grasslands. Journal of Mammalogy.

Maned wolf conservation strategies in the Serra da Canastra region, Brazil.
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The data obtained from the Maned Wolf Project in the Serra da Canastra region, southeast of Brazil have been used for ongoing conservation practices. As a first step, we conducted a general evaluation in order to define the conservation actions more suitable for the region and to address the main threats to the species survival locally. Within this analysis, we aim to observe how local people perceive their environment and the wolves. Thus we identified three 'necessities' to address in order to conduct a wildlife conservation program: (1)prevention of domestic dogs diseases; 2)management of livestock depredation by maned wolves; (3)people awareness improvement towards environmental themes. We collected samples from domestic dogs, tested for the main diseases and later vaccinated 500 dogs yearly, over three years, in the rural areas. Since this number represents only a part of their population, we concentrate our efforts on areas of higher density of dogs. Concerning conflicts, we learned that the percentage of losses by depredation varied among farms as well as the landowners' tolerance to the wolves. We installed chicken coops to prove the effectiveness of preventive methods against predators, lowering on 80% the depredation rate after installing the units. To motivate people to discuss their own problems in order to raise their awareness, we provide opportunities for debating local environmental issues. Thus, we conducted a collective book production on the region and implemented the 'Cine-Lobo'. The «Community Book» consisted of a gathering of 30 locals that worked together writing about their culture, history, environment, and economy. The 'Cine-Lobo' consists in the exhibition of 15-minutes films produced by the project on the wolf, local nature and conflicts, presented at schools, farms, and villages. and followed by circuit movies and a general discussion. We presented 30 sessions gathering over 2,200 people in the region.

Maned wolf biology and ecology: insights from a 5-year study in the Serra da Canastra National Park (SCNP), Brazil.
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The objectives of this project were to study maned wolf biology and to determine the impact of anthropogenic pressures on this species. Forty-three wolves were captured and radiocollared, and biological samples (blood, urine, feces and hair) were collected for genetic and health evaluations. Feces were also opportunistically collected for corticoid metabolite analysis. Home range sizes did not vary between the wet and dry seasons, or between genders (range: 15.56 to 114.29 km^2, mean ± SEM: 50.97 ± 32.47 km^2). However, reproductive seasonality significantly influenced home range size of females with smaller areas observed during the reproductive season. Individuals living in protected areas had larger home ranges than those living on farms. The latter tended to forage and use the remaining natural vegetation, suggesting that wolves may be able to adapt to habitat conversions if some natural areas are still present. Preliminary results of the genetic analyses (n = 16) showed that the wolf population in this region consists of three distinct families plus at least four unrelated individuals (possibly disperses from other areas). Serological analysis revealed that wolves (n = 31)

had been exposed to canine adenovirus, corona virus, canine distemper and canine parvovirus, while a high proportion of the domestic dogs living on farms (n = 50) also tested positive for these pathogens. Corticoid excretion varied among sampling locations ($P < 0.05$), with the highest baseline concentration observed in samples collected on farms (127.8 ± 18.2 versus 26.2 ± 1.1 ng/g feces). Seminal traits of three captured wolves were similar to those previously reported for captive individuals. Overall, our findings suggest that although anthropogenic pressures may slightly impact the ecology, behavior and (perhaps) reproduction of maned wolves, 'stress' associated with direct or indirect interaction with humans and domestic species may cause an increase in disease susceptibility and poor health.

Agricultural expansion and the plight of the maned wolf (*Chrysocyon brachyurus*) in the Brazilian Cerrado.

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Emas National Park (ENP), Brazil, has historically been considered a stronghold for the survival of the maned wolf *Chrysocyon brachyurus*, which is endemic to the grasslands of central South America. Land clearing and agricultural intensification outside of ENP have been rapid and expansive and the Park now stands as a virtual island in a sea of agriculture. This project seeks to assess how these land use practices are affecting this critical population of maned wolves. We employ a number of novel, noninvasive methods to examine the population status and physiological health of the wolves in ENP and the surrounding region. Specially-trained detection dogs were used to non-invasively acquire more than 800 scat samples of maned wolves across a diversity of habitat conditions. DNA analysis of the samples was used to positively identify the species, gender, and number of unique individuals in the population. Spatial analyses and resource selection functions were applied to understand ranging behavior and habitat preferences. Steroid and thyroid hormones extracted from the samples are enabling us to establish profiles of the stress, reproductive, and nutritional health of the wolves in relation to their distance from the park, habitat use, diet, and parasite load. Together, these novel methods are providing critical information on the status and physiological health of an at-risk species on a scale that has rarely been achievable for wildlife. Such information will contribute to the conservation and management of maned wolves, simultaneously providing an important model for similar applications to other free-living, threatened or endangered species.

What's new with the rare and elusive bush dog (*Speothos venaticus*)?

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Lacking knowledge of the basic ecological requirements of the bush dog (*Speothos venaticus*) has meant that developing conservation strategies for this small, social, neotropical canid has been impossible. While a few field studies have successfully studied the bush dog either directly or indirectly, the majority of information about the species' ecology is based on opportunistic field observations. These observations and knowledge from carnivore conservationists allowed for the first comprehensive analysis of the bush dog's current distribution, basic ecology, abundance and status, current public and governmental attitudes towards the species, and identification of species-specific conservation efforts. The complexity of the bush dog's ecology, vulnerability to disease and poaching, and association with partially or fragmented habitat (20% of locations) suggest that widespread destruction of natural resources and lack of legal reinforcement are the greatest threats facing the bush dog. Long-term survival of the bush dog will likely depend on increased protection, public education campaigns, and additional field data. With the latter, efforts to collect detailed ecological data on the bush dog continue with researchers using both standard field techniques, such as radio collars, and innovative noninvasive techniques, such as detection dogs, genetics, and GIS analyses. The use of noninvasive techniques has tremendous potential with rare species because it eliminates the dependence of target species visitation rate and switches the focus to locating evidence, such as scat, associated with the natural behaviour and movement patterns of the species. Initial trials using noninvasive techniques have demonstrated that they can provide species-specific data on the bush dog despite the rugged terrain and dense forest vegetation they may occupy. The ability to effectively gather much needed ecological data over large areas would allow comprehensive conservation strategies to be developed for the bush dog.

The ecology of the bush dog: critical information for species-specific conservation strategies and proposition of new conservation areas in the Mato Grosso State, Brazil. Edson De Souza Lima, Maria Luisa S.P. Jorge*, Rodrigo Jorge, and Ronaldo Morato. malu.jorge@vanderbilt.edu – Vanderbilt University, USA.

The bush dog, *Speothos venaticus* is one of the most poorly known wild canids from the Neotropics due to their natural rarity and elusive behavior. It occurs in the Mato Grosso State (MT, Brazil), where natural habitats have been removed at astonishing rates in the last 10 years. Field data about their spatial requirements, dispersal patterns, diet preferences, reproductive patterns and mortality are urgent, especially from regions where negative anthropogenic impact has been greatest. Our research team is currently monitoring a group of 10 individuals (2 old adults, 3 young adults and 5 juveniles) since May 2008 in Agua Boa, MT, Brazil. Agua Boa district is in the Cerrado biome (one of the global hotspots) and close to the Amazonian arc of deforestation. Nowadays, it is dominated by private land, with cattle ranching and soy plantations, with few islands of native vegetation near large river and in rougher terrains. The group of bush dogs was captured inside a farm of soy plantation. After four months of monitoring, their estimated home range is in the order of 100-200 km² (MPC 100%: 164 km²; MPC 95%: 146 km²; Kernel 95%: 230 km²; Kernel 75%: 93 km²), which supports the idea that they need large areas to survive. Even though inside a farm, they spend most of their time, and find their preys in the few areas of native habitat, and only use the plantations to cross from one natural patch to another. Further short-term results will refine data on home range and habitat use and hopefully provide critical information about group dispersal dynamics. In the long-term, we expect to capture and monitor other groups, as well as develop an efficient and rapid method for density estimation (camera-trapping with a specific bush dog lure) and better understand pathogen transmission between bush dogs and domestic carnivores. Our results should be critical to help design a species-specific conservation strategy for bush dogs and to propose significant conservation areas in the Agua Boa region and surrounding areas, where the native vegetation continues to be removed and replaced by cattle ranching and soy plantations.

Tribulations of long-term and large-scale monitoring of hunted canids in the developing world. Andres Novaro*, M. Funes, A. Travaini, D. Birochio, and G. Porini. anovaro@wcs.org - WCS-CONICET, Argentina.

Large scale monitoring of population trends is necessary to assess the status of species, determine effectiveness of conservation and management measures, and adapt these measures when necessary. For species that are hunted for commercial purposes, monitoring must be maintained through time, beyond periods of intense hunting, because populations can decline even after commercial hunting pressure is removed and also because monitoring provides a baseline for when intense hunting is resumed. We assess factors associated with success of long-term monitoring programs of canids and other wildlife around the world and report on a monitoring system implemented during the last 20 years for canids in Argentina, which are also hunted due to conflicts with livestock. Successful monitoring has been implemented when financial mechanisms are formally established by government agencies and leaders of these agencies can develop long-term policies that outlast their positions. Canid fur exports from Argentina during the last 30 years have ranged between 1.2 million and a few thousand a year, driven mostly by changes in the demand for fur. Canid monitoring in Argentina was funded by local governments and research institutions in the 1980s and 1990s. In 2006 a legal mechanism was established by the federal government to fund monitoring of canid densities with resources from fur exports allocated to a trust fund. This system can be maintained when fur exports are high. We discuss alternative mechanisms to implement long-term monitoring of hunted canids that can be sustained in spite of market changes.

Posters:

Conservation perspective on maned wolf *Chrysocyon brachyurus* in Argentina.
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Between 1982 and 2008 the IUCN has categorized *Chrysocyon brachyurus* (MW) first as Vulnerable, then as Lower Risk/Near Threatened, and currently as Near Threatened. Argentina added the MW to the Endangered Species list in 2006. The threats to the MW include habitat loss, inter-specific competition, illegal trade, mortality resulting from infectious diseases, road kills, and conflicts with humans and domestic pets. But what do we really know about the ecology of this carnivore and the specific threats facing MW in Argentina? We investigated available information about MW for the period 1990-2008 to assess the extent of current knowledge, determine where gaps exist and make recommendations for preserving the species and remaining habitat. Between 1990 and 2008, 11 projects were undertaken, of which 2 (18%) continue today. During that same period, 31 documents were produced: 30% were abstracts presented at scientific conferences, 32% were reports from workshops, conferences and popular journals and 29% were published in national and international journals; 23.3% of the documents considered captive individuals. Descriptions of species distribution was the topic most frequently published (32%), followed by reports concerning the health status of wild (22.5%) and captive (22.5%) individuals. Conflicts and environmental issues were rarely addressed. Regarding the scope of the publications, 48% were regional, 32% local and the remainder had international impact. Priority issues that need to be addressed are:1) accurate determination of the species' distribution, 2) human-MW conflicts, 3) increasing understanding of ecology and behavior, 4) examining population genetics, 5) health status and 6) developing conservation education programmes. It is imperative that the governments take an active role in formulating future action plans by contributing both manpower and financial resources. WAZA project 06031; Supported by: Amnevillé Zoo, Doué la Fontaine Zoo, Abilene Zoo, John Ball Zoological Garden, Friends of Dickerson Park-SSPMW/IUCN, Brookfield Zoo, Idea Wild, WAZA and Safari de Peaugres. PGI 24/B123.

A review of trophic ecology of the maned wolf (*Chrysocyon brachyurus*) in Brazil.
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Although in the last two decades an increasing amount of information has been published about maned wolf's diet, no study has produced an assessment of the available data. Here we made an analysis of the trophic ecology of the maned wolf including data from 17 localities from central to south Brazil, eight from our data and 11 from the literature. All data were gathered by faeces collection and analysis. Qualitatively the maned wolf is a highly generalist and omnivorous species: for all areas we identified 266 food items in the faeces, including 102 fruit and 157 animal species/morphoespecies. However, quantitatively this is a rather specialist canid: food-niche breadth at the species/morphospecies level revealed low figures (B_{st} = 0.119-0.289), because the high consumption of few items [e.g. wolf's fruit (*Solanum lycocarpum*), grasses, some rodent species]. By frequency of occurrence in relation to total number of occurrences, animals (48.65±7.45%) and plants (51.35±7.45%) were similarly distributed in the diets of the 17 study sites. This clear omnivorous pattern suggests zoos must avoid protein-rich diets. In 13 sites where seasonality in the diet was described we found that maned wolves consumed significantly more wolf's fruits (8 sites) and small mammals (6 sites) in dry season, whereas other miscellaneous fruits were significantly more eaten during wet season (9 sites). In an analysis of eight cerrado sites, food items are consumed independently to the cerrado cover in the areas. In spite of high variation among sites regarding of cerrado cover (3.1 - 98.4% of land cover), maned wolves consistently consumed high proportions (41.7-66.1%) of identified plant and animal that inhabit exclusively or mostly cerrado habitats. These findings suggest maned wolves search for food resources more intensively in cerrado vegetation than expected by chance, confirming the relevance of natural grasslands and savannahs for maned wolf conservation.

Historical and current geographic distribution of *Chrysocyon brachyurus* (Carnivora: Canidae).
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The maned wolf, *Chrysocyon brachyurus*, is a monotypic South American endemic canid chiefly found in grassland-dominated regions. We compare its current and historical distributions and propose causal hypotheses for observed changes. We compiled recent presence-absence data from reliable observations, interviews, field studies and museum specimens. Historical data was derived from the accounts of early naturalists and explorers and from paleontological records. Comparison of the two distribution maps shows recent range expansion only on the eastern side, in the Brazilian States of Minas Gerais, Espírito Santo, São Paulo y Rio de Janeiro. This expansion is associated with the deforestation of the Atlantic forests and conversion of habitat to grasslands for cattle range. The northern, northeastern, and eastern sectors of the geographic range have not yet experienced significant modifications, and the species persists in central Brazil, northern and eastern Bolivia, and southeastern Peru. The largest range retractions have occurred on the southern limits. Maned wolves are still present in the Argentine provinces of Formosa, Chaco, Corrientes, the northern half of Santa Fe, northeastern Córdoba and southeastern Santiago del Estero, as well as two records from Uruguay and rare records from extreme NE and SE Rio Grande do Sul. Historically the species was present in nearly all of Rio Grande do Sul, Uruguay, and south to at least the 38th parallel of Argentina. The probable cause of the southern range restrictions is intense anthropic pressure coupled with limiting abiotic factors such as temperature and humidity. Our results show the need to revise our views of how habitat modifications are affecting the range distribution of *C. brachyurus*, so that range-wide conservation strategies can be improved and coordinated.

The status of dholes (*Cuon alpinus*) in Thailand: a preliminary report.
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The status of the dhole in Southeast Asia is poorly understood. In Thailand, dholes are found in protected areas that support large ungulate populations. Although the population size is unknown, and the species has been listed as endangered, opportunistic encounters by park rangers, villagers and tourists with dholes in protected areas have created public perception that dholes are overabundant. Our objective was to generate baseline information on dhole populations in Thailand, knowledge that will help decision makers develop effective management plans for the species. The study was conducted at Khao Ang Rue Nai Wildlife Sanctuary, Thailand. We conducted 200 interview surveys in villages surrounding the eastern boundary of the sanctuary. Respondent age ranged from 18 to 81 years (mean = 50.2 y). The majority (54%) of the respondents were able to correctly identify dhole from photographs. Only 27 (13.5%) of the interviewees reported dhole sightings within the last 12 months. However, 81% of respondents were of the opinion that dhole populations in the area are stable. Camera traps (70 locations; 1,999 total trap nights) captured 497 wildlife photos, with 13 carnivore species, including one pack of dholes (6 members). Camera traps also documented the presence of domestic dogs (n = 4) in the protected area. Our findings suggest that dholes occur at low density in the sanctuary. The presence of domestic dogs inside the sanctuary suggests a disease transmission threat to dhole and carnivore populations in this region. The study is supported by the National Science Foundation, Friends of the National Zoo, Walcott Endowment Fund and AZA's Conservation Endowment Fund.

Risk evaluation of parasite transmission between domestic dogs and maned wolves in Brazilian cerrado.
Fabiana Lopes Rocha*, Rogério Cunha de Paula, Nucharin Songsasen, Flávio H.G. Rodrigues, Ricardo Corassa Arrais, Jean Pierre Santos, Moema Camoleze, Marcelo Ximenes Bizerril, Ana Maria Jansen, and Paulo Sérgio D'Andrea. Rochabia2@yahoo.com.br - Instituto Pró-Carnivoros.

Disease spillover from domestic to wild carnivores is increasingly recognized as a conservation threat. In the Serra da Canastra National Park (SCNP) the contact between domestic and wild carnivores is

constant. On one side, maned wolves had been seen circulating in farms. On the other, domestic dogs had frequent excursions to SCNP areas. In addition, previous studies demonstrated that wolves had been exposed to canine adenovirus, corona virus, canine distemper and canine parvovirus, while a high proportion of the domestic dogs living in farms also tested positives for these pathogens. Our objective was to evaluate the risk of parasite transmission between domestic dogs and maned wolves. For this, we gathered data on the demographics and ownership of dogs in farms surrounding the SCNP through the application of questionnaires and discussions with residents. We evaluated direct and indirect contact rates between dogs and maned wolves using GPS-telemetry technique. The average number of domestic dog was 3.05 (± 2.45) dogs per farm. Only three of the 53 farms visited had dog's vaccinations up-to-date and seventeen had dogs' reproduction control. We captured and equipped 3 wolves with GPS collars (one male and two females). So far, we had thereabout 2,000 locations of each GPS collared individual. Although we haven`t estimated the contact rates between domestic dogs and maned wolves yet, the graphic analysis of the locations indicated that the collared wolves went inside and outside the SCNP and used much more the surrounding area. From ours findings, it is clear that they have opportunities for contact. Additional research is therefore necessary to determine whether disease transmission is occurring and to quantify the risk. Yet, wherever opportunities exist for interaction, disease spillover represent a disease risk for both wild and domestic populations from SCNP, especially if dogs owners usually don`t manage their dogs properly.

Changes in kit fox defecation patterns during the reproductive season can bias non-invasive surveys.

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Noninvasive survey methods based on analyzing DNA extracted from hairs or feces can be useful for carnivores that are difficult to study by other methods. Studies of the possible errors associated with these methods have concentrated on genotyping errors rather than possible differences in fecal deposition patterns among sex or age classes. We investigated possible changes in fecal deposition patterns associated with reproduction in San Joaquin kit foxes (*Vulpes macrotis mutica*), a seasonally breeding, socially monogamous species in which females give birth in mid-February to mid-March. We used trained dogs to collect fresh scats on a 2-km transect in the home range of each of 11 radio-collared female kit foxes in January, February and March 2008 and attempted to determine the sex of each scat we collected by amplifying zinc finger protein genes. We sexed 135 scats in January, 148 in February, and 154 in March. If the scats of both sexes were equally easy to find, we expected to find a 1:1 sex ratio in the scats collected each month. In January the sex ratio of the scats was not different from the expected 1:1. However, in February there were almost 2 male scats for every female scat and in March there were more than 8 male scats for every female scat, both of which were significantly different than expected. In March, we found more male scats on all 11 transects than in January and fewer female scats on 10 of the 11 transects. These results suggest that both sexes show changes in fecal deposition patterns around the time pups are born that make it easier to find male scats and harder to find female scats. The effect of these changes on the results of noninvasive surveys will depend on the purpose of the survey.