



**IUCN/SSC  
Tapir Specialist Group**

Number 2

TAPIR CONSERVATION

JULY 1991

The Newsletter of the IUCN/SSC Tapir Specialist Group.

Issue #2 of the newsletter was produced with the support of Conservation International, Washington, DC.



TAPIR CONSERVATION

The Newsletter of the IUCN/SSC Tapir Specialist Group.

Editor: Sharon Matola

The views in Tapir Conservation do not necessarily reflect those of the IUCN nor the entire IUCN/SSC Tapir Specialist Group (TSG).

Special thanks to Conservation International for their assistance.

The objective of Tapir Conservation is to offer the members of the Tapir Specialist Group/IUCN/SSC and others concerned with the family Tapiridae, news brief papers, opinions, and general information about this threatened mammalian genus. Anyone wishing to contribute to Tapir Conservation can send material to:

Sharon Matola, Chairperson  
Tapir Specialist Group/IUCN/SSC  
P.O. Box 474  
Belize City, Belize  
Central America

Word From The Editor

TAPIR SPECIALIST GROUP UPDATE

Thanks to all who have sent letters and articles to me since last September. Your input is greatly appreciated and has contributed to this second issue of TAPIR CONSERVATION.

Last year, many people were contacted for the inclusion of their data in our Action Plan Report, but the response was low. So please note that a questionnaire is again being sent your way via Issue #2. If you have responded already, please pass the Action Plan form along to someone who may be able to provide additional data. If you haven't responded, or were not on the original list of Action Plan report recipients, please take a few moments to include your thoughts about the species Tapiridae which you are most familiar.

This Action Plan will be the first document ever published detailing the conservation priorities for the four extant species of tapir. Don't miss out on the opportunity to be part of this important and historic work.

I will be serving as Chairperson for the Tapir Specialist Group for the next triennium and look forward to working with all members as we attempt to develop sound conservation strategies which will help to see the preservation of all four species of tapir realized.

Again, my thanks to all who have been in communication. And I look forward to an active Tapir Specialist Group network during the upcoming months.

NEWS FROM THE FIELD

A. PANAMA

1. CAPTIVE BREEDING OF T. BAIRDII TO BEGIN IN PANAMA

At the Summit Zoo in Panama City, Panama, and in a private facility in Escondido, 300 miles to the north, two separate but collaborative breeding programs are beginning for the Central American tapir, T. bairdii.

A total of nine animals will be shared between both facilities. At this time, a young male tapir is being transferred from Escondido to the Summit Zoo on a breeding loan.

The primary goal of these programs is to breed for re-introduction back into protected forested areas in Panama that were once inhabited by tapir. Before protected status was granted to these wild lands, hunting pressures led to the disappearance of some local tapir populations in forests nearby the Summit Zoo.

The Summit Zoo is contingent with a 22,000 hectare National Park which provides good habitat for the Central American tapir, and at one time supported a healthy population of T. bairdii.

The breeding programs just beginning now in Panama, may see the eventual return of T. bairdii to these particular Panamanian forests.

Initial contact with both Panamanian facilities was the work of Rick Barongi, Curator of Mammals at the San Diego Zoo and Tapir SSP coordinator. The Escondido tapir group, once the property of the disposed dictator, Manuel Noriega, were in need of proper care and management. Barongi provided emergency funds and a plan for the future. A tapir "Summit Meeting", held at the Summit Zoo in late February 1991 and attended by the Escondido officials, Dr. Monica Brenes of the Summit Zoo, and other Panamanian conservation personnel, as well as Sharon Vetola, Chairperson for the Tapir Specialist Group, resulted in amenable agreements between Escondido and the Summit Zoo.

Working together, animals will be shared by both facilities. Their goal, reproduction for ultimate reintroduction into healthy Panamanian forests, was strongly agreed upon by the Summit and Escondido officials.

Acquisition of further funds will lead to the improvements of tapir facilities both at the Summit and Escondido. Other actions resulting from the Tapir Summit meeting:

- A tapir conservation masterplan for Panama will be developed with recommendations for the preservation of the tapir in the wild, programs for reintroduction, and exchanges with animals in the USA tapir SSP program.

- Beginning next year, a captive research project will be jointly conducted by CEPEPE in Panama and the Zoological Society of San Diego.

- Dr. Monica Bronea of CEPEPE, Rick Barongi of the Zoological Society of San Diego, and Sharon Matola of IUCN will begin preliminary work for developing a Central American Faunal Interest Group, hoping to create a formal network of information exchange between Central American countries and promoting the transfer of scientific technology from USA institutions to facilities in Central America.

## 2. More News On Species Reintroduction in Panama.

Nicholas Smythe of the Smithsonian Tropical Research Institute has written a plan for the establishment of a center for rehabilitation and reestablishment of locally extinguished species in the Panama Canal area.

The proposed site would be located within the Parque Nacional Soberania and the protracted duration of this project would be at least fifteen years. Species that are being targeted for reintroduction in these forests of the Panama canal watershed are red spider monkeys, Ateles geoffroyi, Central American tapirs, Tapirus bairdii, and white-lipped peccaries, Tayassu pecari.

## B. BELIZE

### 1. Prime Habitat for Central American Tapir Explored

- Sharon Matola, TSG Chairperson

Applying for a position on a scientific expedition intending to investigate an unexplored region in the Maya Mountains of Belize was facilitated by my association with the IUCN Tapir Specialist Group.

Sponsored by the Royal Geographic Society, British Museum of Natural History, and British Forces, the six week long expedition studied the flora, fauna, and geology of this previously unexplored region.

My interest in documenting activity and populations of the Central American tapir, T. bairdii, an endangered species, was well rewarded. A total of four animals were sighted during the expedition, and both faeces and tapir tracks were abundant.

The forests in this area, inundated by seasonal flooding and affected by hurricane-force winds approximately every fifteen years (Hartshorn et al. 1984), are in a continual state of succession. This secondary-growth vegetation, predominant throughout the study area, is preferred food for T. bairdii (Fragoso 1987), and this, along with the availability of water - the Raspaculo River and its many tributaries, afford prime habitat for the species.

The remote location of the study area provides a natural no-hunting sanctuary, those tapirs sighted were unafraid of human presence.

All of the above-mentioned factors have led to flourishing populations of T. bairdii in the Upper Raspaculo region of Belize.

The Government of Belize is discussing the possibility of declaring a Naya Mountain Biosphere Reserve in the near future. It is hoped that the expedition report will lead to the agreement that the Upper Raspaculo region of the Naya Mountains will serve as a core area for the continual preservation of the wildlife found here, as well as for the protection of the valuable watershed.

Tapir Specialist Group members interested in receiving a detailed report of the mammal survey from the Upper Raspaculo, focusing upon T. bairdii, should send US\$5.00 to:

Sharon Matola, Chairperson  
Tapir Specialist Group/IUCN/SSC  
P.O. Box 474  
Belize City, Belize (Central America)

#### References Cited

1. Fragoso, J. 1987. The habitat preferences and social structure of tapirs. M.S. Thesis, Univ. of Toronto, Toronto, Canada.
2. Hartshorn, G. et al. 1984. Belize: country env. profile, a field study. Trejos Hnos. Succ. San Jose, C.R.

### C. EQUADOR

#### 1. UPDATE: Mountain Tapir, Tapirus pinchaque.

Craig Downer, in the field in Sangay National Park, Ecuador, studying the ecology of the Mountain Tapir, T. pinchaque, as part of his PhD dissertation, has kept the Tapir Specialist Group well-advised on the progress he has been making.

At least four animals now have radio collars, and more data, particularly as it involves their migratory patterns, should become available within the next year. The Mountain Tapir appears to migrate annually. Natives in both Columbia and Ecuador report that during the wet half of the year, October to May, populations move to high, open paramo. When the drier half of the year arrives, June to September, the populations return to the upper fringe of the cloud forest.

However, the paucity of technical field work has never adequately supported these local observations. Craig Downer's work will lead to a far greater understanding of Mountain Tapir ecology.

To date, findings during the dry season have shown that the older tapir does not wander as much as the younger tapirs. Craig Downer believes that this may be due to the younger animals not carving out their niche as yet.

Another site, located further south of Sangay National Park, Podocarpus National Park, appears to be an ideal site for a study of T. pinchaque. Unlike Sangay National Park, this park is not being encroached upon by cattle ranching. Craig Downer is hoping to secure funding in order to place ARGOS transmitters on tapirs in Podocarpus N. P.

More data of interest is that to the southwest of Sangay National Park lies the Rio Mazan Reserve. While reports prevail about the extirpation of T. pinchaque from this Forest Reserve, Craig Downer has reported that the possibility of a small population of T. pinchaque living in an isolated corner of this region still exists. He hopes to verify this.

Craig Downer's on-going study of the Mountain Tapir is being adopted as a field project by Wildlife Conservation

International, (WCI), as part of their initiative to preserve Ecuador's cloud forests.

## 2. Possibility of Expanding Protected Areas :

Officials in Quito are considering the incorporation of other forest zones surrounding Sangay National Park to assist in the preservation of T. pinchaque populations in that area:

Ministerio de Agricultura y Ganadería

Quito - Ecuador

Oficio No. 00242 SPNS/DANVS

Quito, a 15 de Mayo de 1990


Señora Doctors  
Sharon Melola Chairperson  
TAPIR SPECIALIST GROUP/IOCN/SSG  
Belize, America Central.-

De mis consideraciones:

En atención a su oficio de 23 de diciembre de 1989, en el que solicita tomar en consideración la propuesta del Sr. Craig Downer, que se refiere a la preservación del Tapirus pinchaque en el Parque Nacional Sangay.

Al respecto esta Subsecretaría agradece por la propuesta indicada, la misma que ha sido tomada en consideración en los estudios de factibilidad que se están realizando, para incorporar otras zonas aledañas al Parque Nacional Sangay, donde la presencia del Tapirus pinchaque es frecuente.

Atentamente,

  
Ing. Néstor R. R.  
SUBSECRETARÍA FORESTAL Y DE  
RECURSOS NATURALES RENOVABLES

RECEIVED  
MAY 15 1990  
DANVS

D. ARGENTINA

1. Two Year Study of Lowland Tapir, Tapirus terrestris, in Northeast Argentina.

Silvia Chalukian, undertaking fieldwork as part of the Programa Regional Manejo de Vida Silvestre in Heredia, Costa Rica, will be studying the status and habitat of T. terrestris in northeast Argentina. She reports that no studies of T. terrestris have ever been accomplished in Argentina, and the field program will most likely start in 1992.

The main objectives of this two year study are to obtain general information about the distribution and abundance of T. terrestris in this region of Argentina.

Fieldwork will be carried out during the dry season months, between April and October, preceded by comprehensive planning involving liaisons between conservation NGOs, as well as the appropriate park and government officials. Besides documenting the T. terrestris populations, other species of fauna will be noted: jaguar, Panthera onca, peccaries, Tayassuidae sp., and cervids.

In the study area, a land-use evaluation will be made, taking into consideration the human impact being made in the region by the local inhabitants and logging interests.

Future issues of TAPIR CONSERVATION will report on progress being made by Silvia Chalukian in Argentina.

E. PARAGUAY

Daniel Brooks, working as a Research Associate for the Zoological Society of San Diego, undertook a one-year study in the Paraguayan Chaco. He has produced some interesting data on Tapirus terrestris spegazzini as part of his investigations of the life histories of neotropical forest ungulates.

The primary purpose of his study was to determine the status for T.t. spegazzini. Although South American tapirs are usually associated with consistently humid forests, the chacoan subspecies is an exception to the rule (Bedford, et al. 1990). The chaco is essentially a vast conglomeration of habitats - Andean forest from

the west, wetland from the north, rainforest from the east, and pampas from the south.

The Paraguay River runs along the eastern boundary of the upper chaco; forming the southwestern periphery of Brazil's vast Pantanal - the largest, most intact wetland existing on today's planet. In the central chaco, *tajamars* (man-made pondlets) and filled gulleys seasonally support water from massive rains.

The majority of the central Paraguayan chaco has been cleared for cattle lands.

The Localities Map shows sites where tapir tracks were found. The most concentrated tapir populations were found in the vicinity of Cerro Leon, Defensores del Chaco National Park, where little human disturbance occurs (Locales 8, 9).

The size of *T.t. spegazzini* is large in proportion to other subspecies of the South American tapir. The chacoan tapir tracks measured were found to be 23% larger than those from areas in Peru (Emmons 1990). Also, the hide of the chacoan tapir is thicker and serves as protection from the thorny vegetation which is more concentrated than in typical tapir (rainforest) habitat.

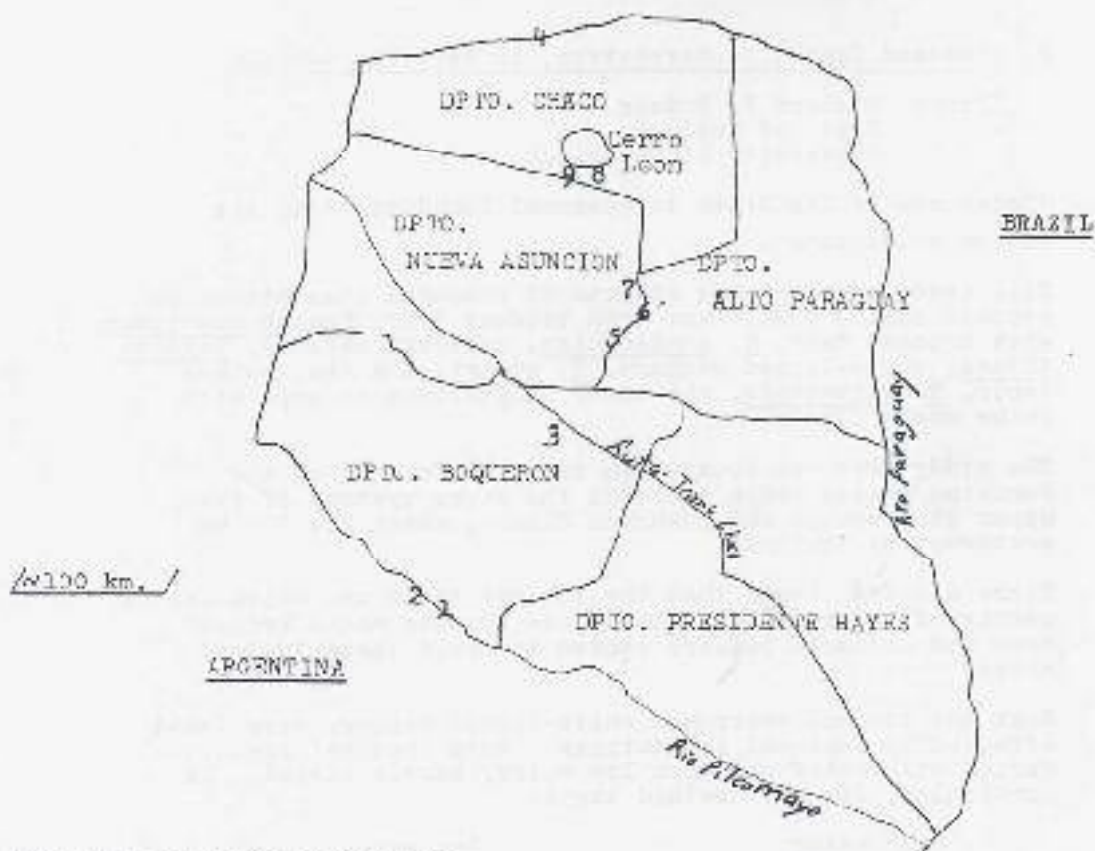
All tracks revealed monogamous individuals. The exception being a juvenile, recorded proximally to an adult in late September (early spring). Judging by numerous strategic track locations and size demography, it is hypothesized that the offspring wanders further from the adult as age increases.

Dan Brooks' year long study shows that *T.t. spegazzini* appears to be stable at present in the middle to upper Paraguayan chaco. The major threat to most species of tapir is habitat destruction. The chacoan subspecies appears more tolerant of human development. Also, because of the animal's extremely thick hide, they are protected from predators - i.e. large felids.

Unfortunately, the thickness of the hide of the chacoan tapir makes it an ideal material for leather. Brooks found that tapir sandals are frequently purchased by tourists as souvenirs.

Besides the animal industry having some impact on populations, a further potential threat is the pet trade. The Paraguayan aristocracy often keep pet tapirs on their vast lawns. The animals are often poorly cared for and many times succumb to malnutrition, resulting in more animals being taken from the wild.

Localities Map



- Local 1 - Estancia Madregada  
Local 2 - Dr. Ferrer's Estancia  
Local 3 - Estancia Palaco  
Local 4 - Estancia San Jose  
Local 5 - 60 km. N. of Fernheim boundary limits.  
Local 6 - 35 km. s. of Teniente Martinez.  
Local 7 - 13 km. s. of Teniente Martinez.  
Local 8 - 2 km. S. of Cerro Leon foot.  
Local 9 - 10 km. S.W. of Cerro Leon.

References Cited

1. Emmons, L.H. 1990. Neotropical Rainforest Mammals: a field guide. University of Chicago Press. pp. 255-257.
2. Redford, K.L., A. Taber and J.A. Simonetti. 1990. "There is more to biodiversity than the tropical rainforest", *Conservation Biology*. 4(3).

F. Lowland Tapir, *T. terrestris*, in Peruvian Amazon

From: Richard E. Bodmer  
Dept. of Zoology  
University of Cambridge

"Responses of Ungulates to Seasonal Inundations in the Amazon Floodplain".

This study examined the effects of seasonal inundations on certain Amazon ungulates: red brocket deer, *Mazama americana*, grey brocket deer, *M. gouazoubira*, collared peccary, *Tayassu tajacu*, white-lipped peccary, *T. pecari*, and the lowland tapir, *T. terrestris*, and their adaptations to cope with large scale floods.

The study area was located in tropical forests of the Peruvian Amazon which included the river systems of the upper Rio Tahuayo and Quebrado Blanco, which lie 100 km southeast of Iquitos.

Richard Bodner found that the lowland tapir and white-lipped peccary frequently used floodplain forests while brocket deer and collared peccary tended to avoid these lowland areas.

Both the lowland tapir and white-lipped peccary were least affected by seasonal inundations. Both species' diets, during high water and then low water, barely varied. In particular, for the lowland tapir:

<u>High water</u>	<u>Low water</u>
Graminae      94.0	Graminae      100.0
Neuritia flexuosa      89.0	Kauritia flexuosa      67.0

This study was supported by the Chicago Zoological Society.

Study area: Richard E. Boerner

#### STUDY AREA

The study area (Figure 1) was located in tropical forests of the Peruvian Amazon and included the river systems of the upper Rio Tahuayo and Quebrada Blanca situated approximately 100 km southeast of Iquitos. The Rio Tahuayo is a black water river approximately 85 km in length with its principle channel running parallel to the Amazon. Water level of the Rio Tahuayo is regulated almost entirely by the Amazon because it flows within the Amazon floodplain. Virtually all forests surrounding the Rio Tahuayo are inundated by high water (Figure 2). During these periods the Rio Tahuayo is fed in its upper reaches by floodwater from the Rio Ucayali and in its middle and lower reaches by floodwater from the Amazon.

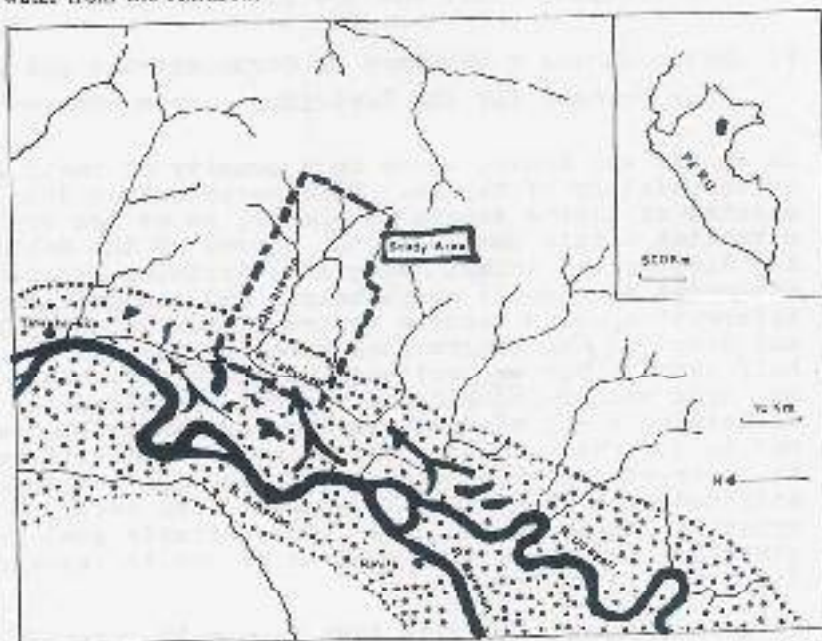


Figure 1. Map of the study area showing seasonally inundated forests (shaded area) and non-flooded forests (not shaded). The arrows depict inflow of water from the Ucayali and Amazon rivers.

G. CORRECTION FROM TAPIR CONSERVATION issue #1

1. Tapirus indicus in Sumatra.

The map of Sumatra showing the distribution of T. indicus in Gunung Leuser, northern Sumatra, and in the areas of 2 and 4 respectively, is incorrect data, according to Dr. Nico van Strien of Zomba, Malawi.

Dr. van Strien states that in the northern quarter of Sumatra, and throughout the island of Borneo, the Malayan tapir has been extirpated.

Tapir Folklore: Dr. Nico van Strien reports that local folklore suggests that tapirs are said to sleep very deeply and to snore loudly. One can easily creep up to a sleeping tapir and tie its legs.

F. Establishing a Database on Morphometrics and Immobilization Drug Dosages for the Tapiridae - from TSC member Chris Wenner

As we are all aware, there is a paucity of basic information on the biology of tapirs. Even morphometric data on the four species of living tapirs is sparse, so we are trying to establish a data base. In the course of the National Zoo's Zoo Biology and Animal Management Training Program, we have attempted to compile morphometric and immobilization drug information using captive tapirs in Malaysia and Singapore, and Brazil. The program has been running for two and a half years. Our project was initiated as a class exercise on large mammal immobilization, but we seized the opportunity to develop a set of measurements for comparison between species, and to determine whether any biometric sex differences exist in these monomorphic species. As you can see from the attached data form, we also examined the teeth to learn about eruption sequences and wear. Our ultimate goal is to generate general information that will be of use to researchers in the field and in captivity.

We hope the morphometrics data form will interest our colleagues in collecting this information as opportunities become available in zoos and the field, and we welcome comments and suggestions as to its use. We were able to immobilize and measure 15 captive Malayan tapirs in Malaysia and Singapore during our Zoo Biology Training Course, and we have also been able to enlist the help of a few North American zoos in expanding the

data base. The measurements require a plastic tailor's tape, a small vernier calipers for tooth measurements, and a forester's calipers with a jaw depth of 0.5 m. Dr. J. Andrew Teare, veterinarian at the Milwaukee County Zoo, an instructor with our program, is maintaining the chemical immobilization database using the ISIS software program MedDirks. Dr. Teare is willing to share his information with other veterinarians, and is interested in learning of their experiences in this important area.

During our training course at the Sao Paulo Zoo in December 1988, we had the opportunity to test the "radio-collar retention ability" of a couple of captive Brazilian tapirs. Our collar, made by Telonice for white-tailed deer, failed the test because the tapir's "leopard" neck. We did not cinch the collars tightly for obvious reasons, but we thought that as in deer, the ears and general body carriage would prevent the animal from dropping the device. This wasn't the case: the collars were shed within a hour after attachment! After two attempts, we carefully measured the neck and recorded the cross-sectional dimensions. We are reasonably confident that a form fitting collar could be constructed that would stay put.

#### 1991 TAPIR SPECIALIST GROUP NETWORK

1. Mr. Rick Barongi  
Curator of Mammals  
Zoological Society of San Diego  
P.O. Box 551  
San Diego, CA 92112
2. Richard E. Bodmer, PhD  
Dept. Zoologia  
Museu Paraense Emilio Goeldi  
Caixa Postal 399
3. Mr. Dan Brooks  
Texas Tech University  
Dept. Biological Sciences  
Lubbock, TX 7949-3131
4. Ms. Silvia C. Chalukian  
Programa Regional Manejo de Vida Silvestre  
Apartado 3000  
Heredia, Costa Rica

5. Mr. Milton H. Cabrera  
Universidad de San Carlos de Guatemala  
Escuela de Biología  
Ciudad Universitaria, Guatemala 10102
6. Mr. Alfredo D. Cuaron  
Rebsamen 1134  
Col. del Valle  
Mexico DF C.P. 13100
7. Mr. Michael Dee  
Los Angeles Zoo  
5333 Zoo Drive  
Los Angeles, CA 90027
8. Mr. Craig Downer  
P.O. Box 456  
Minden, NV 89423
9. Mr. Joe Pragoso  
Dept. of Natural Sciences  
Gainesville, Florida
10. Mr. Bill Konstant  
Conservation International  
1015 18th St. NW  
Washington, DC 20036
11. Mr. Karl Krantz  
Philadelphia Zoological Gardens  
34th St. and Girard Ave.  
Philadelphia, PA 19104
12. Mr. Sukianto Lusli  
Jambang raya 1-17  
Jakarta 11270
13. Ms. Sharon Matola, Director  
The Belize Zoo and Tropical Education Center  
P.O. Box 474  
Belize City, Belize
14. Dr. Chompol Ngampongsai  
Dept. of Conservation  
Faculty of Forestry  
Kasetsart University  
Bangkok, Thailand
15. Ed Ramsay, DVM  
Zoological Medicine/University of Tennessee  
Knoxville, TN 37901-1071

16. Dr. Oliver A. Ryder  
Zoological Society of San Diego  
P.O. Box 551  
San Diego, CA 92112
17. Yr. Phairot Suwanakorn  
Deputy Director General  
Royal Forest Dept.  
Bangkok, Thailand
18. Dr. Charles Santiapillai  
WWF-Indonesia Programme  
P.O. Box 133 Bogor  
Java Barat 16001  
Indonesia
19. Mr. Alan Shoemaker  
Riverbanks Zoo  
P.O. Box 1060  
Columbia, S.C. 29202-1060
20. Dr. Nico J. van Strien  
P.O. Box 537  
Zomba, Malawi
21. Mr. Chris Vaughan, Director  
Wildlife Graduate Program  
Universidad Nacional  
Campus Omar Dengo  
Heredia 1350  
Costa Rica
22. Dr. Chris Wenner  
National Zoological Park  
Conservation and Research Center  
Front Royal, VA 22630
23. Mr. Bill Zeigler  
General Curator  
Miami MetroZoo  
12400 S.W. 152nd St.  
Miami, FL 33177

Please send written contributions for the next TSG newsletter to:

Sharon Katola, Chairperson  
Tapir Specialist Group  
P.O. Box 474  
Belize City, Belize  
Central America

## REFERENCES

- Alexander ID: Actinomyces infection in a tapir (Tapirus terrestris). *J Zoo Anim Med* 9:124, 1978.
- Alvarez del Toro, M.: A note on the breeding of Baird's tapir *Tapirus bairdi* at Tuxtla Gutierrez Zoo. In Jarvis, C. (ed.), *International Zoo Yearbook*, vol. 6, pp. 196-197, 1966.
- Bänziger H: Skin-piercing blood-sucking mites I: Ecological and ethological studies on Calpe eustrigata (Lepid., Noctuidae). *Acta Trop* 32:125, 1975.
- Bohm KH: Dermatoykosen bei zootieren. *Kleintier-Prax* 13:139, 1968.
- Chevalier H-J, Böhm KH, Seeger J: Humane tuberkulose beim tapir. *Kleintier Prax* 14:213-215, 1969.
- Dillehay DL, Boosinger TR, MacKenzie S: Coccidiodomycosis in a tapir. *J Am Vet Med Assoc* 187:1233-1234, 1985.
- Donat, K.: Der *M. cucularis* im Amerikanischen tapir (*Tapirus terrestris*, L. 1758). *Zentral. Vet. Med. C. Anat. Histol. Embryol.* 10:125-129, 1981.
- Ensley PK, Gerber FH, Meier JE: Acute gastrointestinal distress in a ten-day-old Baird's tapir (*Tapirus bairdi*). *J Zoo Anim Med* 11:113-117, 1960.
- Frolka, J.: Erkrankungen beim im zoo gehaltenen schabrackentapir (*Tapirus indicus*) und flachlandtapir (*Tapirus terrestris*). XXVIII International Symp. Erkr. Zootiere, Berlin, Akademie Verlag, 1986, pp. 189-193.
- Frolka, J. and Rostinska, J.: Über die Wirksamkeit von Ivermectin MSD (Ivomec, Equilan) gegen Sarcopotesraude und nematodenbefall bei zootieren. XXVI International Symp. Erkr. Zootiere (Brno). 1984, pp. 455-462.
- Frolka, J.: Zur tuberkulose bei flachlandtapiren (*Tapirus terrestris*) und den prophylaktischen massnahmen. XXXI International Symp. Erkr. Zootiere (Dortmund). 1989, pp. 281-284.
- Gale NB, Sedgwick CJ: A note on the woolly tapirs (*Tapirus pinchaque*) at Los Angeles Zoo. In: Lucas J, ed, *International Zoo Yearbook*, Vol. 8, London, Zool. Soc London, 1963, p. 211-212.
- Göthenboth R: Über eine unterkiefergeschwulst bei einem schabrackentapir (*Tapirus indicus* Cuv.). IX International Symp Erkr Zootiere (Salzburg), Berlin, Akademie Verlag, 1967, p. 239-242.
- Jensen JM: Beta-hemolytic streptococcus associated with enteritis in a Malayan tapir. *J Zoo Anim Med* 9:88-89, 1975.

Keahey KK, Trapp AL: Diagnoses and classifications of diseases of exotic animals. *J Am Vet Med Assoc* 155:1136-1140, 1969.

Keuhr G: Tapiridae, In: Fowler ME, ed, *Zoo and Wild Animal Medicine*. Philadelphia, WB Saunders, 1986, p. 931-934.

Kutzer E, Grünburg W: Sarcopitesraude (*Sarcopites tapiri* nov. sp.) bei tapiren (*Tapirus terrestris*). *Z Parasitenk* 29:46, 1967.

Lee CC, Zairal-Zahari Z, Krishnasamy M: New host record of *Armillifer moniliformis* (Diesing 1835; Sambon, 1922): in a Malayan tapir (*Tapirus indicus*). *Kajian Veterinar* 18:195, 1986.

Mann PC, Bush MB, Janssen DL, et al.: Tuberculosis in large zoo mammals. *J Am Vet Med Assoc* 179:1123, 1981.

Meier J, Sanborn W: A preliminary report on the management and treatment of salmonellosis with trimethoprim-sulfamethoxazole in an exotic animal nursery. *J Zoo Anim Med* 13:26, 1982.

Nair ND, Valsala KV, Mariyamma KI, et al.: Tuberculosis in a tapir (*Tapirus indicus*). *Indian Vet J* 62:1086, 1985.

Pattyn R, Boveroulle MT, Mortelmans J, et al.: Mycobacteria in mammals and birds of the zoo of Antwerp. *Acta Zool Pathol Antwerp* 43:125, 1967.

Reichel K, Mayer H: Herpesvirusinfektion bei tapiren. XIV International Symp Erkr Zootiere (Wrocław). Berlin, Akademie Verlag, 1972, p. 221.

Reichel K: Tapirs. In: Klos HG, Lang E, eds. *Handbook of Zoo Medicine*. New York, Van Nostrand Reinhold Co. 1983, p. 186.

Schnarrbusch U, Schönborn C, Seifert S, et al.: Griseofulvin-behandlung einer *Microsporum canis*-infektion bei einem bergtapir (*Tapirus pinachaque*). XIV International Symp Erkr Zootiere (Wrocław), Berlin, Akademie Verlag, 1972, p. 251.

Selbitz HJ, Elze K, Schüppel KF: Kasuistischer Beitrag zu den jungtiererkrankungen beim flachlandtapir (*Tapirus terrestris*). XXIV International Symp Erkr Zootiere (Veszprem), Berlin, Akademie Verlag, 1982, p. 65.

Snyder RL: Historical aspects of tuberculosis in the Philadelphia Zoo. In: Montali RJ, ed, *Mycobacterial Infections of Zoo Animals*, Washington, Smithsonian Institution Press, 1978, p. 33.

Starzynski, W.: Cholelithiasis in an American tapir. In C. Jarvis (ed.), *International Zoo Yearbook*, vol. 5, Lencor, Zool. Soc. London, pp. 195-196.

Sweatman, G.K.: Mites and Pentastomes, In Davis, J.W. and Anderson, R.C. (eds.), *Parasitic Diseases of Wild Mammals*. Ames, IO, Iowa State University Press, 1971, pp. 3-64.

Taborski, A.: Gelenkerkrankungen bei tapiren und einem milpferd im zoo zu Pozan. Xii International Symp. Erkr. Zootiere (Budapest), Berlin, Akademie Verlag, 1970, pp. 117-119.

Thoen CO, Himes EM: Tuberculosis. In: Davis JW, Karstad LH, Trainer DO, eds, *Infectious Diseases of Wild Mammals*. Ames, Iowa State University Press, 1981, p. 263.

Thoen, C.O., Mills, K. and Hopkins, M.P.: Enzyme-linked protein A: An enzyme linked immunosorbent assay reagent for detecting antibodies in tuberculous exotic animals. *Am. J. Vet. Res.* 41:833-835, 1980.

Vrcege, C., and Zwart, P.: Babesiosis in a Malayan tapir (*Tapirus indicus* Desmarest, 1819), *Z. Parasitenk.* 40:177-179, 1972.

Wiesdorf, H. and Nautrup, C.P.: Anatomische grundlagen zur punktion, endoscopie sowie operativen eroffnung des luftsackes (divericillum tubae auditivae) beim schabracken:apir (*Tapirus indicus*). International Xymp. Erkr. Zootiere, Berlin, Akademie Verlag, 1977, pp. 407-410.