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PPHSG Newsletter



This newsletter is electronically available at: <http://iucn.org/themes/ssc/sgs/pphsg/home.htm>

Suiform Soundings

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Photo front page: Camera trap photo of White-lipped Peccaries (*Tayassu pecari*) in Ravelo, Bolivia.
Photo by WCS Bolivia

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Editorial:

First of all, a warm welcome to all readers of this latest issue of Suiform Soundings. The number of contributions to this issue has been truly overwhelming, and I want to thank all authors and other contributors for their efforts. Compared to previous issues this is a considerable improvement, and I hope this enthusiasm will continue. Much of the increase in content is due to our new associate editors, Mariana Altrichter and Edsel Amorim Moraes Jr. Mariana and Edsel have done a great job collecting papers from South and Meso-America. Their initial effort has already resulted in more contributions than I could use in the present issue;

the remainder will appear in December 2005 in issue 5(2). This is also the first time that we publish papers in other languages than English, i.e. Portuguese and Spanish and we hope to reach a large audience as a consequence. I envisage that the next step is to add French to our newsletter so we can attract more readers from Francophone Africa. Overall, I am very pleased with the way the newsletter is developing and I see a bright future ahead of us. Thanks to all of you for your essential input and support.

Erik Meijaard, Samarinda, Indonesia

News from the Hippo Specialist Sub Group

Rebecca Lewison

Comprehensive hippo bibliography up and running

Thanks to the efforts of two Hippo Group members (R.Taylor and G.Feldhake), we are happy to announce that a comprehensive common hippo bibliography is now available on our website <http://moray.ml.duke.edu/projects/hippos/> (follow the **Bibliography** link).

With references for hundreds of documents, this is an excellent resource for those looking for current or historical documents on common hippos.

If you have an entry to add, please email rebecca.lewison@duke.edu

Conservation status of common and pygmy hippos worsens

Based on a population assessment conducted in 2003-2004, there is evidence to suggest that both hippo species have suffered population declines, habitat loss or both.

Common hippos

At the time of the last complete assessment of hippo populations in 1994, the common hippopotamus (*Hippopotamus amphibius*) was described as widespread and secure, with an estimated population of at least 160,000 animals. The more recent survey found that the population could be as low as 125,000 individuals (range 125,000-148,000).

The most catastrophic declines have occurred in the Democratic Republic of the Congo (DRC), where the ongoing political



The two hippo species (*Hexaprotodon liberiensis* and *Hippopotamus amphibius*) in the Johannesburg Zoo. Photo by William Oliver.

troubles have had a devastating impact. The population has been decimated as a result of unregulated hunting for bushmeat and for ivory (found in the hippo's canine teeth). From having the second highest estimated hippo population in Africa (30,000 in 1994 after Zambia's 40,000), numbers have plummeted by 95%, to just over 1,000 in 2003. A 2005 census has found the population has continued its precipitous decline and may be less than 900 individuals (see link below for details)

Although the declines in DRC are by far the largest, there is evidence of similar trends in other countries, including West African countries where populations were already at low densities. Given observed and reported declines, the common hippo will be classified as Vulnerable on the 2005 IUCN Red List

Pygmy hippos

Far less is known about the abundance and distribution of the pygmy hippo (*Hexaprotodon liberiensis*). Pygmy hippos, currently classified as Vulnerable in the IUCN Red List, is confined to four West African states: Liberia, Sierra Leone, Guinea and Ivory Coast. In 1994, the population was estimated to be at most, 3,000 animals, with a very fragmented distribution. Logging and subsequent agricultural encroachment has continued to eat away at the pygmy hippo's habitat throughout its range, and pushed it into ever decreasing and isolated parcels of remaining forest. In these fragments, the animals are increasingly accessible to subsistence hunters. Pygmy hippo populations have also been severely affected by the unrest and instability in the region, which has further reduced the effectiveness of protected areas and the enforcement of logging controls. In Liberia, for example, where most pygmy hippos are found, legal protection is incomplete and the level of protection poor. A key forest area, believed to support substantial numbers, the Cesto's-Senkwehn rivershed, has recently been cleared and protection in the Sapo National Park, another key area, has been suspended. At present, little is being done to protect the pygmy hippo or its habitat. As a result of the clear evidence of very low abundance, substantial habitat loss and lack of protection, pygmy hippos are being re-classified as Endangered.

For more information on the conservation status of hippos, see: <http://www.iucn.org/themes/ssc/news/>

[hippos.htm](http://www.panda.org/about_wwf/what_we_do/species/news/news.cfm?uNewsID=23191), http://www.panda.org/about_wwf/what_we_do/species/news/news.cfm?uNewsID=23191 or contact rebecca.lewison@duke.edu

Research highlights: A critical look at common hippo population structure

Five subspecies of hippos have been described based on morphological differences (*H.a.amphibius*, *H.a.kiboko*, *H.a.capensis*, *H.a.tschadensis*, *H.a.constrictus*; Lydekker 1915). However, the existence of these putative subspecies had not been tested by genetic analyses. A recent paper by Okello *et al.* (2005) does just that.

Using mitochondrial DNA from skin biopsies taken from 13 sampling locations, the authors consider genetic diversity and structure among hippo populations across the continent. They find low but significant genetic differentiation among 3 of the 5 putative groups - *H.a.amphibius*, *H.a.capensis*, *H.a.kiboko*. If these findings are accurate, that would mean that common hippos in Kenya and Somalia (*kiboko*), southern Africa (*capensis* from Zambia to South Africa), and the rest of sub-Saharan African countries (*amphibius*) represent three distinct subspecies, with *H.a.amphibius* as the ancestral group. Okello *et al.* also find evidence that common hippos in Africa experienced a marked population expansion during or after the Pleistocene, which they attribute to an increase in water bodies at the end of this era.

These findings have important conservation implications. Hippo populations across the continent are threatened by habitat loss and unregulated hunting. In addition to addressing these common threats, we will also need to preserve the genetic diversity of these three distinct subspecies.

Sources

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PECCARY SUBGROUP NEWS

Lowland Tapir (*Tapirus terrestris*) and White-Lipped Peccary (*Tayassu pecari*) Range-Wide Geographical Status Analysis and Conservation Priority Setting – A Work in Progress

Andrew Taber, Silvia Chalukian and Karen Minkowski

This ongoing project follows on priority recommendations in the Action Plans for both the Tapir (TSG) and the Pigs, Peccaries and Hippos Specialist Groups (PPHSG) of the IUCN/SSC. In particular, this exercise was a key component (Action 12) of the goal of developing National Action Plans for tapir conservation and management for all range countries in the 2004-2005 TSG Plan for Action that came out of the Second International Tapir Symposium in Panama. Early in 2004, members of both specialist groups and other experts on the species met and decided to undertake a range wide status analysis and priority setting exercise jointly for both species. This approach is similar to that already applied to tigers, jaguars and American crocodiles. This decision was taken for a variety of reasons. There is a large overlap in the pool of experts for both species so that there would be a cost savings in bringing scientists and conservation practitioners together for only one workshop rather than two. In addition, (i) the two species' ranges overlap enormously, (ii) as large terrestrial herbivores and frugivores they are ecologically similar, and (iii) we suspected that they face a similar suite of threats and conservation opportunities. Accordingly, we felt that by combining forces synergistically we could better prioritize, promote and strengthen conservation actions for both species.

Starting in July 2004, the Tapir Country Coordinators of the TSG were contacted, as was the pool of peccary biologists, to identify and invite appropriate experts to participate in this exercise. Further contacts were made with experts at the Amazonian Wildlife Management Congress held in Iquitos Peru in September 2004. Subsequent to this, a questionnaire survey was distributed to the identified pool of specialists across the ranges of the two species. Between September 2004 and April 2005, data forms and maps filled out by the

experts were compiled and merged into a geographical information system.

From 3-10 April 2005, a workshop was held at the Rio Selva Ecoresort in Santa Cruz, Bolivia. Here, twenty-seven experts with knowledge on one or both of these species from throughout their ranges were brought together. Seventeen other experts in either or both species also provided data, but were unable to attend the workshop because of either cost or time constraints. The specialists included conservation scientists and practitioners, as well as graduate students, who had either previously at some point over the past twenty years, or were currently working on either or both of these species.

During five hard work days at the workshop the experts reviewed and refined the following geographical data sets: (i) the historical range of the species, (ii) the areas for which expert knowledge on the status and distribution of both species were available as well as those areas for which data were lacking, (iii) all points where the presence of either species had been documented as present or absent over the past twenty years, (iv) the current distribution and local status of the species across their ranges, and (v) key areas for the conservation of Lowland Tapirs and White-lipped Peccaries. Standardized information was also checked and tabulated for all polygon and points identified. The expert group also discussed and evaluated factors to prioritize conservation areas as well as assessed the relative importance of different threats to the two species. Finally, priorities for further research, and for assessing and alleviating threats to the two species, were discussed and developed. We further took advantage of bringing the pool of experts together to arrange a series of presentations on the biology, conservation and use of both species for the benefit of the group, and two field trips were organized.

The pool of peccary biologists at the meeting also held an Ad Hoc meeting. It was felt that while there have been many advances in work on these species in recent years, the time has come to organize the peccary subsection more formally along the lines of the TSG and the Suid sections of the PPHSG. Suggestions of the group included: Establish a network of country coordinators for each of the range states. There was also a desire to produce an informal electronic newsletter. Finally, the group suggested exploring the establishment of various working committees to focus on key issues and topics. There was also much clamoring from the participants in the workshop for expanding membership in the PPHSG or, perhaps, to create an associate membership category. We are currently exploring prospects for bringing on a part time coordinator to kick start this process.

To date, one very important outcome of this geographical status and conservation priority setting exercise has been to greatly increase connections between and within tapir and peccary researchers throughout the Americas. This will in the near future facilitate information exchange and standardization of methods and increase cooperation across international borders. In terms of the specific ob-

jectives of this exercise, we are continuing the process of finalizing the geographical data sets across the two species ranges with each of the experts. Once finalized, we will analyze these data and produce a detailed report on the results and priorities identified as well as at least two articles for publication in professional conservation journals. All should be completed by the end of 2005.

This exercise is being coordinated by Silvia Chalukian of the Tapir Specialist Group and Andrew Taber (Wildlife Trust) of the Pigs, Peccaries and Hippos Specialist Group. Karen Minkowski and Eric Sanderson of the Landscape Analysis unit of the Wildlife Conservation Society are providing technical support for the data compilation, GIS mapping and analysis. This exercise has been financed principally by a grant from the Gordon and Betty Moore Foundation to the Wildlife Conservation Society.



Peccaries and cows can be seen side by side in the Pantanal. Photo by Arnaud Desbiez

Here we provide descriptions of some current peccary projects in Latin America. In issue 5(2), more such project descriptions will be published.

Peccary Project Descriptions (in Spanish, Portuguese, and English)

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PRESENTACIÓN DE LA SECCIÓN DE PECARÍES

En abril de 2005 se realizó en Santa Cruz, Bolivia, el taller “Lowland Tapir (*Tapirus terrestris*) and White-Lipped Peccary (*Tayassu pecari*) Range-Wide Geographical Status Analysis and Conservation Priority Setting”. En el taller participaron 27 expertos de diferentes países con conocimiento en una o ambas especies. Durante este taller se realizó una reunión informal entre los investigadores de pecaríes, para discutir formas de fortalecer contactos, mejorar coordinación y compartir lecciones aprendidas entre la comunidad de investigadores y conservacionistas enfocados en estas especies. Una de las ideas que surgió en esta reunión fue la creación de un newsletter de pecaríes, (*Tayassu pecari*, *T. tajacu* y *Catagonus wagneri*) trilingüe, y se eligieron los editores. Las discusiones sobre el tema continuaron post-congreso, incorporando otra gente del grupo de especialistas PP&HSG. Durante estos intercambios de ideas, fuimos invitados por los editores del Suiform Sounding para formar parte de su revista. De esta forma, no solo vamos a conectar la comunidad de investigadores de pecaríes del continente americano sino la comunidad más amplia que abarca todos los suiformes y otros continentes.

La intención de la creación de esta sección de pecaríes es que nos ayude a compartir información, enterarnos de lo que se está haciendo, intercambiar literatura, compartir nuestras experiencias y nuestros problemas, ayudarnos unos a otros, unir esfuerzos, etc. El objetivo para esta primera con-

tribución a la sección pecaríes del Suiform Sounding es proveer información actualizada de los estudios que se están realizando con pecaríes o se están por empezar. Para ello hemos pedido la colaboración de los investigadores que pudimos contactar para que describan de manera resumida los principales aspectos de su proyecto. Afortunadamente tuvimos una muy buena respuesta y recibimos varias contribuciones. Los investigadores enviaron resúmenes en español, portugués e inglés, proveyendo información sobre: tipo de proyecto, objetivos, metodología usada, área de estudio, resultados esperados, período de estudio, financiamiento, principales problemas que han encontrado para realizar su investigación, y necesidad de asistentes. También hicimos una recopilación de artículos sobre pecaríes publicados desde el 2002. Lamentablemente no tenemos acceso a revistas que no están indexadas, por lo que la lista no es completa. Para publicaciones en revistas locales contamos con la ayuda de investigadores que nos enviaron la información.

Para la próxima publicación pedimos la colaboración de los lectores para que nos hagan llegar información sobre revistas científicas locales, tesis y disertaciones, fotos, y contactos con personas que trabajen con pecaríes y no estén en esta lista.

Gracias y abrazos a todos!

APRESENTAÇÃO DA SEÇÃO DE PORCOS-DO-MATO

Em abril de 2005 se realizou em Santa Cruz, Bolivia, o seminário “Lowland Tapir (*Tapirus terrestris*) and



Collared peccaries at San Miguelito Private Reserve, eastern Bolivia (photo by Rosario Arispe)

White-Lipped Peccary (*Tayassu pecari*) Range-Wide Geographical Status Analysis and Conservation Priority Setting”. Nesse seminário participam 27 especialistas de diferentes países com conhecimento em uma ou ambas espécies. Durante este seminário se realizou uma reunião informal entre os pesquisadores de pecarídeos, para discutir formas de fortalecer contatos, melhorar a coordenação e compartilhar lições aprendidas entre a comunidade de pesquisadores e conservacionistas dessas espécies. Uma das idéias que surgiu nesta reunião foi a criação de um “newsletter” de porcos-do-mato, (*Tayassu pecari*, *T. tajacu* e *Catagonus wagneri*) trilingüe, e se elegeram os editores. As conversas sobre o assunto continuaram pós-congresso, incorporando outras pessoas do grupo de especialistas PP&HSG. Durante estas trocas de idéias, fomos convidados pelos editores do Suiform Sounding para tomarmos parte de sua revista. Desta forma, não vamos apenas contactar a comunidade de pesquisadores de porcos-do-mato do continente americano como também a comunidade mais ampla que abrange todos os suiformes e outros continentes.

A intenção da criação desta seção de porcos-do-mato é que nos ajude a compartilhar informações, interagirmos do que se está acontecendo, trocar literatura, compartilhar nossas experiências e nossos problemas, ajudarmos uns aos outros, unir esforços, etc. O objetivo desta primeira

contribuição para essa seção do Suiform Soundings é prover informação atualizada dos estudos que se estão realizando com porcos-do-mato e os que estão pra começar. Para isso temos pedido a colaboração dos pesquisadores que pudemos contactar para que descrevam de maneira resumida os principais aspectos de seu projeto. Afortunadamente tivemos uma resposta muito boa e recebemos várias contribuições. Os pesquisadores nos enviaram resumos em espanhol, português e inglês, fornecendo informações sobre: tipo de projeto, objetivos, metodologia usada, área de estudo, resultados esperados, período de estudo, financiamento, principais

problemas encontrados para realizar sua pesquisa, e necessidade de estagiários. Também fizemos uma compilação de artigos sobre porcos-do-mato publicados desde 2002. Lamentavelmente não tivemos acesso a revistas que não estão indexadas, por isso a lista não é completa. Para publicações em revistas locais contamos com a ajuda de pesquisadores que nos enviaram as informações.

Para a próxima publicação pedimos a colaboração dos leitores para que nos mandem informações sobre revistas científicas locais, teses e dissertações, fotos e contatos com pessoas que trabalhem com porcos-do-mato e não estão em nossa lista.

Obrigado! Abraço a todos!

PRESENTATION OF THE PECCARY SECTION

In April 2005, the workshop “Lowland Tapir (*Tapirus terrestris*) and White-Lipped Peccary (*Tayassu pecari*) Range-Wide Geographical Status Analysis and Conservation Priority Setting” was held in Santa Cruz, Bolivia. Twenty seven experts from different countries with knowledge in one or both species participated in this event. During the workshop, the peccary researchers met informally to discuss ways of strengthening contacts, improve coordination and share learned lessons among the community of researchers and conservationists focused on these species. One of the ideas that was talked about in this meeting was the creation of a trilingual peccary (*Tayassu pecari*, *T. tajacu* e *Catagonus wagneri*) newsletter, and the group chose the editors. Discussion on this topic continued over the following months including other members of the

Specialist group PP&HSG. As a result of these exchanges of ideas we were invited by the editors of the Suiform Soundings to form part of their newsletter. Under this modality, we will not only connect the community of peccary researchers of the American continent but we will also be connected with the wider community that encompasses all suiforms and other continents.

Our goals for creating the peccary section is to have a means to share information, learn about what is happening with peccaries, exchange literature, share our experiences and problems, help each other, and unite efforts. The objective of the first contribution to the peccary section of the Suiform Soundings is to provide updated information on studies that are been carried out or are about to start, as well as on new literature.

To accomplish this objective we asked those who we were able to contact to send a short description of their projects. Fortunately, we had a very good

response and we received several contributions. Researchers sent contributions in Spanish, Portuguese and English, providing information on: type of project, objectives, methods, study area, expected results, study period, funding, main problems they have experienced to carry out their research, and needs for assistance.

We also made a compilation of papers published since 2002. Unfortunately we don't have access to journals that are not indexed, so the list is not complete. For publications in local journals we counted on the help of researchers to send us information.

For the next publication we ask for the collaboration of the readers to send us information on papers published in local scientific journals, thesis and dissertation, pictures and contacts with people working with peccaries that are not in this issue.

Thanks very much

Efectos de la defaunación por cacería sobre la estructura y dinámica del bosque atlántico del alto paraná, Misiones, Argentina: El rol de los pecaríes y otros ungulados

Lic. Diego M. Varela (Investigador principal)

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Orientadores: Dr. Mario Di Bitetti (Universidad Nacional de Tucumán/CONICET, Argentina), Dr. Paulo de Marco Jr. (Unversidade Federal de Viçosa, Brasil).

Iniciado en mayo de 2005, este proyecto de 3 años me servirá para acceder al título de doctorado de la Universidad de Buenos Aires, pero con idea de establecer un proyecto de estudio a largo plazo mediante clausuras de ungulados y otros mamíferos.

Justificación

La disminución o extinción local de poblaciones de pecaríes y otros ungulados debido a la cacería puede alterar el reclutamiento y diversidad de árboles en bosques neotropicales al afectar procesos ecológicos importantes como la herbivoría o la dispersión y predación de semillas (Dirzo & Miranda 1991, Redford 1992, Painter 1998, Wright et al. 2000, Roldán & Simonetti 2001, Wright 2003). La

meta de este proyecto es evaluar las consecuencias a largo plazo de la pérdida de ungulados en el Bosque Atlántico del Alto Paraná, en Misiones, Argentina.

Objetivos del proyecto

Evaluar los efectos de la remoción de ungulados sobre las tasas de predación de semillas, supervivencia y reclutamiento de renovales del Bosque Atlántico; como también sobre su riqueza, diversidad y composición mediante experimentos de exclusión selectiva en áreas sin cacería.

Comparar el tamaño de los efectos de la remoción de ungulados sobre la estructura del bosque en ambientes de palmital y no palmital.

Describir los patrones de visita de pecaríes y otros ungulados consumidores de frutos y semillas sobre 6 especies de árboles del Bosque Atlántico.

Evaluar y comparar la abundancia de ungulados y la

estructura y dinámica de regeneración en palmitales del Bosque Atlántico en áreas con diferente intensidad de cacería en Misiones.

Mis hipótesis se basan en que la disminución de los ungulados producirá en el Bosque Atlántico un aumento en la densidad de renovales y una disminución en su riqueza y diversidad debido a la alteración en las tasas de predación y dispersión de semillas, herbivoría y pisoteo.

Además se espera que los efectos de la defaunación sean más importantes en los ambientes de palmital (*Euterpe edulis*) dada sus características como especie clave (Terborgh 1986, Placci et al. 1992). Y que la abundancia de pecarí labiado sea el factor principal que genere los patrones de alteración por ungulados en la estructura del bosque debido a su comportamiento gregario y de forrajeo (Kiltie 1981, Keroughlian et al. 2004, Beck et al. 2005).

Área de estudio y metodología

Este estudio se desarrolla en Parque Nacional Iguazú (67.000 has.) y el Parque Provincial Uruguáí (84.000 has.), dos unidades de conservación del norte de la provincia de Misiones, Argentina, donde todavía conviven 5 especies de ungulados: *Tayassu pecari*, *Tayassu tajacu*, *Tapirus terrestris*, *Mazama americana* y *Mazama nana*.

Se construirán parcelas de exclusión s en áreas bien conservadas de ambos parques para simular la defaunación parcial de ungulados (tapir, pecaríes y venados). Las clausuras serán de 4,5 x 4,5 metros y 1,2 metros de altura. Unos 20 centímetros de espacio libre en la base permitirá el ingreso selectivo de mamíferos de menor tamaño como agutíes, entre otros. Se establecerán parcelas control sin alambrado con las mismas dimensiones. En cada parcela se medirá inicialmente y durante 3 años consecutivos la densidad, riqueza, diversidad y composición de renovales de árboles. Además se realizarán experimentos de remoción de semillas para medir tasas de predación y se utilizarán plántulas artificiales para evaluar el impacto del pisoteo sobre los renovales. Diez de estos bloques se instalarán en palmitales y 10 en áreas sin palmitales con el objetivo de realizar comparaciones de los tamaños de los efectos entre estos ambientes. Estas comunidades se caracterizan por la dominancia de la palmera *Euterpe edulis*, considerada una especie clave en el Bosque Atlántico (Placci et al. 1992, Reis 1995) y de gran importancia económica en la región

(Galetti & Fernández 1998). El palmital es el hábitat preferido por varios de los ungulados en los períodos de escasez de alimento debido a la abundante y sincronizada fructificación de esta especie durante el invierno (Placci et al. 1992).

El estudio de los ungulados que visitan los árboles frutales será de carácter descriptivo y se realizará con la ayuda de trampas cámara. Para evaluar el objetivo d) se medirán por única vez las mismas variables de vegetación en parcelas de igual tamaño (sin clausura) en 15 áreas con diferentes intensidades de cacería. El grado de cacería se medirá mediante variables cualitativas como número de encuentros con cazadores o perros, distancia a áreas pobladas, número de disparos oídos y entrevistas a informantes clave. Se evaluarán las abundancias de mamíferos en los sitios con diferente intensidad de cacería a través del uso de trampas cámara.

Se espera que este proyecto sirva para entender los efectos y las consecuencias a largo plazo de la pérdida o disminución de las poblaciones de pecarí labiado y otros ungulados por cacería sobre la estructura y dinámica del Bosque Atlántico en Misiones, y sus implicancias en el manejo de áreas protegidas y en la conservación de procesos ecológicos y la biodiversidad.

Apoyos y financiamiento

Este proyecto de investigación es apoyado por el programa *Education for Nature* (EFN) de la WWF. Además cuenta con el apoyo institucional y logístico de Conservación Argentina, la Administración de Parques Nacionales y del Ministerio de Ecología, Recursos Naturales Renovables y Turismo de la Provincia de Misiones.

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Sostenibilidad de la cacería de pecaríes en el Chaco Argentino

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Tipo de investigación: Este estudio forma parte de la disertación de doctorado de la investigadora principal. Es una parte de un proyecto mayor de estudio de uso de recursos naturales por gente local en el Chaco Argentino, coordinado por la Dirección Nacional de Flora y Fauna de Argentina y ejecutado por la investigadora principal.

Objetivos:

- Estimar el estado de conservación, abundancia y distribución de las tres especies de pecaríes.
- Estimar el efecto de la cacería en las tres especies.
- Evaluar la posibilidad de implementación de uso sostenible de pecaríes para la comercialización de pieles.

Metodología: Se recorrió todo el norte del Chaco

argentino para hacer un relevamiento general del estado de conservación mediante entrevistas a cazadores locales, colección de cráneos y cueros, y evaluación en campo de señales de presencia de pecaríes. Para el estudio de parámetros reproductivos y estructura de edades se colectaron cráneos y fetos. Se estimó abundancia relativa y densidad mediante el uso de transectos, trampas de huellas, y relevamiento completo de sitios de área conocida (conteos directos de manadas y observación de huellas) con la ayuda de cazadores locales. Este último método proveyó los mejores resultados y parece ser un método factible para el ambiente chaqueño. Se usaron varios indicadores de sostenibilidad: tendencias poblacionales, reducción de distribución, modelo de cosecha, estructura de edades, y patrones de cacería en áreas rurales y en pueblos.

Sitio de estudio: La primera parte del estudio se rea-

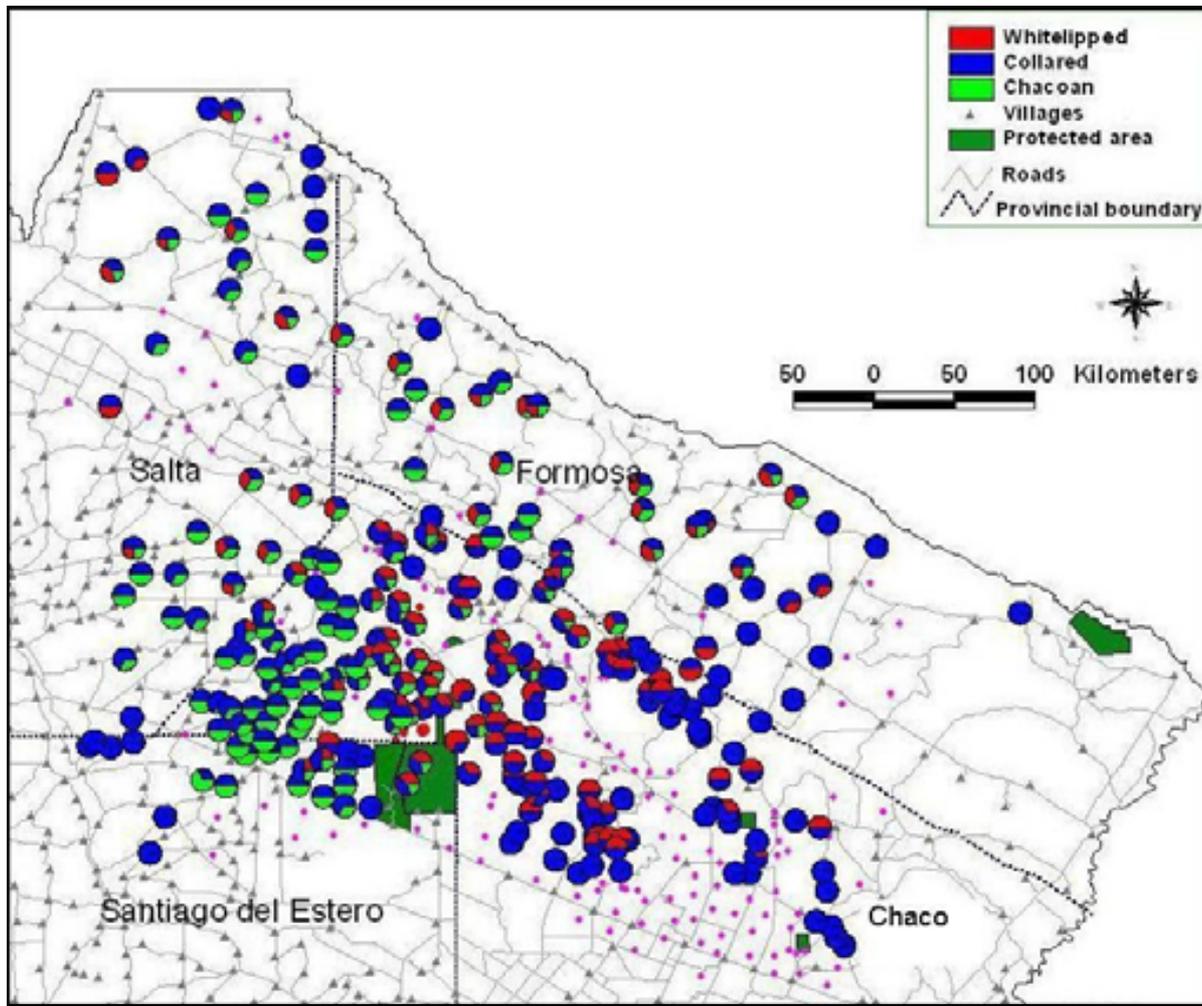


Figure 1. Distribución de pecaríes en el norte del Chaco Argentino. Los gráficos de pastel son áreas de muestreo de 10 km de diámetro y los colores indican la presencia de las especies, basado en entrevistas y corroboraciones de campo. Los puntos rosados son sitios donde las tres especies de pecaríes no se han observado durante los últimos 10 años. Las divisiones del gráfico solo indican presencia, no abundancia. Los círculos no están en escala con el mapa.

lizó en el ambiente chaqueño de las provincias de Salta, Formosa, El Chaco y Santiago del Estero. La segunda parte se centralizó en el *Impenetrable*, ubicado en el chaco semi-árido de la provincia del Chaco.

Período de estudio: Comenzó en el 2000 y terminó en el 2005.

Resultados: El rango de distribución de las tres especies ha disminuido durante las últimas dos décadas, sobre todo en el Chaco húmedo, posiblemente como resultado del avance de la agricultura. Sin embargo, el pecarí de collar aún persiste en áreas degradadas y con alta presión de cacería. Las otras dos especies, el pecarí chaqueño y el labiado, son las más susceptibles y han sido afectadas por la cacería y destrucción del hábitat. Su distribución se ha reducido en más de un 60%, y sus poblaciones continúan decreciendo. Estas especies persisten en

áreas con alta cobertura boscosa, baja densidad humana, escaso desarrollo, y poca alteración del hábitat. Los pecaríes en la zona rural del Chaco semi-árido son una parte importante de la dieta, sobre todo de los campesinos más pobres. La cacería por parte de los campesinos no es muy alta, sin embargo, combinada con la cacería practicada por gente de los pueblos, cazadores deportivos visitantes, y trabajadores del carbón, es insostenible. La mayoría de los animales cazados son jóvenes o crías menores a un año, y la época de mayor cacería es durante el invierno, cuando las hembras están preñadas. Las tres especies se reproducen durante el año con un pico entre septiembre y noviembre. Incorporar la venta de cueros de pecaríes de collar a la economía del campesino podría ser sostenible biológicamente, pero la comunidad no cuenta con mecanismos de organización para control y monitoreo, por lo que la cacería podría superar los límites sostenibles si no se contro-

la el acceso a cazadores que no son locales.

Principales problemas: El chaco presenta mucha dificultad para hacer estimaciones de densidad de pecaríes. Al no existir una metodología apropiada para este ambiente, tuvimos que probar diferentes métodos. Se requirió mucho esfuerzo de campo para obtener resultados que finalmente no son completamente confiables. Otro problema fue la dificultad para obtener información de las oficinas locales de gobierno acerca de la planificación para

el uso y venta de la tierra.

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Pantanal peccaries and pigs project

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Figure 1. White-lipped Peccaries foraging at the edge of a salina (Photo by Arnaud Desbiez)

Project Aims

Long term comparative ecological study on white lipped peccary (*Tayassu pecari*), collared peccary (*Tayassu tajacu*) and feral pig (*Sus scrofa*) in different landscapes of the Brazilian Pantanal.

Specific Objectives

These studies are all taking place simultaneously within different regions of the Pantanal:

- Population density estimates of the mammalian community within different landscapes with a particular emphasis on the three target species;
- Habitat use studies;
- Feeding ecology studies;
- Seasonal variation in resource availability and use;
- Ecological role as predators and dispersers of key

- fruit seeds;
- Behavioral ecology;
- Ecological and socio-economical impact of feral pig;
- Population dynamic studies of the feral pigs;
- Potential as disease reservoirs

Study Region

The Pantanal wetland is located in the central portion of South America, where it occupies about one third of the Rio Paraguay hydrographic basin. It comprises approximately 140,000 km² in Brazil. The Pantanal is characterized by its low altitude, the slight gradient of declivity, the seasonal alternation between periods of flooding and droughts and high annual thermic amplitudes. Flooding and topographic features strongly influence the vegetation, which occurs as diversified mosaics of forest, aquatic and open habitats. The composition of the Pantanal's flora and fauna is influenced by the surrounding biomes Cerrado, Amazonia, Chaco and the Atlantic Forest.

Why study pigs and peccaries?

White-lipped peccaries were selected as one of five "landscape species" for the Pantanal (WCS Living Landscapes Bulletin, 2001) and we are finding the difference in densities to be useful landscape indicators. Peccaries also play an important role as seed predators and dispersers.

The Pantanal is excellent for comparative studies as human induced changes in the landscape are still relatively few. Our work is being compared with the long term study conducted by Alexine Keuroghlian in the Atlantic Forest (Keuroghlian, 2003).

Finally about 200 years ago domestic pigs were brought to the Pantanal, where they inevitably escaped and became feral. The hunting pressure on the peccaries in the Pantanal is diluted by the presence of feral pigs (Lourival, 1997). However as an introduced species they may have a negative ecological and economical impact particularly when their numbers are high. Potential negative impacts of feral pigs on peccaries have been suggested (Alho *et al.* 1988, Sicuro *et al.* 2002) and are being investigated.

Methods

Captures, radio-telemetry, line transects, use of

micro chips, macro and micro analysis of feces, phenology studies, fruit surveys, fruit removal experiments, skull collection, hunting registers, and interviews.

Field sites

Fazenda Rio Negro is dominated by large areas of gallery and cordillera forests, open grasslands associated with *vazantes* and lakes, and is seasonally flooded by the river and rains.

Fazenda Nhumirim and its neighboring ranches, which is more dependant on rain fall for flooding, has less gallery forest, and a larger area of cerrado forest.

Fazenda Mangabal, Manduvi, Baia das Pedras is dominated by naturally-occurring open grasslands and large *vazantes*; small proportion of forest cover; low-impact, traditional cattle ranching practiced in the region.

UNIDERP is dominated by open grasslands and shrubs, (*campo sujo* and *campo limpo cerrado*); narrow strips of gallery forest associated with the upper-middle Rio Negro; intensive cattle operations on neighboring farms, including recent deforestation and a predominance of exotic grass pastures.

Examples of some results

Fazenda Rio Negro (started in 2000)

Captured and radio-collared 28 white-lipped peccaries, 12 collared peccaries, and 11 feral pigs;

Microchips (passive identification tags) implanted in more than 100 captured peccaries and feral pigs (newborn to adult);

Over 700 km of transects walked;

Phenology and fruit availability study: 104 species of fruits have been identified from monthly censuses.

Fazenda Nhumirim and neighboring ranches (started 2002)

Over 2,100 km of transects walked;

250 feces collected and analyzed;

Hunting registers;

Pig peccary and palm (*Scheelea phalerata*) study.

Acknowledgements

We are indebted to the support provided by Earthwatch (EW), EMBRAPA-Pantanal, Institute for Bio-

logical Conservation (IBC), Conservation International - Brazil / Fazenda Rio Negro, European Union project INCO PECARI, Durrell Institute for Conservation Ecology (DICE) in particular Dr. Richard Bodmer, Edinburgh Zoo - Royal Zoological Society of Scotland, IAGRO (Mato Grosso do Sul Animal Health Department) Fazenda Rio Tinto, Pousada Mangabal, Fazenda Nhumirim, Fazenda Alegria, UNIDERP/Pousada Ararauna/IPPAN, Baía das Pedras, São Paulino, and Fazenda Diacui. Thanks to our collaborators in the field: EW volunteers, veterinarian Tatiana Freitas, IAGRO veterinarians and especially Rita Paes, Ellen Wang - EW field coordinator, Maria do Carmo, Ezidio Arruda (Baiano) and Ireido field assistants, Camila Donatti (EW Frugivore project), Leandro Ines, Gomes Junior - research field assistant. We are also grateful to all the staff from the different fazendas for their support.

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Photo of a feral pig by Alexine Keuroghlian

Registros de *Catagonus wagneri* de en la zona de Charata (Parque Nacional Kaa-Iya y Tco Isoso)

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Tipo de proyecto: Investigación puntual de guardaparque.

Objetivo: Describir distribución de la especie, práctica de capacitación.

Sitio: Campamento Charata del Parque Nacional Kaa-Iya

RESUMEN: Este estudio se inició en 2003 con registros puntuales de *Catagonus wagneri*, registrando datos de la observación y tomando las coordenadas para mapear la distribución de la especie en la zona. En 2005 se está intentando conseguir fotografías con trampas-cámara en dos salitrales importantes, para confirmar el uso de los mismos. Se creará y se mantendrá una base permanente de registros de la especie en el paisaje.

Financiado: WCS, Parque Kaa-Iya

Problemas: la densidad poblacional de la especie es muy baja, y se caza todavía en la zona.

Conteos de pecaríes en bosques secos de Santa Cruz, Bolivia, mediante el uso de trampas-cámaras

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Tipo de proyecto: Muestreos generales para mamíferos terrestres empleando trampas-cámara.

Objetivo: Confirmar presencia, describir distribución de las especies.

Sitio: Parque Nacional Kaa-Iya (Guanacos, Cerro Cortado, Tucavaca, Ravelo, Estación Isoso), Estancia San Miguelito, Parque Nacional Otuquis.

RESUMEN: Este estudio, iniciado en 2001, se basa en muestreos sistemáticos con juegos de 25-35 pares de trampas-cámara desarrollados para jaguares (*Panthera onca*). Sin poder identificar individuos de *Tayassu pecari* o de *Tayassu tajacu*, solo podemos confirmar la presencia de las especies, y comparar frecuencias de captura en diferentes sitios y años. En algunos sitios donde tenemos salitrales (Cerro Cortado, San Miguelito) o pozas de agua (San Miguelito, Ravelo), para evaluar el uso de esos recursos por ambas especies. Todavía no se ha registrado *Catagonus wagneri* en los muestreos sistemáticos con trampas-cámara, pero sí se confirma su presencia en las zonas Guanacos y Ravelo por observación directa. También se ha realizado muestreos en Tucavaca, y en 2005 se planifican muestreos en la zona de la Es-



Camera trap photo of *T.tajacu* from Cerro, Bolivia. Photo by WCS Bolivia

tación de compresión Isoso y en el Parque Nacional Otuquis del Pantanal boliviano.

Financiado: WCS, Fundación Kaa-Iya

Problemas: a diferencia de jaguares y algunas otras especies, no se puede estimar densidades de pecaríes porque no logramos identificar individuos y/o tropas diferentes a través de las fotos.

Monitoreo de cacería de pecaríes en la Tco Isoso

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Tipo de proyecto: manejo comunitario de fauna.

Objetivo: Evaluar la sostenibilidad de la cacería, recomendar medidas de manejo incluyendo la zonificación de la TCO Isoso.

Sitio: 23 comunidades de TCO Isoso

RESUMEN: Este estudio, iniciado en 1996, se basa en cazadores voluntarios de las comunidades de Isoso quienes realizan un auto-monitoreo de sus actividades de cacería de subsistencia. Evaluamos cambios de un año a otro, diferencias entre comunidades, patrones espaciales de cacería, y su importancia en términos de carne. En 2003 extendimos el monitoreo a unos 25 puestos ganaderos dentro de la TCO Isoso. Además implementamos un muestreo sistemático de hogares para poder monitorear el esfuerzo de cacería, incluyendo salidas sin suerte.

Financiado: WCS

Problemas: Falta de precisión en los datos de automonitoreo en relación a esfuerzo y cacería total, por eso el nuevo énfasis en el muestreo sistemático de hogares.

Uso sostenible de *Tayassu tajacu* en la Tco Isoso-La comercialización de cueros

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Tipo de proyecto: manejo comunitario de fauna.

Objetivo: Generar beneficios económicos a través de la conservación y del uso sostenible de la fauna silvestre.

Sitio: 23 comunidades de la TCO Isoso

RESUMEN: En base a los estudios de cacería, se ha propuesto un uso comercial sostenible dentro de la TCO Isoso para generar beneficios económicos adicionales a favor de las comunidades de Isoso. Los cueros de animales cazados para fines de subsistencia actualmente se desperdician, y el programa en Perú demuestra que el uso comercial puede ser sostenible y puede generar beneficios importantes. Se ha presentado al gobierno una propuesta para legalizar el uso comercial dentro de la TCO Isoso, y se están realizando ajustes y preparativos para poder implementar ese programa.

Financiador: WCS

Problemas: Falta de procedimientos claros para la legalización, falta de capacidad técnica de las autoridades gubernamentales para monitorear y fiscalizar el proceso.



Orphaned collared peccary kept as a pet (above); and peccary hunted for subsistence by Isoso-Guaraní indigenous communities (right). Photos by Andrew Noss, WCS Bolivia.

Fontes naturais de suplementação mineral para ungulados no pantanal do mato grosso: Implicações nas frequências de uso por taiassuídeos e relações com a estrutura da paisagem

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O projeto, financiado pelo CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico) e SESC (Serviço Social do Comércio), teve início em agosto de 2003, com duração prevista para 24 meses. Constitui uma atividade interinstitucional, integrando o Museu Nacional, Universidade Federal do Rio de Janeiro (UFRJ), o Programa de Pós-Graduação em Ciência Ambiental (PGCA) da Universidade Federal Fluminense (UFF), o Laboratório de Geoprocessamento, Centro de Ecologia, Universidade Federal do Rio Grande do Sul (UFRGS) e o Instituto de Nacional de Tecnologia (INT), no Rio de Janeiro. Conta com uma equipe constituída por pesquisadores e alunos de mestrado e doutorado vinculados a essas instituições. A região de estudo, uma área de conservação natural (RPPN SESC Pantanal), situada no Município de Barão de Melgaço, MT, no Pantanal do Mato Grosso (Figura 1), foi considerada recentemente

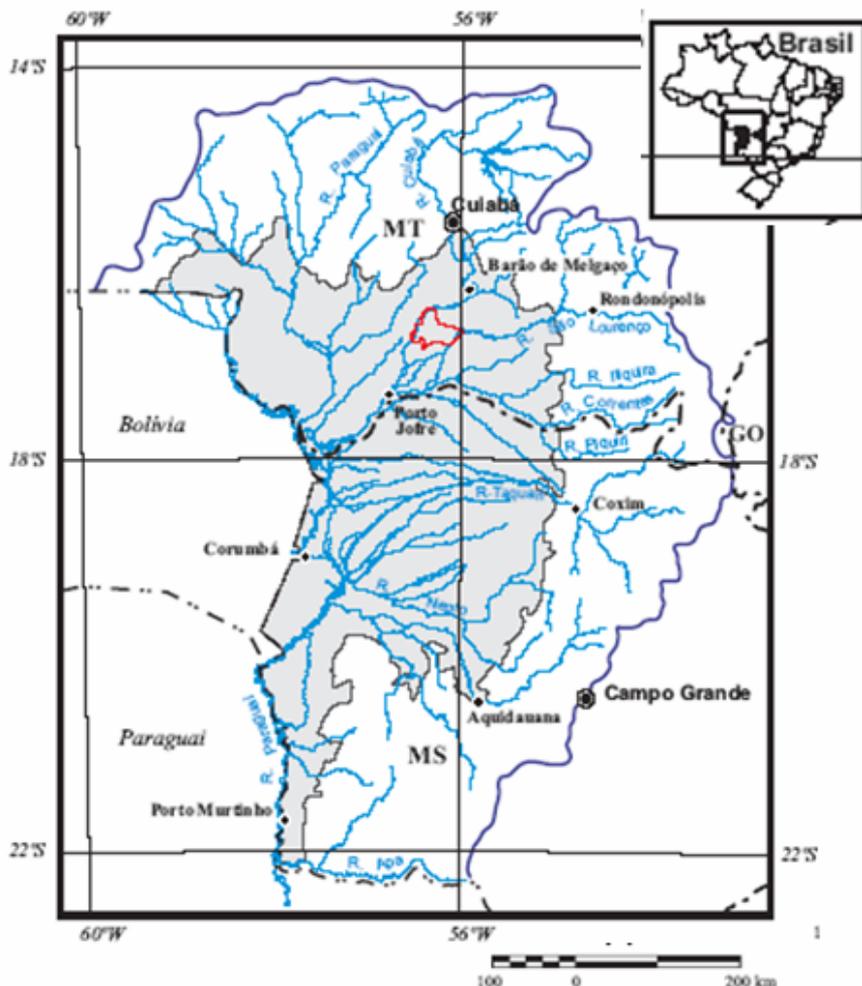


Figura 1. Localização da RPPN SESC Pantanal (polígono vermelho) no nordeste do Pantanal do Mato Grosso (em cinza) e delimitação da Bacia do Alto rio Paraguai.

A

Figura 2A. Queixadas (*Tayassu pecari*)

uma Área Prioritária para Conservação da Biodiversidade pelo Ministério do Meio Ambiente, em 1999.

As fontes de minerais para ungulados são largamente reconhecidas no mundo como um dos fatores que atua na disposição espacial das espécies. As implicações dessas como atrativo para componentes da fauna de ungulados são pouco conhecidas no Brasil. Menos conhecidas ainda são suas implicações no aspecto nutricional. Os padrões de uso das fontes minerais observados em outras regiões sugerem que a importância das mesmas deve ser considerada em qualquer plano de manejo sustentado da fauna. Diferentes elementos, como sódio, magnésio, manganês, ferro, cálcio e cobre, presentes em barreiros, podem servir como permanente fonte de atração para as espécies. As implicações da atração da fauna podem ter conseqüências positivas, quando na viabilização de populações, ou efeitos contrários quando, indiretamente, atuam como fator de extinção local em decorrência da atividade humana.

Queixadas (Figura 2A), caititus, antas e porcos-monteiros, na região do Pantanal, criam e mantêm manchas de depressões em solos úmidos (Figura 2B), em qualquer época do ano. O uso dos barreiros, já observado para essas espécies na

região, sugere que o suprimento alimentar seja relativamente precário, possivelmente vinculado à deficiência de minerais na vegetação.

As freqüências de ocorrência, visualizações, rastros, fezes ou outros sinais de uso da área, estão sendo considerados nas observações em campo. O uso dos barreiros é avaliado com utilização de armadilhas fotográficas, dispostas em pelo menos 6 áreas, e permanecendo ativos pelo período mínimo de 60 dias. Vegetação e solo são coletados nesses barreiros e em áreas externas e adjacentes aos mesmos. As análises de cálcio, cobre, ferro, magnésio, manganês, potássio, sódio, zinco, enxofre, sulfato e cloreto estão sendo conduzidas no Laboratório do Centro de Ecologia da UFRGS, Porto Alegre.

O Projeto objetiva oferecer uma nova

B

Figura 2B. Borda de barreira com armadilha fotográfica

perspectiva para efetivação da sustentabilidade através do manejo dessas áreas em regiões remotas do país. Uma vez conhecida a composição química dos barreiros, surge a perspectiva de que sistemas artificiais sejam criados para viabilizar o uso sustentado de populações de ungulados em regiões com condições ecológicas similares.

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Sentinel species: The Pontal do Paranapanema case study

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The CCM (Consortium for Conservation Medicine) and its partner institutions are involved in a variety of ongoing research projects. For example, the CCM is currently investigating the factors that led to the emergence of Nipah virus in Malaysia and a closely related virus, Hendra virus, which emerged in Australia. Additional CCM projects include a study on the dynamics of SARS in Asian wildlife, how human and environmental factors affect the prevalence and emergence of WNV, and groundbreaking research to aid in predicting how pathogen pollution might drive future emerging diseases.

In Brazil, CCM collaborates with researchers from IPE-Institute for Ecological Research in an area of western Sao Paulo State known as the Pontal do Paranapanema (colloquially simply Pontal). The region is a microcosm of many parts of South America, where modern social and environmental conflicts have raised new issues for conservation biology and conservation medicine.

IPE is monitoring large cats and wild pigs in the remaining forest fragments of the Pontal. Researchers use these animals as “sentinel species” to gauge the overall health of the remaining Atlantic Forest that, although once constituting a continuous forest stretching along the Brazilian coast, has now been reduced to eight percent of its original area. The reduction of habitat has had a concomitant impact on the health of wild populations as contact with people, and particularly their pets and livestock, has gradually increased.

Large cats such as the jaguar (*Panthera onca*), the puma (*Puma concolor*) and ocelot (*Felis pardalis*) are practical bioindicators of general community health since, as top predators, they funnel many environmental and pathogenic components of their habitat (e.g. Edwards *et al.*, 1990). Pumas are particularly vulnerable to diseases of domestic ani-

mals because of their relative tolerance of human-altered habitat. White-lipped (*Tayassu pecari*) and collared (*Tayassu tajacu*) peccaries are other important components of the terrestrial community: both species are effective seed dispersers, their prolific digging creates favorable soil conditions for seed germination and both are important prey for jaguars and pumas. Wild pigs are traditionally vulnerable to diseases of domestic ungulates which, of course, are the main livestock presence in the Pontal.

Beginning with the severe deforestation of the mid-twentieth century until the early 1980, the Pontal hosted primarily sugar cane and intense cattle culture. This system had been of low consequence to wildlife health because cattle were maintained at low densities and, because of commercial considerations, were effectively immunized and generally healthy. Thus, historically, the remnant forests and the wildlife within them had faced low extrinsic pressures vis-à-vis disease, and these primarily from cattle and few other types of livestock.

However, a drastic change in disease dynamics in the Pontal has resulted from recent government-sponsored agrarian reforms and the consequent increase in the settlement of previously landless families on expropriated agricultural land. This has had two main consequences for wildlife health. First, animals tend to be held in considerably higher concentrations on multi-family farm plots than they had been in the previous commercial agro-systems, thus significantly raising the risk of epidemics in domestic and, eventually, wild animals. Moreover, family plots tend to be self-sustaining, such that a more diverse animal stock is maintained, including poultry, swine, equines and a much higher concentration of pet animals (in addition to cattle). This leads to a broader range of pathogens reservoired on farms with the potential to cross into wild species. Hygienic considerations for domestic animals, such as

immunizations and parasite control, also tend to be less rigorous from the point of view of the poor settlers. That the resettlement of thousands of families is irreversible is unquestioned, therefore IPE's focus has been on providing mitigating strategies for the region. One of these has been the monitoring of the most relevant diseases of domestic and wild animals in and around important Atlantic Forest fragments (including feline immunodeficiency virus, feline leukemia virus, brucellosis, and leptospirosis). For example, IPE research so far has ascertained the presence of leptospirosis in 25% of domestic animals tested (including cows, dogs, pigs, horses and sheep) and 78% of wild swine analyzed.

The increase in human population in the Pontal has also generated a nascent non-agricultural base in the few urban centers with the consequence that towns are growing with few planning regards for human or animal sanitation. For example, several urban domestic cats have been diagnosed with feline immunodeficiency virus, a pathogen that has been shown transmissible to wild cats. The eventual dispersal of such diseases into more rural settings is another worry for conservation biologists in the region.

The epidemiological research in the Pontal is relevant for the reasons introduced in the sections above, but includes another facet that has rarely been addressed: the impact of remedial conserva-

tion efforts on wild populations that have reached near-equilibrium in human-altered landscapes. Thus in the Pontal one concern is that the implementation of forest corridors and other strategies that increase the mobility of animals through the agricultural matrix will have the undesired consequence of also facilitating the spread of diseases between forests, whereas before they would have been relegated to single fragments. However, given the precariously low number of most large mammals in the remaining forests, this possibility is outweighed by the risks from inbreeding and low genetic variability that result from isolated forest fragments. Consequently, the emphasis here should be to encourage the maximum amount of genetic exchange between habitat patches. This will sustain acceptable levels of genetic health, making wild populations more adaptable to future perturbations, including disease.

IPE is seeking to ameliorate conditions for both humans and wildlife by encouraging multi-use steppingstone and corridor forests that promote animal movement and also benefit farmers. This has been particularly well-received by the landless settlers because of the multiple benefits that these systems offer, including improved pollination services and the potential harvesting of timber. In order to preempt the spread of potentially devastating epidemics, IPE researchers are also monitoring pathogens in several wild species before and during the planting of the steppingstones and forest corridors.

Ocorrência e abundância de *Pecary tajacu* registrados por armadilhas fotográficas no noroeste de Minas Gerais

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Introdução

O mais significativo impacto ecológico decorrente da ação humana sobre sistemas naturais nos últimos séculos parece ser a perda de hábitat. Dentro desta perspectiva encontra-se o Cerrado,

ambiente natural que vem sendo gradativamente substituído por atividades agrícolas, pecuárias e de reflorestamento por espécies exóticas. Neste contexto, a presente pesquisa tem como objetivo principal o levantamento e monitoramento da

Tabela 1 – Espécies registradas na FBVM, seu Índice de Abundância Relativa (IAR) e *status* de ameaça
*BR – Brasil / MG – Minas Gerais

Espécies	Nome vulgar	IAR	Status*
Ordem Xenarthra			
<i>Euphractus sexcinctus</i>	tatu-peba	0,37	
<i>Mymercophaga tridactyla</i>	tamanduá-bandeira	0,37	Ameaçada (BR, MG)
<i>Tamanduá tetradactyla</i>	tamanduá-mirim	0,37	Ameaçada (MG)
Ordem Carnivora			
<i>Chrysocyon brachiurus</i>	lobo-guará	1,20	Ameaçada (BR, MG)
<i>Eira barbara</i>	irara	0,37	
<i>Leopardus pardalis</i>	jaguaritica	1,86	Ameaçada (BR, MG)
<i>Procyon cancrivorus</i>	mão-pelada	1,86	
<i>Lycalopex vetulus</i>	raposinha-do-campo	2,98	Ameaçada (MG)
<i>Puma concolor</i>	onça-parda	0,37	Ameaçada (BR, MG)
Ordem Perissodactyla			
<i>Tapirus terrestris</i>	anta	0,74	Ameaçada (MG)
Ordem Artiodactyla			
<i>Pecary tajacu</i>	catitu	2,98	Ameaçada (MG)
Ordem Rodentia			
<i>Dasyprocta azarae</i>	cotia	2,98	
<i>Hydrochaeris hydrochaeris</i>	capivara	0,37	
Ordem Lagomorpha			
<i>Sylvilagus brasiliensis</i>	tapeti, coelho	1,86	

comunidade de mamíferos de médio e grande porte numa área de Cerrado no noroeste de Minas Gerais por meio de armadilhas fotográficas (ver metodologia). Este estudo vem a ser um subprojeto oriundo de um projeto de longa duração, iniciado em 1998 e ainda em andamento, denominado “Fauna de mamíferos do Cerrado de Minas Gerais: monitoramento da diversidade de espécies e da densidade populacional”, desenvolvido em três áreas de Cerrado na região norte e noroeste de Minas Gerais e que focava, no seu escopo original, os marsupiais e roedores, também conhecidos como pequenos mamíferos não voadores.

Área de Estudo

A fazenda Brejão, propriedade da Vallourrec & Mannesmann Florestal (FBVM), está situada no noroeste de Minas Gerais no município de Brasilândia de Minas. Tem como principal atividade econômica o plantio de eucalipto (*Eucalyptus sp.*) para produção de carvão vegetal. Possui área de aproximadamente 36.000 hectares, onde destes, apenas 27% são explorados economicamente. A vegetação nativa predominante é o Cerrado (*lato sensu*), incluindo matas de galeria e Veredas.

Metodologia

Para a coleta dos dados estão sendo utilizadas, desde março de 2003, cinco armadilhas fotográficas,

instaladas em locais distintos e em diferentes ambientes (eg: Campo-Cerrado, Vereda, etc.), prevalecendo uma distância mínima de cinco quilômetros entre cada ponto amostrado. O equipamento, inspecionado mensalmente, está programado para funcionamento contínuo (24 h) e com intervalo de 20 segundos entre os disparos. São utilizados filmes negativos 200ASA de 36 poses. Para o cálculo de Sucesso de Captura, consideramos um registro efetivo como sendo uma fotografia da espécie em determinada armadilha-fotográfica num período de 24 horas, excluindo-se os registros seqüenciais de um mesmo indivíduo. Para a estimativa do IAR (Índice de Abundância Relativa) de cada espécie, multiplicamos o número de registros efetivos por 100 e dividimos pelo esforço amostral.

Resultados e Discussão

Os resultados correspondem a quatro meses de amostragem. O esforço amostral foi de 268 armadilhas-dia. Obtivemos 75 fotos com 41 registros de 14 espécies de mamíferos, das quais sete estão listadas como ameaçadas de extinção no Brasil ou em Minas Gerais (tabela 1). O sucesso de captura corresponde a 15,3%, ou seja, um registro efetivo a cada 6,5 dias de amostragem. Dentre as espécies registradas, o catitu (*Pecary tajacu*) apresentou juntamente com a raposinha do campo (*Lycalopex vetulus*) e a cotia (*Dasyprocta azarae*), o maior índice de abundância relativa (IAR). Os porcos-do-mato foram registrados em três dos

cinco pontos amostrados (Vereda, Campo-Cerrado, Cerrado) e também em pequenas áreas de reserva, circundadas por talhões de eucalipto. São animais bastante abundantes e as fotografias registraram os catitus sempre em grupos, não havendo registros de indivíduos isolados. Existem ainda fotografias de uma fêmea adulta seguida por três filhotes além de indivíduos jovens. Espera-se que, com a continuidade deste estudo, seja possível identificar quantas populações estão estabelecidas no local, estimar o número de indivíduos e, assim, inferir acerca da viabilidade das populações de catitu na FBVM.

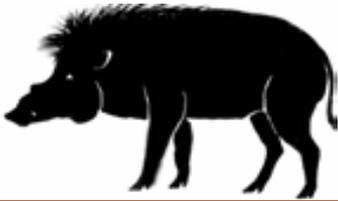
Uma vez que a ferramenta básica deste projeto são as armadilhas fotográficas, alguns fatos indesejáveis ocorreram, como: *i*) diversas ocorrências por problemas decorrentes de mau funcionamento do equipamento, sendo necessário a troca do mesmo, *ii*) invasão de cupins em uma das câmeras e conseqüente perda do equipamento por queima dos circuitos e *iii*) furto de uma câmera, fato registrado em boletim de ocorrência na Polícia Ambiental de Brasilândia de Minas.

Apoio

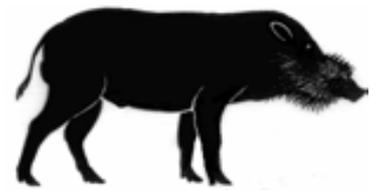
O presente projeto é financiado pela iniciativa privada, num convênio entre a Vallourrec & Mannesmann Florestal e o Laboratório de Mastozoologia e Manejo de Fauna da Universidade Federal de Minas Gerais.



Collared Peccary from Tucavaca, Bolivia. Photo by WCS Bolivia



Papers and communications



First Visayan piglets in Rotterdam Zoo

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The dry season has ended a while ago in the Philippines, which means that many animals have been busy reproducing. The Visayan warty pigs too have produced offspring in the forests of the island of Negros. However, the Philippines are not the only spot where one can feel the will to propagate: also in Rotterdam Zoo the Visayan warty pigs seem willing to reproduce. Only recently, three piglets were born. Hopefully, the other pairs will have youngsters very soon too, as it is the highest time that the captive population starts to grow.

Two breeding programs

In the wild, the Visayan warty pig can be found on only two islands: Panay and Negros. Unfortunately, hardly anything is left from the natural habitat of this pig. Only three national parks still harbour Visayan warty pigs, but here too they are threatened by poaching and illegal logging. That is why a project was started in the nineties to protect and breed the Visayan warty pig in order to prevent it from becoming extinct.

It is believed that the warty pigs from Panay and Negros are not completely identical (for instance, the pigs from Panay are said to have longer manes). Therefore, two different breeding programs have been set up. For the first program involving the Panay-pigs an agreement was signed in 1993 by San Diego Zoo and the Philippine government. San Diego Zoo is now collaborating with a breeding centre of Panay university. The second breeding program was initiated in 1995 when Rotterdam Zoo agreed with the Philippine government to breed the pigs from Negros. This 'European' breeding program is a joint effort together with two other breeding centres on Negros.

Although the pigs have been sent to Europe and the United States, they remain the property of the government of the Philippines. Moreover, participating zoos are obliged to provide the conservation projects on Panay and Negros with financial support.

Traveling pigs

Whereas the zoo of San Diego has been breeding the Visayan warty pigs for quite a while now, Rotterdam Zoo has welcomed three pairs just a couple of months ago. These pigs have arrived in November after a long trip.

Four males and four females were gathered in March 2004 at the breeding centre of NFEFI in the north of Negros. NFEFI is a conservation agency which is involved in breeding Visayan warty pigs, but also with other threatened animal species such as the Philippine spotted deer. Some of the pigs that were brought together originated from the other breeding centre on Negros, CenTrop. Alas, during the transport to NFEFI two pigs died due to stress. Fortunately, a second attempt proved to be more successful.

In special boxes the eight pigs were moved to the airport of Bacolod City from where they flew to Europe. Before going to Rotterdam however, the pigs went to Poznan Zoo in Poland where they arrived safely. After a six month period in quarantine in the Polish zoo they were transported to Rotterdam Zoo. One pair stayed in Poznan Zoo because the keepers suspected the female to be pregnant. Indeed the sow gave birth to one piglet in April this year. Soon they will join the rest of the Visayan warty pigs in Rotterdam.

Future plans

Now that the Visayan warty pigs are here expansion of the group is needed badly. In the States the breed-



Figure 1. Drawings of Visayan Warty Pigs in Rotterdam Zoo by Ben Kubbinga

ing efforts have resulted in a large bunch of offspring. As they are living in one big group this is a great view for the visitors. Now, it is Rotterdam's turn to expand the population. One pair has already produced three piglets; the other two will probably have offspring in the near future as well. As soon as Rotterdam Zoo has enough pigs to continue breeding, other zoos in Europe will participate in the program. This will eventually bring about a large captive population which is entirely owned by the Philippine government. Once a large population is established, it might be possible to release some animals back into the wild, in order to supply the wild population (comprising ca. 100-200 individuals!) with new pigs, thus preventing the population from becoming extinct.

Other Philippine projects

The conservation project of the Visayan warty pig is not the only project for endangered animal species in the Philippines. Earlier a similar project was launched for the severely endangered Philippine spotted deer. Conservation agencies in the Philippines are cooperating with Western zoos whereby the Philippine government stays the official owner

of the deer. And here too, zoo who participate have to support conservation efforts *in situ*. This approach seems to be very effective, as conservation agencies like NFEFI on Negros are now able to build extra shelters for the animals and educate local people, including school children and farmers.

Outside the Philippines, the Philippine spotted deer are being bred in zoos in the United States, Australia and Europe. Since its distribution is almost identical to that of the Visayan warty pig, two separate breeding programs have been set up. The deer from Panay were housed in American and Australian zoos. The breeding program of the deer from Negros takes place in Europe and is coordinated by Mulhouse Zoo (France). Rotterdam Zoo is also taking part in this program: by breeding the deer and by paying the salary of an education officer at NFEFI.

The elegant brown spotted deer can be seen together with the Visayan-warty pigs in the Malayan Forest exhibit of Rotterdam Zoo. The new piglets can be found inside the Asia-house – tiny, light-brown and striped creatures, closely resembling piglets of the common wild pig. With a little bit of luck, many will follow.



Photo by Ben Kubbinga of Visayan Warty Pigs at Rotterdam Zoo

The parasites of the Eurasian wild boar, *Sus scrofa*, in Iran: An emerging implication for public health

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Introduction

The European wild boar, *Sus scrofa* Linnaeus, 1758 (Mammalia: Suidae) is distributed all over Eurasia including Iran. Among its several subspecies, *S. scrofa attila* Thomas, 1912 is the one that occurs in different parts of Iran. Although no accurate estimates of the Iranian wild boar population is available at present, it is evident that this animal is a frequent inhabitant of regions of dense forests in littoral regions of The Caspian Sea and Persian Gulf in north and south, respectively, as well in dense oak forests in west, north west, north east, and south west of this country owing to the abundance of diet. These creatures also are found even in desert lands of south east of the country neighboring Pakistan. Of omnivorous characteristics and high adaptation capacity, this animal includes seeds, fruits, mushrooms, reptiles, amphibians, insect larvae, birds, and their eggs, small rodents and even carrions in its diet. However, in Iran the main diet is rots, bulbs, acorns, and beech nut. Analysis of the stomach contents of wild boar in agricultural areas of Luristan in western Iran revealed that wheat, vetch, lentils, grain, and maize were the commonest food items consumed. Other diets commonly consumed by these creatures were soil, amphibians, small rodents, roots, bark and other vegetable materials. Farmers local believe that this animal does not like the farmed crops equally. They believe that boars like to attack pea and wheat fields more than other crops. In cultivated farms of cane sugar in Kuzistan in south western Iran, the sugar cane was the commonest food item, but that usually more than one type of food had been eaten.

Nowadays, in absence of natural enemies, *S. scrofa* is considered to be the most common important vertebrate pest, causing a wide range of damages to the cultivated farms in rural regions of Iran. These

animals are usually shut by farmers to protect agricultural crops, but some ethnic minorities including Christian Armenian and some gypsy tribes hunt wild boar illegally and use its meat in preparation of a delicacy.

In Iran, litter size is usually between 4 and 8 piglets and up to 10 piglets per litter are not uncommon (Etemad, 1985). Similar findings have been reported from Iraq and Armenia, both neighboring Iran, where 5 and 7-10 piglets per litter as being usual (Harrison and Bates, 1991). In contrast to its domestic derivatives, reproductive activity in *S. scrofa* tends to be seasonal and positively correlated with the relative availability of principal foodstuffs or related climatic factors (Oliver, 1993). For example, in tropical countries, such as Sri Lanka, peak estrus activity has been recorded during the wettest months of November and December (Santiapillai and Chambers, 1980). In cooler areas of Iran, peak estrus activity has been recorded in mid winter; in contrast in warmer regions it seems that boar mate earlier in mid fall and piglet are born in late winter.

Wild boars are the definitive host of a variety of helminth and protozoan parasites from which some of them are transmissible to humans (de-la-Muela, et al, 2001; Solaymani-Mohammadi, et. al, 2003; Solaymani-Mohammadi, 2004). Wild boars have been mentioned as hosts for trichinosis in Russia and other European countries (Gari-Toussaint, et.al, 2005). Relatively little research; however, has been done on the occurrence of parasitic infections between Eurasian wild boars; nearly all of the existing information comes from studies in the European countries including Germany, Spain, and Italy. There are some limited reports on the parasites of boar in Iran, most of which are from northern and western Iran (Eslami and Farsad-Hamdi, 1992; Solaymani-Mohammadi, et. al, 2003; Solaymani-Mohammadi, et. al, 2004). A total of sixteen and seven different

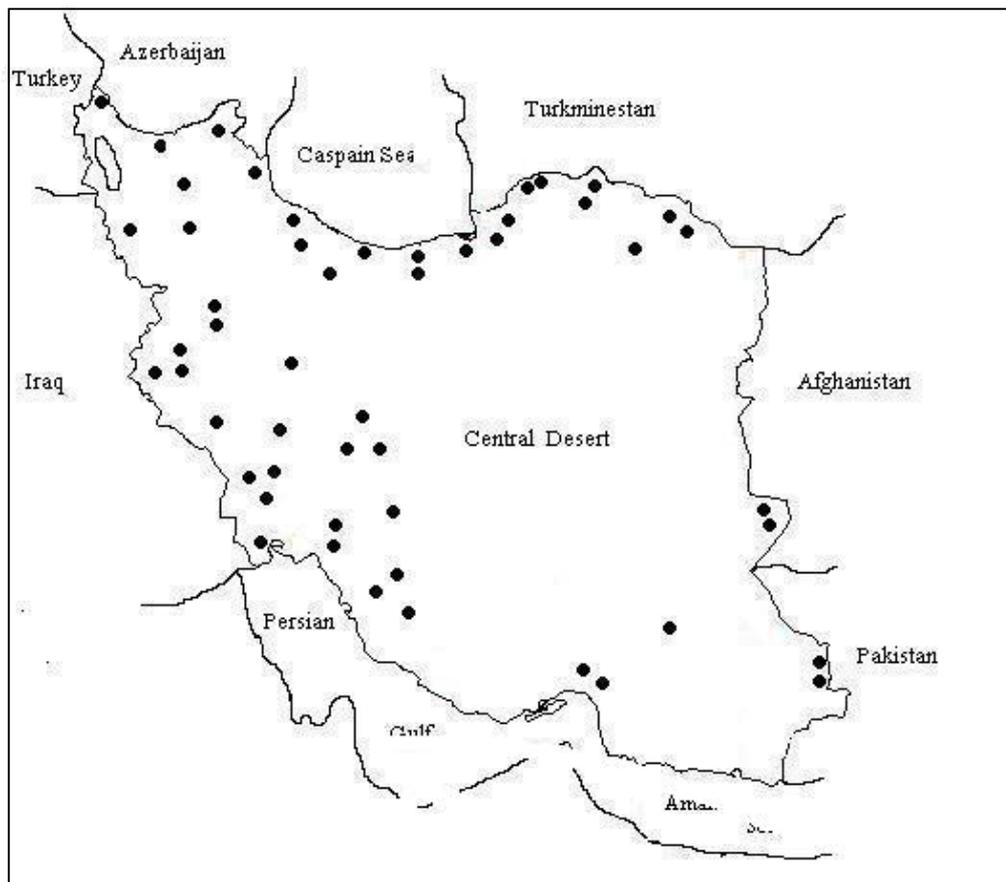


Figure 1. Distribution of Wild Boar in Iran (indicated by black dots)

helminth and protozoan species have been reported from Iranian wild boars.

The direct contact of boars with farm lands, resulting in their contamination by the parasites of this animal. This may increase the chance of transmission of the parasites to humans, especially in rural areas that boar roam freely. These animals make use of different diets, and this may explain the diversity of parasites having been detected in wild boar in Iran (Solaymani-Mohammadi. *et.al*, 2003). Some important parasites of boar that are transmissible to humans are discussed here:

Helminths:

Trichinella spiralis (Owen, 1833) occurs in the small intestines of pig, men, wild boar, rat and many other mammals. Independent sylvatic and synanthropic-zoonotic cycles of infections occur. The sylvatic cycle involves wild carnivores such as foxes, jackals, wild boars, black bears, bush pigs, and these animals maintain the transmission. In some parts of the world, sporadic outbreaks occur due to the consumption of meat of wild boars and warthog (Nelson et al, 1961). Although trichinosis frequently occurs in a wide variety of Iranian canids, but only 0.04% of boars examined in northern Iran were found to be infected by *Trichi-*

nella larvae (Afshar and Jafarzadeh, 1967). There is no report of human trichinellosis in Iran due to the fact that Iranians, on religious background, do not consume wild boar meat.

Trichuris suis (Shrank, 1788) occurs in pigs, wild pigs and wild boar. It is cosmopolitan in distribution. Morphologically, it is identical to *T. trichura* of man. Some workers believe that the two to be identical (Soulsby, 1982). Additionally, the successful experimental transmission of *T. suis* of pigs to humans have been reported. In western and northern Iran, 8.3% and 4% of wild boar examined in were infected by *T. suis* respectively. Although the human counter part of the parasite, *T. trichura* is prevalent in some parts of this country, there is no report of human infection by this parasite.

Taenia solium (Linnaeus, 1785) occurs in the small intestine of man and experimentally and it has been established in the gibbons and the chacma baboons. The pigs (and wild boar) are the main hosts of the adult form. Infection is common in areas where villages are not supplied with sanitary facilities and where the pigs run loose scavenging for food, with ready access to human faecal materials. According to this, human infections have been reported in some

countries, especially in Latin America, Mexico, Peru, and southeastern Asia, where people eat cured or insufficiently cooked pork. To date, human infections with adult worms have not reported in Iran, although infections with worm larvae, *Cysticercus celulosae*, have been detected frequently. This shows that, at least in some parts of Iran, the wild boar-human cycle has been established, despite the religious ban on pork consumption (Solaymani-Mohammadi, et. al, 2003). It is interesting to note that, in Iran, contrary to other countries, wild boar is the solitary reservoir host for human taeniasis solium.

Macracanthorhynchus hirudinaceus (Pallas, 1781) is widespread in the world, with swine, wild boars, and peccaries serving as final hosts. A history of either accidental or intentional ingestion of arthropods, especially dung beetles, is related to human infection. Most of the several hundred infections documented in humans are from China (Leng et. al, 1983).

In Iran, this acanthocephalan parasite has been frequently found in a variety of canids and in wild boars (Eslami and Frasad-Hamdi, 1992; Solaymani-Mohammadi, et.al, 2003). Dung beetles are abundant in the rural areas of Iran, especially in the warm months of late spring and summer. Although no human infections having been report from Iran, it is evident that such high prevalence in wild boars and presumably high contamination of farm land represent a human infection for farmers by accidental ingestion of infected intermediate hosts.

Protozoa:

Wild boars are involved in transmission of some protozoa to humans from which *Balantidium coli* is of great medical importance and discuss here in details. In addition, *Entamoeba polecki* is of less medical importance, and always is misdiagnosed as human pathogenic species *Entamoeba histolytica*.

Balantidium coli (Malmstein, 1857) Stien, 1862 is widespread in swine, and it is likely that it will be found in any pig if an adequate examination is undertaken. The prevalence of the infection in man is much lower, and prevalences of 0.6-1% have been recorded. The pig (and wild boar) appears to be the primary hosts, and in them *B. coli* is generally regarded as a commensal. Occasionally infections

of other animals (including dog and camel) with *B. coli* have been reported. This parasite has been reported from wild boars in some parts of the world including Western Europe, Japan and Iran (Nakauchi, 1999; Solaymani-Mohammadi, et. al, 2004). Human infection is a zoonosis and is usually acquired from swine through the contamination of foodstuffs, fingers, etc. with pig faeces. High rates of animals examined were in infected by this parasite, suggesting the potential role of this animal in the transmission of the disease to humans.

Iran is one of the most important endemic foci of human disease in the world (Solaymani-Mohammadi. et.al, 2005). Human infections are reported from nearly all parts of the country especially in southern, western, and northern of the country. The pig husbandry is prohibited in Iran on religious background; therefore, pig can be excluded as the source of human disease. It is interesting to note that the reports of human balantidiasis correspond with the distribution of wild boars in Iran. Previously, we concluded that "*wild boars are probably a source of B. coli infections in humans in Iran, especially in rural areas where wild boars are abundant and where their feces could contaminate soil and water, bringing local inhabitant into direct with this parasite....*"(Solaymani-Mohammadi. et.al, 2004; Solaymani-Mohammadi. et.al, 2005).

Entamoeba polecki is found in monkeys, pigs, and wild boars all around the world. In rare cases it has been reported to cause human infections. Gay et al. (1985) reported the presence of *E. polecki* for the first time from a group of eight refugees from South-east

Asia. Most infected persons are individuals, and *E. polecki* is considered to be non-pathogenic in humans. Although no human infections have been reported so far, this parasite is a commonly found protozoan parasite found in Iranian domestic and wild suids (Shieban, 1971).

Wild boars are likely to be involved in the epidemiology of parasitic zoonoses by acting as reservoir hosts for parasites that could survive in sylvatic cycles, independent of domestic cycle. In Iran wild boar has been seen approaching human settlements in rural areas of the country, probably due to the prolonged dryness suffered in many Iranian regions in the past decade. Such close proximity may accelerate the direct contact of boars with farm lands resulting in their contamination by the parasites of the wild boar.

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Critically Endangered Sumatran Tiger threatened by organised hunt

FFI News release, Cambridge, UK. December 10, 2004

A Sumatran pig hunting association is planning a hunt with up to a thousand men and dogs in an area adjoining one of the most important tiger sanctuaries in the world. Although the area designated for the hunt is outside of Sumatra's Kerinci-Seblat National Park borders, Critically Endangered and protected wildlife that will be threatened includes Sumatran tigers, Asian golden cats, clouded leopards, Malay tapir, sun bears and at least four species of deer. Evidence suggests that the skins of two Sumatran tiger cubs seized recently in the area were from animals killed by pig hunters.

Porbi, a Sumatran pig hunting sports association will hold a mass pig hunt and demonstration of pig baiting with dogs at a festival to be held on the 12th December 2004. The hunt, arranged in conjunction with the Pesta Danau Kerinci festival is supported by the Kerinci district government, but has dismayed local NGOs as the festival is intended to promote the area as an eco-tourism destination.

Rusdi Fachrizal, a Sumatran conservationist working on tiger conservation in Kerinci district said

"We are very unhappy about this. The case of these two tigers cubs shows that pig hunters are operating outside of the rules and without control. We do not think that encouraging big organised pig hunting and pig baiting is going to help develop nature tourism in Kerinci and for so long as the hunting groups are not supervised and do not operate within the guidelines, they are a threat to rare animals in and around the national park."

Additional notes

The skins of the two Sumatran tiger sibling cubs were recently seized in a joint operation between Kerinci-Seblat National Park and Kerinci District police officers based on information from an undercover investigation by the national park's tiger protection team. Examination of the skins revealed that the cubs died in a frenzied attack by five or more men armed with spears and machetes - injuries consistent with the killing being carried out by pig hunters. An eyewitness to the killing has also confirmed that this was the case. The tiger skins had been concealed in the house of a Kerinci police officer and were on sale on the black market for USD550 each. It is not known what legal action is being taken against the police officer.

Sumatran tigers

The Sumatran is the smallest subspecies of tiger, and is listed by IUCN (the World Conservation Union) as Critically Endangered, with less than 400 individuals now surviving in the wild. They are threatened by poaching for their skins and body parts (for use in Chinese traditional medicine), and by habitat loss, which also leads to conflict as they increasingly encounter people and their livestock. Over-hunting of their prey species by humans (such as deer and wild pigs) further increases the likelihood of conflict, as they are

forced to take livestock for food.

Kerinci

Kerinci district in the heart of Sumatra is famous as the site of Indonesia's biggest active volcano, Mt Kerinci (3805m), and for its spectacular scenery. It is surrounded by the Kerinci-Seblat National Park, one of the largest national parks in Asia and one of the two most important tiger sanctuaries in the world.

Kerinci-Seblat National Park Kerinci Seblat National Park (KSNP) covers a total of approximately 1.35 million hectares (more than 13,000 sq. km) of forest running for almost 400km north-south down the Barisan mountain range of western Sumatra. It is the second-largest national park in Southeast Asia, encompassing areas of four provinces of Sumatra - Jambi, South Sumatra, Bengkulu and West Sumatra. Approximately 80 tigers remain within the park. Over the last three years Fauna & Flora International (FFI) has worked with the Sumatran Ministry of Forestry to prevent tiger poaching, establishing three Tiger Protection and Conservation Units (TPCUs) each comprised of one National Park Ranger and three community rangers. FFI's Tiger Protection Project found that in 2003, regular patrolling led to a significant reduction in the amount of snares discovered, suggesting an overall reduction in poaching. Over the period that the project has been active, more than 91 arrests have been made both inside and outside the borders of Kerinci-Seblat National Park, for offences including poaching and trafficking in Sumatran tiger parts and other species, possession of illegal firearms and illegal logging.

New field project to study the effects of selective logging on bearded pigs and sun bears in Borneo

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A new field study on bear pig (*Sus barbatus*) and Malayan sun bear (*Helarctos malayanus*) has commenced on March 2005 at Ulu Segama Forest Re-

serve and Danum Valley Conservation Area, with logistics stations in Danum Valley Field Center, Sabah, Malaysian Borneo. The project aimed to inves-

tigate the effects of selective logging on Malayan sun bears and bearded pigs by comparing various ecological parameters of bears and pigs in logged and primary forests. These ecological parameters include home ranges, activity and movement patterns, population densities, habitat selection, physical condition, food habits, and food qualities. The methods that will be use including radio tracking, camera trapping, scat analysis, and collect basic information on fruit and invertebrate production in both forest types for 24 months. During the first phase of the project (March-June 2005), three focal areas in each primary and logged forests have been identified, and a 2-km transect lines have been established in each focal area. We have been collecting fruit production information using fruit traps, fruit-on-trail, and monthly monitoring of trees phenology since March 2005. We monitor inverte-

brate abundance by setting up pitfall traps and recording the abundance of two species of beetle nightly at the center. We also collected information on animal signs, such as feeding sites, trees with bear claw marks, trees with pig rubbing signs, mud wallow, and microhabitat features to investigate habitat preference. Animal trapping has been delayed due to funding and other logistics difficulties. The next six months of fieldwork will concentration on trapping and radio-tracking animals in the study area, at the same time resume all data collection on fruits, invertebrates, and animal signs. Please feel free to contact us if you have any question regarding our project. We hope this project will catalyze more studies on these two little known species that play important roles in the rainforest ecosystem of Borneo.

A preliminary survey of bearded pig (*Sus barbatus*) in Malinau river forest, Bulungan, East Kalimantan, Indonesia.

Titiek Setyawati, Steve Read and Graeme Coulson

Email: titieks@mail.student.unimelb.edu.au

Poster abstract

The bearded pig (*Sus barbatus*), is a large wild pig of South East Asia, the species is widespread in tropical rain forest, feeding mostly on fruits and seeds of forest trees, particularly dipterocarps. Habitat degradation through logging of dipterocarps is believed to reduce the availability of food available and the loss of habitat for foraging and breeding, although little is known about the pig's diet and habitat use in response to logging. A preliminary populations survey of the bearded pig was therefore carried out in the lowland Inhutani II Malinau forest along the Malinau River, district of Malinau, East Kalimantan, Indonesia, in the rainy season from Dec 2002 to Jan 2003. There were three study sites: forest logged conventionally in 1998/99 (CL), forest logged in 1999/2000 using reduced-impact logging (RIL) and unlogged primary forest (UL). The forest was dominated by dipterocarp species, with patches of dense shrubs and regenerating species such as *Macaranga* sp, *Anthocephalus cadamba*, and *Trema*

orientalis in logged forest. Relative densities of pigs were estimated from tracks and other traces along line transects, and from direct sightings on reconnaissance walks. Indirect evidence and sightings of pigs were lowest in RIL and highest in UL. Reconnaissance walks proved to be easier to conduct than line transects in the difficult topography of the Malinau area, although a combination of both methods would be needed for accurate monitoring of bearded pig populations in areas of dense understorey.

Note:

This paper was presented in the 3rd International Wildlife Management Congress, 1-5 December 2003, in Christchurch, New Zealand. This abstract has been published in 3rd International Wildlife Management Congress, Program and Abstract: Incorporating the 16th Annual Australasian Wildlife Management Society Conference (p. 271).

RECTIFICATION: The photo titled "Hunted bearded pigs in Malinau" (Vol. 4(2): 47) was actually taken by Titiek Setyawati, not Douglas Sheil.

Wearable GPS transmitter for Wild Boar (*Sus scrofa*) - from a poster presented at the 9th International Mammal Congress, Sapporo, Japan

Takeuchi M., H. Ueda and J. Nakatani

Wildlife Management Laboratory, National Agricultural Research Center for Western Region, Shimane 694-0013, Japan. Email: MASAHIKO_TAKEUCHI@affrc.go.jp

Background and Purpose

Agricultural damage by wild boar is a serious problem in western Japan.

Trapping is a measure to fight wild boar damage.

But then, feeding for trap attracts wild boar to crop fields.



We scrutinize hunting activity on movement behavior of wild boar. By means of GPS tracking, but...

...We must avoid current collar or harness-transmitter



because neck of wild boar is less constricted and its circumference varies 20% in size seasonally.



New attachment for wild boar to load a GPS transmitter

The vest is processed to shirr it.

Weigh 350g for 70Kg size adult wild boar

A cloth is made from para-aramide fibres (Kevlar®).

Put cloths together with the magic cloth

15% elasticity

Lightweight

High tearing strength

Easy installation in the field working



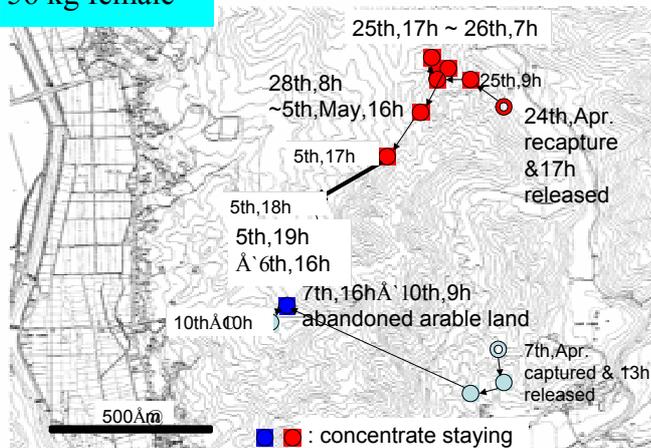
Manufactured by TEIKOKU SEN-I, Tokyo



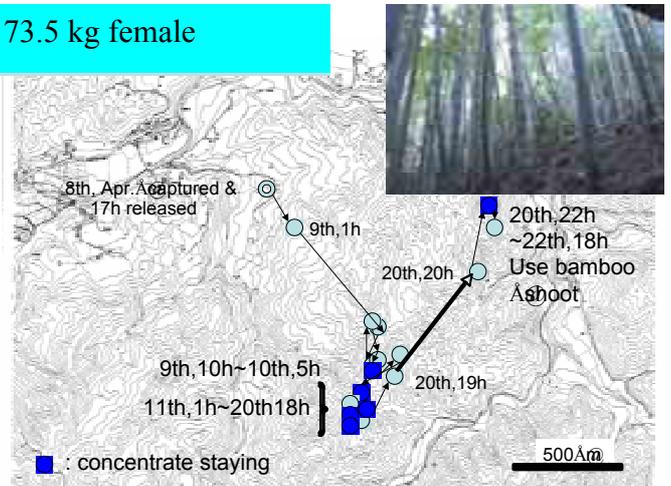
Field studies

Two adult females were captured and were fitted with GPS transmitters.

56 kg female



73.5 kg female



Wild animals can take off (shrug off).

Now, improving.



From our colleagues at Pig Trop: <http://pigtrop.cirad.fr/en/index.html>



International Species Information System



This information was taken from the Pig Trop website. Actual links to ISIS and species listed below can be found at: http://pigtrop.cirad.fr/en/inquisitive/SV_isis.htm

ISIS is a non-profit organization that maintains computer-based information systems used by the worldwide zoological community.

Information in the ISIS system helps members meet increasing conservation responsibilities as natural wildlife habitats disappear or become untenable. Because less than four percent of the Earth's land surface is protected from development, most zoological populations must be self-sustaining, rather than dependent on wild-caught stock. ISIS data indicates that 82 percent of new zoo mammals are now born in captivity, along with 64 percent of birds and a majority of reptile species. Unfortunately, zoo populations of many species may be all that we have left.

ISIS supports coordinated captive conservation programs in several regions of the world. In numerous other cases, captive propagation in zoos and other facilities are being used to augment threatened wild populations.

→ Find animals in zoological parks

With the help of the database system, you can find animals: try the following links in Mammalia / Taxonomic Names to access information about suids:

Phacochoerus aethiopicus / Desert warthog
Phacochoerus africanus / Warthog
Phacochoerus africanus sundevallii / Warthog
Phacochoerus africanus sundevallii (Group) / Warthog
Potamochoerus larvatus koiropotamus / African bush pig
Potamochoerus larvatus nyasae / African bush pig
Potamochoerus porcus / African bush pig
Potamochoerus porcus (Hybrid) / African bush pig
Potamochoerus porcus pictus / African bush pig
Sus barbatus / Bearded pig



Sus scrofa vittatus / Wild boar
Tayassu / White-lipped peccary
Tayassu (Group) / White-lipped peccary
Tayassu pecari / White-lipped peccary
Tayassu pecari (Group) / White-lipped peccary
Tayassu pecari albirostris / White-lipped peccary



→ **Who can become a member of ISIS?**

Zoos, aquariums, animal conservation organizations and other professionally-managed public facilities that care for captive animals are typical ISIS members. In addition, zoo and aquarium associations and associations of zoo professionals may apply for formal representation in ISIS. In limited circumstances, educational facilities may become members of ISIS.

→ **More details** <http://www.isis.org>

NEW PUBLICATION | • Iberoamerican Swine Biodiversity: Characterization & sustainable use
[Biodiversidad Porcina Iberoamericana: caracterización y uso sustentable]

The Latin American Program of Science and Technology for the Development reaches a new goal with the publication of the book "Latin American Pig Biodiversity: Characterization and sustainable use", presented within the activities of the Latin American Network of the Local Domestic Animal Biodiversity for the Sustainable Development.

Here is a monograph made like a praiseworthy and commendable initiative oriented to the best knowledge of the history and evolution of the genetic animal resources in the world; referring in Ibero-America it occupies an emptiness in this matter.

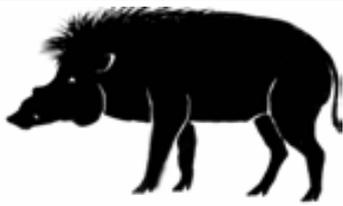
The great importance is doubtless that the pig has on the Latin American agrarian development, since it constitutes a protein source of high level and has a great potentiality for the product obtaining with quality and elevated price, with great amount of sub-operated genetic forms and with production systems that can produce a great environmental impact.

It agrees this presentation with the celebration of

VII the World-wide Conference on Biodiversity in Kuala Lumpur (Malaysian), that is a support of the basic postulates but in the agreements reached in 1992 in the Earth Summit of Rio de Janeiro, to restrain the loss of biodiversity and to introduce the necessary measures for the maintenance and improves of the species.

The compilation of the different national experiences stands out in this monographic work, which allows to have an ample and comparative vision of the different organizational models and management of the production, the maintenance and improves of the ancestries, and that will suppose, without a doubt, a stimulus for the improvement and optimization of the scientific and technological plans of cooperation in the Latin American countries.

This work has been possible thanks to the collaboration of numerous groups of scientists who welcomed with interest this initiative and which they have made a very fruitful effort for the elaboration of the different chapters. Program CYTED, when supporting the publication of this book hopes to be able to contribute to the conceptual systematization and the thorough knowledge of this problematic one in the Region, with the advantages that it supposes for a suitable agrarian operation of this resource animal. The made task deserves all our gratefulness, that corresponds of very special form to all those that, under the direction of Juan Thin Vicente, publisher-



Brief Conservation News



Brief conservation news (1)

Conservationist turns to pig to study pheasant

John Roach

for National Geographic News

When John Rowden asks local villagers on the Southeast Asian island of Borneo what they know about the Bulwer's pheasant, the first thing they almost universally tell him is "the bird is delicious," he said.

That's not the answer Rowden is seeking. He's an ornithologist with the New York-based Wildlife Conservation Society and curator of animals at the Central Park Zoo. Since 1999, he's traveled to Borneo several times every year to learn as much as he can about the elusive pheasant.

Bulwer's pheasants (*Lophura bulweri*) are chicken-sized birds. Males have bushy white tails and folds of brilliant blue skin on their faces. Females have folds of brown skin. The pheasants are found in the wild only on Borneo and are thought to number no more than a few thousand.

Meanwhile, few of the pheasants kept in zoos around the world will breed. Rowden's trips to Borneo are part of an effort to figure out how to orchestrate better chemistry between captive pheasants.

According to Rowden, a new generation of captive pheasants would help raise awareness of the birds and the conservation crisis they face in their native habitat.

In addition to being a delicacy for local villagers, the pheasants are threatened by the rapid loss of Borneo's tropical rain forests. A study published February 2004 in the journal *Science*, for exam-

ple, found lowland forest cover in the Indonesian province of Kalimantan decreased by more than 56 percent between 1985 and 2001.

Borneo is the world's third largest island (behind Greenland and New Guinea) and is shared by the countries of Indonesia, Malaysia, and Brunei. Rowden said the logging in Malaysian Borneo is better than in Indonesia only because protected area boundaries are respected.



Photo: Bearded Pig in East Kalimantan (by Kimabajo)

Bearded Pigs

Hoping to learn how the pheasants breed in the wild before the birds and their habitat disappear, Rowden spends a lot of time asking villagers for their local knowledge. After they tell him how good the Bulwer's pheasants taste, they say "if you want to find the birds, look for [bearded] pigs," Rowden said.

The bearded pig (*Sus barbatus*) is marked by an elongated head, narrow body, and abundant whiskers on its chin. It can measure as long as 5.5 feet (1.7 meters) and weigh upwards of 330 pounds (150 kilograms).

According to the observations of the villagers, the pheasants follow the pigs as they forage for things like tubers and bulbs. In the process of their foraging, the pigs scare up grubs that the pheasants eat. The pheasants may also eat the scraps the pigs leave behind.

Erik Meijaard is an expert on wild pigs, including the bearded pig, at The Nature Conservancy-East Kalimantan Program. He said he's "heard similar stories from villagers in various parts of Kalimantan, but never actually witnessed pigs and pheasants together."

Rowden said the reasons for the association are scientifically unknown, but that he and other researchers plan further studies. One hope, he said, lies with the government in the Malaysian province of Sarawak on Borneo. The government is interested in learning more about the bearded pig population status since it is a major staple in the local diet.

"They want to ensure such an important [food source] is protected, there is an abundance of pigs around. So it gives them an interest in studying pigs and – excuse the pun – I'm piggybacking on that to get more support for the Bulwer's stuff," Rowden said.

Conservation Importance

Meijaard said that bearded pigs are an underrated species in Bornean conservation. "They are the most important source of animal protein in many

inland communities and when pig populations decline there is a hunting shift to other, more endangered species like primates," he said.

Rowden's studies in Borneo have yet to yield the magic something that compels captive Bulwer's pheasants to breed. However, he said the work has opened the door to a larger conservation project the he believes will help save Borneo's remaining rain forest.

"If we don't have a species to show people this is an amazingly cool bird, that's unfortunate. But we're doing good work on the ground protecting habitat and that's ultimately what we're fighting for," he said.



Photo: Male Bulwer's Pheasant

Brief conservation news (2)

Over 300 hippos died mystically in Uganda

www.chinaview.cn 2005-04-20 16:24:01

KAMPALA, April 20 (Xinhuanet) -- Controversy has erupted over how more than 300 hippos have died in Queen Elizabeth National Park, some 438 km west of Kampala.

Local reports indicate that some of the hippos were poisoned so that their teeth is sold off, add-

ing that each tooth goes for 4,500 shillings (about 2.86 US dollars).

The Head of the National Task Force for fighting anthrax, Nicholas Kauta told Xinhua by telephone on Wednesday that the samples that the task force tested indicated that the hippos died of anthrax.

"It is very dangerous for one to extract teeth from a hippo that has died of anthrax because the disease will definitely kill him or her," said Kauta.

Kauta however did not rule out the possibility that some of the hippos were poisoned because some of

the carcasses were not tested.

Uganda Wildlife Authority officials however insist that the hippos died of anthrax arguing that if poison was used then other animals would have died as well.

Local reports indicate that a Japanese trader based in Dubai, who wants five tons of hippo teeth could have fueled the killing of the hippos. About 300

hippos were killed since mid last year but deaths had stopped last month.

Hippos are listed as endangered animals under the Convention on International Trade in Endangered Species of wild flora and fauna. Its teeth are used for making bangles, bracelets and necklaces that are on high demand in Asia. Enditem

Brief conservation news (3)

300 carcasses buried without teeth

New Vision (Kampala)

April 20, 2005

Gerald Tenywa

Kampala

MANY of the carcasses of the hippos that were killed by anthrax in Queen Elizabeth National Park were buried without teeth. This has prompted civil society sources to say some of them were poisoned, even though the Uganda Wildlife Authority (UWA) insists that anthrax killed them. Other sources say a Japanese trader based in Dubai, who wants five tonnes of hippo teeth, could have fuelled the killing of the hippos. Hippos are listed as endangered animals under the Convention on International Trade in Endangered Species of wild flora and fauna. Hippo teeth are used for making bangles, bracelets and necklaces that are on high demand in Asia. Some fishermen were keeping the teeth and an unnamed trader had already bought some of them from Katungulu fishing village. They sold each tooth at sh4,500, down from sh5,000, and the fishermen gave in on the understanding that large stocks would be bought. The fishermen told this reporter, who disguised as a trader, that they could collect the teeth in about a week because they were scattered in various fishing villages. They said the largest stocks were in Katungulu and Kasenyi on the fringes of Lake George, within the park. However, Moses Mapesa, the acting executive director of UWA, said, "We know for sure that the hippos died of anthrax," adding that if poisoning was used to hunt down hippos then other animals and insects would have been killed as well. However, other wildlife officials conceded that some of the carcasses were missing teeth and vowed to mount a crackdown on their illegal possession.

Brief conservation news (4)

Pygmy Hogs are not extinct

Sukhendu Bhattacharya in Assam | July 08, 2005 17:58 IST

Pygmy hogs (tiny wild pigs), feared to have disappeared from forests, are not extinct. Known to be present in only two Assam wildlife sanctuaries in the whole world, the pygmy hog may be one of the prized members once again in the Bornodi wildlife sanctuary. Located near the Mangaldoi township is the sanctuary, which is otherwise known among researchers as the home of another endangered species in the world, the slow loris.

"Due to its remoteness and deplorable road condition, we have very few tourists with only people doing research, mostly from south India, occasionally visiting the park," says Mangaldoi Wildlife Division Divisional Forest Officer M Momin.

Seven nests, believed to be that of the hogs, were found early this year, raising hopes of the presence of the shy tiny creatures in this remote sanctuary.

Excited at the discovery, Momin claims that the forest department examined all aspects before coming to the conclusion that those belonged to pygmy hogs.

Although the habitats of the wild boar and the pygmy hog look almost the same, the shrub by which the nests are made are different, he says. "Experts have also tested the droppings of the animals which have been sent to competent authorities, including the Pygmy Conservation Centre in Guwahati and veterinary institutes, to confirm the presence of the creatures," the DFO says.

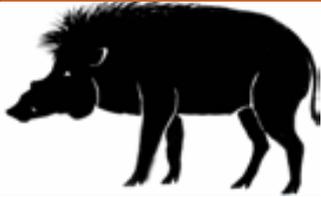
"We are awaiting their reply. But the findings and the sighting of two pygmy hogs by a forester, a couple of months back inside the sanctuary, has given us a lot of heart," he added.

The Pygmy hog, believed to be present only in the Manas Wildlife sanctuary, a world heritage site, and Bornodi, has a tragic tale. Almost the entire species was feared to have been wiped out, forcing experts to build the conservation centre in Guwahati which has been hugely successful in captive breeding of the animal.

The reason for the fast dwindling numbers was that the hogs were easily poached as they were not fast runners. Being tiny, almost like a mouse, the creatures are difficult to spot inside thick jungles leading to the assumption that they might have been totally wiped out, Momin says.

Villagers setting fire frequently to forest areas was another reason for the numbers coming down but gradually with awareness increasing among people, hunting had now stopped, Momin said.

"We have adopted all precaution this time to ensure that the pygmy hog stays and sought necessary help and guidance from the appropriate authorities so as to build a congenial habitat this time", he said.



New Literature on Suiformes



Book

The Whole Hog

Exploring the Extraordinary Potential of Pigs

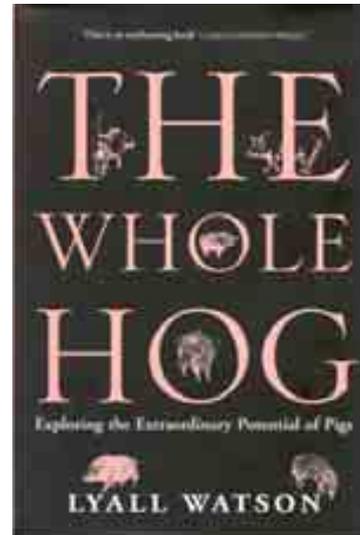
Lyall Watson

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George Orwell was right. Pigs are unquestionably the farmyard animals most likely to succeed. But why, exactly? Science has been slow to pin down the source of their superiority.

Pigs are dramatically different from their closest and more placid relatives, sheep, deer and cattle. During forty million years of evolution, they seem to have made a series of canny decisions, adapting to changing circumstances much as humans have – by becoming more versatile, more gregarious and more curious. Sixteen species of wild pigs now occupy every continent except Australia and Antarctica, filling in the environmental gaps by deploying a panoply of domestic and feral forms – pigs for all seasons. *The Whole Hog* is their story. The biologist Lyall Watson has tracked pigs in the wild, observed their resourceful and playful lives, deciphered their grunts and oinks – and is convinced pigs deserve new respect.

Excerpt — "Pigs enrich my life in surprising ways. I know of no other animals that are more consistently curious, more willing to explore new experiences, more ready to meet the world with open mouthed enthusiasm. Pigs, I have discovered, are incurable optimists and get a big kick out of just being. We have a lot to learn from them."

‘A brilliant contribution to the pig cause . . . a book you can root about in and be sure of discovering unexpected ideas and delicious morsels of information. It kept me occupied for hours, snuffling and oinking contentedly.’ — Oliver Pritchett, *Sunday Telegraph*

‘Walking with these pigs, watching them through Watson’s eyes, will convince anyone that the pig is a true wonder.’ — *The Scotsman*

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Ecology and conservation studies

1. Lee, R. J., A. J. Gorog, et al. (2005). "Wildlife trade and implications for law enforcement in Indonesia: a case study from North Sulawesi." Biological Conservation **123**(4): 477-488.

Abstract: Excessive hunting pressure, due in large part to commercialization, has reduced the populations of many tropical large mammal species. Wildlife over-exploitation is severe in Indonesia, especially on Sulawesi, where human resources and funding are inadequate to monitor the wildlife trade and enforce existing protection laws. In response, the Wildlife Crimes Unit program was established in December 2001 to: (i) monitor wildlife transportation into North Sulawesi and market sales; (ii) provide legal and technical support to law enforcement agencies; and (iii) promote public awareness of wildlife and protection laws. Over a two-year period, 6963 wild mammals en route to markets were encountered (similar to 8 individuals h(-1)) and 96,586 wild mammals were documented during market surveys. The trade of some protected mammals declined significantly over this period, but overall trade in wild mammals increased by 30%. High volume of trade in non-protected animals such as the Sulawesi pig *Sus celebensis* and large flying foxes (Pteropodidae), raise concerns about the sustainability of current harvesting. To combat this problem, we recommend that: (1) efforts are continued to reduce trade in protected species; (2) protected status is extended to heavily traded but non-protected taxa, such as flying foxes; (3) the effects of hunting on rat and bat populations, as well as its impact on forest dynamics, are quantified; and (4) work is carried out with local communities to strengthen awareness, set sustainable limits on wild mammal harvesting, and establish practical mechanisms for enforcing these limits. (c) 2005 Elsevier Ltd. All rights reserved.

2. Cruz, F., C. J. Donlan, et al. (2005). "Conservation action in the Galapagos: feral pig (*Sus scrofa*) eradication from Santiago Island." Biological Conservation **121**(3): 473-478.

Introduced mammals are major drivers of extinction and ecosystem change. As omnivores, feral pigs (*Sus scrofa*) are responsible for wholesale adverse effects on islands. Here, we report on the eradication of feral pigs from Santiago Island in the Galapagos Archipelago, Ecuador, which is the largest insular pig removal to date. Using a combination of ground hunting and poisoning, over 18,000 pigs were removed during this 30-year eradication campaign. A sustained effort, an effective poisoning campaign concurrent with the hunting program, access to animals by cutting more trails, and an intensive monitoring program all proved critical to the successful eradication. While low and fluctuating control efforts may help protect select native species, current eradication methods, limited conservation funds, and the potential negative non-target impacts of sustained control efforts all favor an intense eradication effort, rather than a sustained control program. The successful removal of pigs from Santiago Island sets a new precedent, nearly doubling the current size of a successful eradication, and is leading to more ambitious projects. However, now we must turn toward increasing eradication efficiency. Given limited conservation funds, we can no longer afford to spend decades removing introduced mammals from islands. (C) 2004 Elsevier Ltd. All rights reserved.

Taxonomic, morphological, biogeographic, and evolutionary studies

1. Gongora, J. and C. Moran (2005). "Nuclear and mitochondrial evolutionary analyses of Collared, White-lipped, and Chacoan peccaries (Tayassuidae)." Molecular Phylogenetics and Evolution **34**(1): 181-189.

Abstract: The three extant peccary species, the Chacoan (*Catagonus wagneri*), the White-lipped (*Tayassu pecari*) and the Collared (*Pecari tajacu*), are morphologically and chromosomally distinct

and confined to the New World. There is ongoing paleontological, cytogenetic, and molecular debate about phylogenetic relationships among them. To contribute to the understanding of Tayassuidae phylogeny, three mitochondrial (control region, cytochrome b, and 12S rRNA) and five nuclear (K-casein, thyrotropin, tyrosinase, and swine short interspersed nuclear elements PRE-1 P27 and P642) peccary DNA fragments were amplified, cloned and sequenced from Chacoan, White-lipped, and Collared peccaries. Phylogenetic analyses were performed using maximum likelihood and neighbor joining methods. K-casein, thyrotropin, and tyrosinase sequences did not resolve the phylogeny, while control region, cytochrome b, 12S rRNA, and PRE-1 P27 and P642 sequences were more informative in deciphering phylogenetic relationships. When pig and warthog were used as an outgroup, Chacoan and White-lipped peccaries clustered distinct from Collared peccaries. Furthermore, control region and cytochrome b sequence variation within Collared peccaries was as extreme as that between White-lipped and Chacoan peccaries, supporting subspecific and possibly even specific variation within the widely distributed Collared peccary. This study supports the existence of two independent genera within the Tayassuidae family consisting of Collared and Chacoan/White-lipped peccaries, in contrast with classical morphological taxonomy which clusters White-lipped and Collared peccaries in the genus *Tayassu* or which alternatively clusters the Collared peccary in the genus *Dicotyles* as a related sister clade of the Chacoan peccary (genus *Catagonus*).

2. Li, C.-Q., Q. Chang, et al. (2005). "Phylogeography and population structure of the wild boar *Sus scrofa* in northeast Asia based on mitochondrial DNA control region variation analysis." *Acta Zoologica Sinica* **51**(4): 640-649.

Abstract: The wild boar (*Sus scrofa*), which inhabits wide areas of Asia, Europe, and North Africa, is an ancestral species of domestic pigs with 27 subspecies. Five subspecies inhabiting Northeast Asia are the Ussurian wild boar (*S. s. ussuricus*), the North China wild boar (*S. s. moupinensis*), the Japanese wild boar (*S. s. leucomystax*), the Ryukyu wild boar (*S. s. riukiuanus*), and the Korean wild boar (*S. s. coreanus*). Total of 144 mitochondrial DNA (mtDNA) control regions of wild boars from these areas were analyzed and the phylogeographic characteristics and genetic population structure were investigated.

Thirty-four wild boar haplotypes detected from the whole sequences of the mtDNA control region were analyzed using the neighbor-joining method. The phylogenetic relationship indicates that the wild boars in Northeast Asia share a common ancestor. The Japanese wild boars were more closely related to Northeast China wild boars than the others, and the Ryukyu wild boars have a closer relationship with the Northern China wild boars.

Nested contingency analysis of geographical associations and the nested cladistic analysis of geographical distance for the mtDNA haplotypes of control region indicate that there is significant geographical population structure in wild boars of Northeast Asia. The results also suggest that: (1) the ancestral population had experienced a long distance movement to establish the contemporary population;(2) the Ryukyu wild boar population may descend from the continental boar, and it may have experienced allopatric fragmentation in the past;(3) the Northern China wild boar population in southern areas has higher genetic diversity than that in the northern areas, and the population has experienced contiguous range expansions

3. Gongora, J., P. Fleming, et al. (2004). "Phylogenetic relationships of Australian and New Zealand feral pigs assessed by mitochondrial control region sequence and nuclear GPII genotype." *Molecular Phylogenetics and Evolution* **33**(2): 339-348.

Abstract: Pigs were introduced into Australia and New Zealand in the 18th and 19th centuries, with some establishing feral populations. With few records of pig introductions into these two countries, molecular phylogenetic analysis was used to assess their origins. Mitochondrial (mt) control region sequence and nuclear glucosephosphate isomerase pseudogene (GPIP) restriction fragments were used, as distinct European and Asian domestic pig and Wild Boar control region clades and GPIP genotypes can be recognised. Feral pig control region sequences clustered with either European or Asian domestic pig sequences and both Asian and European GPIP alleles were segregating. It was not possible to distinguish direct importation of Asian domestic animals into Australia and New Zealand from indirect introgression of Asian domestic sequences via Europe. However, the clustering of three feral control region sequences of pigs from northern Australia with Asian Wild Boar implies unrecorded introduction of Wild Boar or crossbred animals into Australia. However, two of these feral pigs had European GPIP alleles. In combination, analyses of control region and GPIP markers suggest that both European and Asian pigs have contributed in similar frequencies to the origins of Australian feral pigs.

4. Lucchini, V., E. Meijaard, et al. (2005). "New phylogenetic perspectives among South-East Asian wild pig species based on mtDNA sequences and morphometric data." *Journal of Zoology* **266**(1): 25-35.

Abstract: There are more taxa of wild pig in South-east Asia (SEA) than in any other comparable area in the world, but the number of species and subspecies is still uncertain. The taxonomy of some wild pig populations distributed in Malaysia, Indonesia and the Philippines, was investigated using molecular and morphometric techniques. Our results suggest the existence of two main evolutionary clades that are likely to have diverged during the Pliocene in SEA: one including wild pig populations distributed in the Philippines (*Sus cebifrons*) and Sulawesi (*S. celebensis*); the other including the Indonesian and Malaysian bearded pigs (*S. barbatus*), and the widespread Eurasian wild boar (*S. scrofa*). A possible scenario for pig speciation in SEA is developed, and the need for a taxonomic revision of bearded pigs suggested, particularly concerning the taxonomic status of *S. b. ahoenobarbus* from Palawan Island, and the existence a new species distributed in the Tawi Tawi Islands (Philippines). Unexpectedly, bearded pigs in the Malay Peninsula are closely related to the Bornean population, but distinct from Sumatran *S. barbatus*, and they should be considered as belonging to a different subspecies.

5. Jones, C. J., T. C. Santos, et al. (2004). "Placental glycosylation in peccary species and its relation to that of swine and dromedary." *Placenta* **25**(7): 649-657.

Abstract: Comparison has been made between glycans at the fetomaternal interface of two *Tayassu* species (New World peccaries or wild pigs) and those of swine (true pigs) and dromedary, which have similar epitheliochorial placentae. Plastic sections of near-term fetomaternal interface from *Tayassu tajacu* (120 days gestation) and *Tayassu pecari* (140 days gestation) were stained with 20 lectins and compared with those of swine (109 days) and dromedary (375 days). Both *Tayassu* species showed similar staining characteristics, which differed only slightly from those of the swine. Most differences were quantitative rather than qualitative, except for binding of *Arachis hypogaea* lectin to terminal beta-galactose which was absent in swine uterine epithelium though present in both *Tayassu* species, and binding of *Sambucus nigra* lectin to sialic acid which was absent in swine epithelium and trophoblast though present in *Tayassu*. Glycosylation of the dromedary fetomaternal interface showed, in contrast, significant differences compared to *Tayassu* and swine, particularly regarding fucosyl, sialyl and terminal galactosyl residues. Despite a divergence of between 33 million and 37 million years between true pigs and peccaries, glycosylation of the fetomaternal interface has remained similar, with most of the observed changes affecting

terminal structures. The dromedary has an epitheliochorial placenta with a similar architecture, but different glycan expression, suggesting modification of glycosyl transferases with evolution. These data contain clues to changes of glycosyl transferase activity that accompany speciation.

6. Fang, M., X. Hu, et al. (2005). "The phylogeny of Chinese indigenous pig breeds inferred from microsatellite markers." Animal Genetics February **36**(1): 7-13.

Abstract: Summary: A genetic study of 32 local Chinese, three foreign pig breeds [Duroc (DU), Landrace and Yorkshire], and two types of wild boar (Hainan and Dongbei wild boar) based on 34 microsatellite loci was carried out to clarify the phylogeny of Chinese indigenous pig breeds. The allele frequencies, effective numbers of alleles, and the average heterozygosity within populations were calculated. The results showed that the genetic variability of the Lingao pig was the largest, while the Jiaying pig was the lowest. The greatest distance between domestic pigs was found between Shanggao and DU pig and the shortest was found between Wuzhishan and Lingao pig, respectively. A neighbour-joining tree constructed from Modified Cavalli-Sforza genetic distances divided Chinese pigs into two clusters; four subclusters were also identified. Our results only partly agree with the traditional types of classification and also provide a new relationship among Chinese local pig breeds. Our data also confirmed that Chinese pig breeds have a different origin from European/American breeds and can be utilized in programmes that aim to maintain Chinese indigenous pig breeds., Copyright (C) 2005 Blackwell Publishing Ltd.

7. Larson, G., K. Dobney, et al. (2005). "Worldwide Phylogeography of Wild Boar Reveals Multiple Centers of Pig Domestication." Science Mars Express: Mapping With OMEGA. March **307**(5715): 1618-1621.

Abstract: Mitochondrial DNA (mtDNA) sequences from 686 wild and domestic pig specimens place the origin of wild boar in island Southeast Asia (ISEA), where they dispersed across Eurasia. Previous morphological and genetic evidence suggested pig domestication took place in a limited number of locations (principally the Near East and Far East). In contrast, new genetic data reveal multiple centers of domestication across Eurasia and that European, rather than Near Eastern, wild boar are the principal source of modern European domestic pigs., Copyright (C) 2005 by the American Association for the Advancement of Science

8. Spencer, P. B. S. and J. O. Hampton (2005). "Illegal translocation and genetic structure of feral pigs in Western Australia." Journal of Wildlife Management **69**(1): 377-384.

Abstract: Unlike many regions in the world where wild pigs (*Sus scrofa*) are threatened, in Australia they are a significant invasive species. As such, the molecular ecology of feral pigs was investigated to understand their social and population genetic structure. Samples from 269 adult animals were collected over their distribution in southwestern Australia. Using 14 highly polymorphic microsatellite markers, we identified 7 inferred feral pig populations that had moderate heterozygosity (mean = 0.580) and displayed a high level of differentiation (mean R-ST = 0.180). In revealing the genetic structure of feral pigs, we detected anomalies in the putative native origin of some individuals. Samples from these animals were collected from 2 main areas: recently colonized regions that were previously uninfested, and established feral pig populations, where animals from geographically isolated areas had been introduced. In the latter, these corresponded to areas that were in close proximity to public road access and towns. Given the large distances immigrants were found from their population of origin (from 50 to > 400 km), the generally low levels of dispersal of southwest feral pigs, and the grouping and sex of these pigs, we

suggest that these individuals have been deliberately and illegally translocated to supplement recreational hunting stocks. Additionally, we could not detect any genetic contribution in these feral pigs from domestic pig herds, suggesting that the deliberate release of domestic pigs to restock feral Populations is relatively uncommon. Our molecular data allowed some inferences regarding the Success or lack thereof of current, management practices, and offered considerable insights into the dynamics of the feral pig populations and identification of "new" approaches that may allow for better control of this highly destructive species.

9. Hopkin, M. (2005). "Phylogeny: Hippo relations." Nature February **433**(7025): 474.

Full text: A morphological analysis has helped to fill a large gap in the evolutionary story of the hippopotamus. The discovery also brings researchers a step nearer to closing the book on a debate that has lasted more than 150 years. Taxonomists had suggested that the nearest living relatives of hippos are pigs. But genetic analyses indicated that hippos are more closely related to cetaceans (whales, dolphins and the like). Jean-Renaud Boisserie et al. now report that hippos are the only surviving members of a group of animals known as anthracotheres — and that the anthracotheres are the sister group of the cetaceans. They base this conclusion on studies of a range of animal species, including *Libycosaurus*, a semi-aquatic anthracothere that lived in Africa between 12 million and 6 million years ago. The link between hippos and anthracotheres, which are well represented in the fossil record, also enables the evolutionary history of hippos to be traced back through what was a frustrating 40-million-year hole in their story.

Reference: Boisserie et al. Proc. Natl Acad. Sci. USA 102, 1537–1541 (2005)

Veterinary studies

1. Rossi, S., E. Fromont, et al. (2005). "Incidence and persistence of classical swine fever in free-ranging wild boar (*Sus scrofa*)." Epidemiology & Infection June **133**(3): 559-568.

Abstract: Although veterinary authorities aim to limit persistence of classical swine fever (CSF) in wild boar (*Sus scrofa*), to avoid potential transmission to pigs, factors influencing CSF transmission and persistence are not clearly understood. Here we analyse incidence and persistence in a CSF epidemic that occurred in the French Vosges Forest. Higher incidence was found in large forests compared to smaller isolated ones, being highest near the starting point of the epidemic, but poorly related to the local density. We hypothesize that the spatial and social structure of wild boar populations may be responsible for this variability of incidence over space. Persistence was highest near the starting point of the epidemic and where initial density was highest. We hypothesize that persistence was favoured by the abundance of young wild boar, itself encouraged by CSF. Our results allow us to propose management measures aimed at limiting CSF persistence., (C) Cambridge University Press 2005

2. Gauss, C. B. L., J. P. Dubey, et al. (2005). "Seroprevalence of *Toxoplasma gondii* in wild pigs (*Sus scrofa*) from Spain." Veterinary Parasitology **131**(1-2): 151-156.

Abstract: Sera collected from 507 hunter-killed wild pigs (*Sus scrofa*) between 1993 and 2004 from five geographic regions in northern Spain and seven regions in southern Spain were assayed for antibodies to *Toxoplasma gondii* by the modified agglutination test (MAT). Antibodies to *T. gondii* were detected in 185 (38.4%) of 507 pigs with titers of 1:25 in 71, 1:50 in 111 and \geq 1:500 in 3; seroprevalence was significantly higher ($P < 0.05$) in pigs from southern regions. Seroprevalence was density dependent; it

was higher in pigs from high stocking per hectare and availability of forage. Statistically significant differences were not observed between *T gondii* seroprevalence and hunting estates (open versus fenced), sex or age. Serological results indicate a widespread exposure to *T gondii* among Spanish wild boars, suggesting that this population could represent a public health risk for persons that handle or consume raw or undercooked infected wild pig meat. Published by Elsevier B.V. [References: 31]

3. Ehlers, B. and S. Lowden (2004). "Novel herpesviruses of Suidae: indicators for a second genogroup of artiodactyl gammaherpesviruses." Journal of General Virology **85**(857-862).

Abstract: Five novel herpesviruses were identified in suid species from Africa (common warthog, *Phacochoerus africanus*) and South-East Asia (bearded pig, *Sus barbatus*; babirusa, *Babyrousa babyrousa*) by detection and analysis of their DNA polymerase genes. Three of the novel species, *P. africanus* cytomegalovirus 1, *P. africanus* lymphotropic herpesvirus 1 (PafRLHV-1) and *S. barbatus* lymphotropic herpesvirus 1 (SbarLHV-1), were closely related to known beta- (porcine cytomegalovirus) and gammaherpesviruses [porcine lymphotropic herpesvirus (PLHV) 1 and 3] of domestic pigs. In contrast, two novel species, *S. barbatus* rhadinovirus 1 (SbarRHV-1) and *Babyrousa babyrousa* rhadinovirus 1 (BbabRHV-1), were more closely related to a ruminant gammaherpesvirus, bovine herpesvirus 4 (BoHV-4), than to the porcine gammaherpesviruses PLHV-1, -2, -3, PafRLHV-1 and SbarLHV-1. SbarRHV-1, BbabRHV-1 and BoHV-4 were therefore tentatively assigned to a novel genogroup of artiodactyl gammaherpesviruses. This latter genogroup may also contain an as yet undiscovered gammaherpesvirus of domestic pigs, thereby adding a concern to their use in xenotransplantation.

4. Saikawa, Y., K. Hashimoto, et al. (2004). "The red sweat of the hippopotamus." Nature **429** (6990): 363.

Abstract: The red and orange pigments in this secretion account for its protective properties., (C) 2004 Nature Publishing Group

Palaeontological studies

1. Boisserie, J.-R., A. Zazzo, et al. (2005). "Diets of modern and late Miocene hippopotamids: Evidence from carbon isotope composition and micro-wear of tooth enamel." Palaeogeography, Palaeoclimatology, Palaeoecology **221**(1-2): 153-174.

Abstract: Carbon isotope composition and micro-wear analyses of tooth enamel were used to reconstruct the diet of late Miocene hippopotamids unearthed in the Toros-Ménalla area, Chad, contemporary to the oldest known hominids. A large sample of wild modern *Hippopotamus amphibius* from various locations in Africa was also analysed for comparison. Isotopic analyses showed that the modern hippo, reputedly a strict grazer, has a more varied diet than usually thought, including a significant amount of C3 plants in closed to moderately open environments. Enamel formed before weaning was on average 3‰ depleted in ¹³C compared to post-weaning enamel, a pattern that could be partially explained by milk consumption. The observed micro-wear pattern of the modern hippo differs from that of other modern ungulates. We explain the very abundant fine scratches and small pits found on these hippo teeth by the preference for fresh short grasses with low silicon content. The diet of the late Miocene hippopotamid was probably close to that of the modern *Hip. amphibius*, but included a larger amount of C3 plants. This contradicts previous palaeoecological findings based on relative hypsodonty degree and indicates that the modern feeding behaviour of large hippos was already developed at the end of the Miocene, when C4 grass exploitation by large ungulates became much more frequent in Africa. Finally, it also in-

dicates that C4 grasses were a significant component in late Miocene environments of Central Africa.

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The newsletter of the IUCN/SSC Pigs, Peccaries and Hippos Specialist Group (previously Asian Wild Pig News)

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It consists of a group of technical experts focusing on the conservation and management of wild pigs, peccaries and hippos.

The broad aim of the PPHSG is to promote the long-term conservation of wild pigs, peccaries and hippos and, where possible, the recovery of their populations to viable levels.

Pigs, peccaries and hippopotamuses are non-ruminant ungulates belonging to the Suborder Suiformes of the Order Artiodactyla (the even-toed ungulates).

Within the Suborder Suiformes, pigs belong to the Family Suidae, peccaries to the Family Dicotylidae and hippopotamuses to the Family Hippopotamidae.

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