CROCODILE SPECIALIST GROUP

NEWSLETTER

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Species Survival Commission

Cover Photo: Black caiman, *Melanosuchus niger*, juvenile, photographed at Estación de Biologiá Tropical Roberto Franco, Colombia, during the 1970's when the specimen was in the collection of Federico Medem. R. Mittermeier photo.

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The CSG NEWSLETTER is produced in both printed and www editions by the Crocodile Specialist Group of the Species Survival Commission, IUCN - World Conservation Union. The NEWSLETTER provides information about crocodilians, their conservation, status, and management, and on the activities of the CSG. The hardcopy edition of the NEWSLETTER is distributed to CSG members and, upon request, to other interested individuals and organizations. We hope you find this www edition of use. All subscribers and users are asked to contribute news and other materials---see Editorial Policy below. As a professional courtesy, the sources of the news and information are identified throughout the NEWSLETTER. If you use any of the information provided in the NEWSLETTER, please continue that courtesy and cite the source. Subscribers who receive the printed edition of the NEWSLETTER are requested to make a voluntary contribution (suggested $40.00 US per year) to defray expenses of publication and mailing. Comments concerning the NEWSLETTER or this www page should be addressed to the

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- Dr. I. Lehr Brisbin, Savannah River Ecology Laboratory, Aiken, SC , USA.

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- Warren Entsch, Mareeba Farms, Australia.
- Mike Husby, Savannah Leather Pty. Ltd., Australia.

EDITORIAL

INITIAL SUCCESS IN FUNDRAISING DRIVE. In response to the fundraising drive announced in the last NEWSLETTER, and direct solicitation for support sent to numerous supporters, a significant increase in the number of supporters and funds raised for the CSG general program has occurred. To date, 28 active Patrons have made donations this year, reaching our initial goal of double the 1994 supporters. We are very pleased to welcome new Patrons of the CSG (in alphabetical order) Warren Entsch, Sam Pulio, Alian Ruswan, Sergio Trachter and Don Wieringa and to acknowledge gifts from Fabricio Andrade, Martin Blumenthal, Adam Britton, Burris Feeds, Terry Cullen, Louisville Zoo, Bill McMahan, Greg Mitchell, Jonathan Politano and Zongwe Farms (Zambia). A great many of our regular Patrons have renewed, and in many cases increased, their support.

Newsletter subscriptions have also been healthy with 161 responses in the last three months of which more than 50% have made a donation to the Newsletter. This a rate of response above previous years and many additional responses are expected in the remaining months of 1995.

There remains a need for additional donations, particularly for two special projects. The CSG Chairman and I determined that after 5 years of faithful service our nearly obsolete computer was inadequate for current needs. After reviewing available computers we agreed that to provide adequate capacity for a period into the future we should invest in the best available computer

capacity. Accordingly we have upgraded to an Pentium 120 computer at a cost of $3,000. The Chairman has generously agreed to pay half of this cost and a matching donor is needed to cover the other half. Another project requiring special funding is the distribution of the Revised Action Plan. A very generous donation from Utai Youngprapakorn in 1994 has enabled the revision and printing of a Revised Action Plan. A limited number of review copies are now circulating among Steering Committee members. In order to make this valuable update on crocodilian status and CSG priorities widely available to all members, a special donation to fund distribution of 500 -1,000 copies ($5,000 - $8,000) is needed. Potential donors for this project should contact me and I will send sample copies of the New Plan.

THE FUNDRAISING DRIVE IS NOT OVER! We have received sufficient funding for general operations and a modest reserve fund, but our ability to initiate broader support for members and projects as outlined in the last NEWSLETTER still requires significant additional funding. If you value the activities of the CSG now is the time to express your support in a concrete fashion. Donations may be sent in any form to the CSG office at our masthead address. -- J. P. Ross, *Editor.*

CITES ANIMALS COMMITTEE

CITES ANIMALS COMMITTEE, 12TH MEETING. The Animals Committee of CITES met in Antigua, Guatemala, 11-14 September 1995 and discussed several items of interest to the CSG. A number of the Animals Committee are also CSG members (chairman R. Jenkins, J. Hutton,. M. Quero, O. Lara, Tonny Soehartano and E. Severre) and CSG Members P. Ross, G. Webb, L. Aquino, M. Hoogmoed, J. Morales, M. Stambulie, D. Ashley and Y. Kaneko were present representing Parties or as observers.

Agenda item 6. -- Review of Res. Conf. 5.16, trade in ranched specimens, marking. Jon Hutton directed the attention of the committee to the provisions of 5.16 that require marking of ranched products, manufactured goods, and containers for both primary export and re-export in a manner well beyond any marking of ranched products currently undertaken. The history and origins of this resolution were discussed and it was noted that the new crocodile skin marking resolution (Res. Conf. 9.22) was approved by the parties as adequate for controlling trade in ranched crocodilians although marking of manufactured products is not required. Recognizing the basic need under the Convention for a marking system to clearly differentiate ranched products from illegally obtained wild products, but noting that by default the Parties were accepting effective marking systems that did not meet all the requirements of 5.16, it was agreed that it was timely to begin the process of reviewing 5.16 with an objective of producing a consolidated revised resolution for consideration at the next meeting of the Parties. A small working group headed by Jon Hutton was asked to return to the next Animals Committee meeting with a draft for discussion. No immediate action by CSG is needed. The draft resolution produced for Animals Committee should be reviewed by CSG.

Agenda item 9. -- Review of Res. Conf. 8.15, Captive Breeding. Chuck Dauphine, of Canada, introduced a background document outlining a series of perceived difficulties in implementation of 8.15. Concerns about this issue stemmed largely from the captive bred bird trade, iguana pet trade, and breeding of free ranging monkeys on islands for the medical research industry. A large working group discussed the issue for several hours and defined a number of action items for detailed consideration. These included reviewing the definition of what constitutes "commercial

use" under the Convention, discussing a revised definition of "captive bred" and reviewing the operational responsibilities of the management authorities and the Secretariat to allow a flexible resolution of issues raised by Parties who review a proposal for captive breeding facility registration, prior to causing either an automatic approval or pushing the issue to a vote of the parties. Several divergent views on the conservation value of captive breeding and the degree to which the Convention should encourage captive breeding in favor of other forms of sustainable use (e.g. cropping or ranching) were expressed. No clear resolution of any of these issues was achieved. Chuck Dauphin undertook to draft language to address these key issues, with assistance from any other interested parties and observers. No formal mechanism was established, but new draft language will likely be introduced at the next meeting of Animals Committee. CSG should track this issue to ensure compatibility with existing captive breeding operations for crocodilians and current CSG thoughts on the relative benefits of captive breeding and ranching.

Agenda item 21. -- Universal marking of crocodilian skins, implementation. O. Menghi, of CITES Secretariat, informed the meeting that implementation of Res. Conf. 9.22 was proceeding very well, particularly as applied to trade in caiman flanks and skins. He expressed thanks to major exporters of caiman skins and the management authorities of Colombia, Brazil, Venezuela and Panama for their energetic assistance in implementing the universal tagging requirement. The resolution was also being applied to re-exports of whole crocodilian skins. Dr. Menghi reported that CITES had now approved eight companies to produce tags meeting the requirements for distribution control and physical characteristics required by 9.22. He noted that Brazil has requested the assistance of the Secretariat to utilize a large existing stock of old tags in order to introduce new tags, and this was being completed under supervision of the Secretariat. Dr. Menghi noted one concern, that lack of available funds had prevented the development of a computerized tracking system for tags. The Chairman of the Animals Committee, Hank Jenkins, noted that some countries required additional marking of processed skins and manufactured goods because of their interpretation of Res. Conf. 5.16 and that Animals Committee had established a process to address this problem (see item above).

Don Ashley, representing International Alligator and Crocodile Trade Study, requested clarification regarding the use of tags on transparent containers of small crocodilian parts (heads, feet, scraps etc.) as allowed under 9.22. He questioned whether such containers should be tagged with same "self locking, tamper proof, individually numbered tag" described in 9.22. He drew attention to a slight discrepancy in the terminology of 9.22 and some practical reasons which allow an interpretation that transparent containers of parts do not require the same tag as skins. He noted that the skins from which parts are derived have already been tagged with the required tag and that putting an additional tag on parts would confuse trade tracking mechanisms. He also noted the additional record keeping that such tagging required and drew attention to the practice adopted in the USA where bags of parts have a simple paper tag or attached list which refers by tag number to the whole skins from which parts have been removed. Varying opinions on the interpretation and intent of 9.22 were offered, particularly by its drafters. No clear consensus emerged, except that, as the Universal tagging requirement was apparently being widely adopted, it would be unnecessarily confusing to introduce any immediate additional changes. It was deemed best to allow various parties to continue their interpretation and monitor the situation. CSG Steering Committee should reconsider this matter in the light of information that accrues before the 13th Working meeting in Santa Fe.

Agenda item 10. -- Trade in Hybrid specimens, was identified as of possible significance to crocodilian interests given the widespread production of hybrid crocodiles for commercial use in

captive breeding operations. Discussion of the item was restricted entirely to the special problem of breeders of hybrid fallow deer (*Dama dama*) in Australia and no generally applicable or relevant conclusions for crocodiles were drawn.

The Animals Committee will meet again in late 1996, and an invitation to hold the meeting in Prague, Czech Republic, was presented. -- J. P. Ross, *CSG Executive Officer.*

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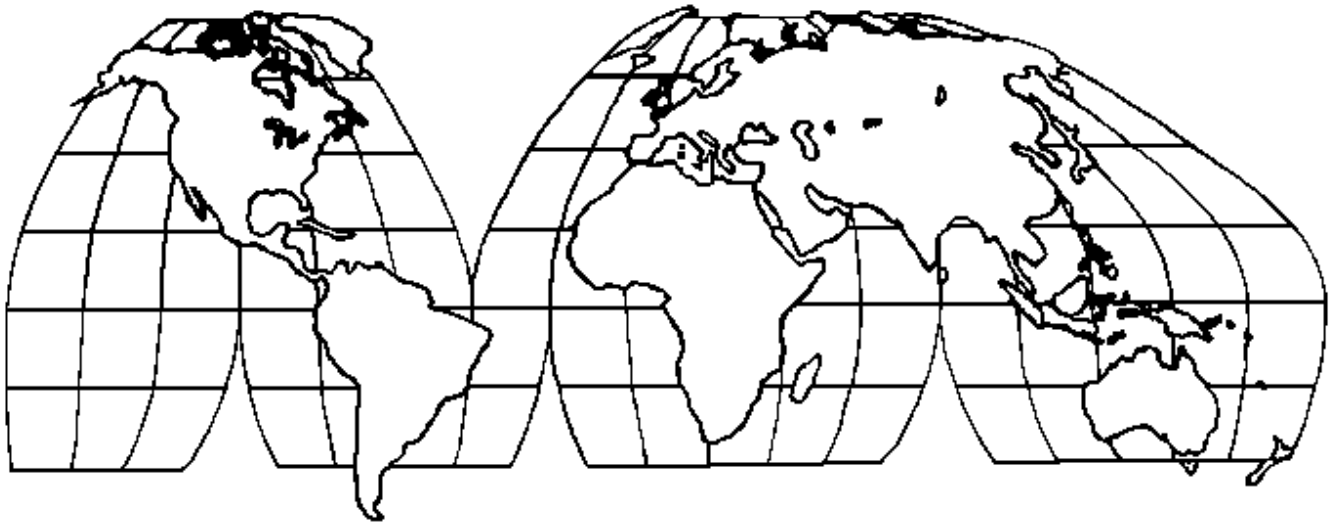
AREA REPORTS



AFRICA

Congo:

CONTINUATION OF THE WORK ON *OSTEOLAEMUS TETRASPIS* IN THE CONGO. During April/May 1995, Marcellin Agnagna and Fritz Huchzermeyer continued their investigation into the commercial exploitation of the African dwarf crocodile in the Congo. John Riley of the University of Dundee, who had been brought into the project via his identification of parasitic pentastomes collected by us from *O. tetraspis* in 1993, was able to join us in the field this time and to make very valuable and relevant contributions. This year's investigations were hosted and largely funded by the Brazzaville office of the WCS, Project Nouabalé-Ndoki.

More sampling was carried out at markets in Brazzaville and Impfondo. An attempt was made to establish population densities by counting crocodiles and their nests along transsects while traversing a hitherto unexplored swamp forest between Dzéké and Mobenzélé south of Impfondo. However, a large central part of the swamp, apparently out of reach of the annual floods, was found to be sterile, unable to support any aquatic life. In addition to this work local hunters were interviewed about traditional crocodile hunting methods. While on one hand more information is required on volume and technicalities of the trade in live dwarf crocodiles for meat consumption in the Congo, the emphasis of future investigations is shifting towards an examination of habitats, population densities and reproductive potential with a view to formulate recommendations for the conservation and sustainable use of this species. -- F.W. Huchzermeyer, *Onderstepoort Veterinary Institute, Onderstepoort, 0110, South Africa. E-mail: Fritz Huchzermeyer: fritz@moon.ovi.ac.za;* Marcellin Agnagna: *76225.1721@compuserve.com; & John Riley: j.riley@dundee.ac.uk*

Madagascar:

CROCODILE MANAGEMENT IN MADAGASCAR: NEW LEGISLATION, HELP OF POLICE REQUESTED. A decree (N0. 94/700) related to crocodile management has recently been signed in Madagascar (8 November 1994). It specifies a certain number of rules some of which are new and of great interest looking to the control of local hunting and trade. A text is nothing if you don't have the means to enforce it (see photo).

Nile crocodile carcasses (belly skins removed), Manambolo river, Madagascar, September 1993.

O. Behra photo.

Noting the need of proper control at the national as well as at the international level following CITES, the head of the Management Authority is now proposing an "Arrété" (for the implementation of the decree). This "Arrété" will install a committee in charge of supervising the exploitation of the crocodiles and to enforce the legislation. It will include representatives of different Ministries including Police and Army. It is expected that by involving policemen in the control it will be possible to improve the control and slow down the illegal killing of crocs.

This might be an interesting step as up to now it is virtually impossible to do anything with the limited means of the Water and Forest Department. Indeed we are more and more frightened that we will not be able to keep the crocodiles hunters out of the zones restricted for the ranching if no measure are taken.

Our associate in BIODEV, Ramandimbison, is going to Besalampy to organize the egg collection of 50% more eggs than last year and we should be able to assess the situation in a few months. We hope to be able to convince authorities that if we agree to get rid of crocodiles in some dangerous areas some breeding sites need protection. -- O. Behra & Ramandimbison, *BIODEV, Lot 18, Adrefandrova, Antananarivo, Madagascar.*

NEW MADAGASCAR FARM. While in Madagascar recently, CSG member Ken Dodd visited a new private nature park/resort that features crocodiles. The "farm" or "reserve," depending on who you talk to, is located at Périnet in the eastern rain forest. The only sign is `Et. A. Izouad Enterprises' although the nature park and lodge is still being developed and will be advertised more extensively later. The owner has purchased 300 ha of primary rain forest and plans to build 24 resort cabins; nature trails eventually will be constructed in the forest.

There are a series of pens that house approximately 50 *Crocodylus niloticus* about 1.2 m in length, nine 3.0 m crocs, and one wild adult in a solitary pen. All crocodiles were said to have originated from the west coast, although the present stock apparently came from a defunct farm destroyed or damaged by a cyclone a few years ago. The owner stated that farms were not practical in Madagascar and that these were his "pets." In the area where the lodge is to be constructed, two very large crocs, including a 4.8 m male (not measured), were housed. Pens were under construction, or recently completed, for native boas, chameleons, radiated tortoises, and lemurs. An orchid garden was present. Construction of a pond to house the two large crocodiles was nearing completion.

Unfortunately, I was not able to visit the crocodile farm located outside the capital city, Antananarivo. However, I spotlighted several crocs, including one very large adult, in Lake Ravelobe near Ampijoroa. Signs warned people to stay away because of the aggressive nature of the crocs. -- Ken Dodd, *National Biological Service, 7920 NW 71 St., Gainesville, FL 32653, USA.*

Uganda:

UGANDA NATIONAL PARKS. The Uganda National Park (UNP) has an agreement with Uganda Crocs (Ltd), a private company, which is rearing crocodiles for commercial purposes. The agreement is such that this company collects 4000 eggs each year, from Murchison Falls National Park, for rearing. The company then gives 5 % of the one year-old juveniles to UNP for reinforcement. The agreement is for 5 years effective from 1991.

UNP went into such an arrangement because it was discovered that the crocodile population within Park was not recovering as expected after the civil crisis of the 1970's and 80's when poaching was very rampant. It was discovered that the number of eggs laid was adequate but somehow most of these eggs never hatched, possibly due to predators. Therefore, this reinforcement programme is still on pilot study basis. Mr. Baguma of Kampala University, is carrying out research which is supposed to assist UNP in finding out whether the method being used is effective in boosting the crocodile population in the national park. -- Mr. Pritpal S. Soorae, *Technical Project Officer IUCN/SSC/RSG, c/o African Wildlife Foundation, P.O. Box 48177, Nairobi, Kenya.*

Cameroon:

PAIR OF CROCODILES DRESSED LIKE HUMANS BURNED ALIVE. A male and a female crocodile, captured by traditional healers and said by locals to be bewitched, were burned alive in public, witnesses in Yaounde, Cameroon, said recently.

Up to 300 people watched as the healers burned the 3 foot-long crocodiles, both of them dressed in clothing. The male was adorned with a beard, the female with hair and red nail polish. The healers took away the ashes. Residents blamed the male for a series of road accidents on a bridge just outside the capital, Yaounde, under which it lived. Others blamed the animals for the disappearance of small children. -- THE ORLANDO SENTINEL, *Monday, September 25, 1995.*

Nigeria:

BEWARE, CONSERVATION SCAMS! Recently, John Newby (an SSC member) forwarded to the SSC office a copy of a letter he received, supposedly from a representative of an organization called the Nigerian Conservation Foundation. The letter asks for assistance from `a trustworthy and very reliable foreign individual or company' to assist with the transfer of US $40 million into this trustworthy individual's account, for which service a commission of 35% of the amount is offered. However, numerous letters of this sort have come from Nigeria and are a well organized form of fraud. The end result is that any person offering assistance in the matter runs the risk of losing a significant amount of their own money. SSC brought the matter to our attention because of a reference to SSC in the letter and the likelihood that Dr. Newby's address was obtained from SSC materials. It is possible that other SSC members may receive similar letters and should therefore be alert that this is a dangerous scam. Remember, if it sounds too good to be true, it probably is too good to be true. [Sounds like some crocodile farming proposals we have heard. -- *Eds.*] -- *from correspondence,* Simon Stuart, *Head, Species Survival Program, IUCN, Rue Mauverney 28, CH-1196,*

Gland, Switzerland.

WESTERN ASIA

India:

BHITARKANIKA WILDLIFE SANCTUARY, ORISSA: INDIA. Unlike previous years, census of Saltwater Crocodiles, *Crocodylus porosus*, was conducted in the river systems of the Bhitarkanika Wildlife Sanctuary during the first and second week of January '95 (the peak winter month). A total 660 C. porosus were counted/sighted which include 222 hatchlings, 258 juveniles, 129 sub-adults and 51 adults.

The census results indicate that gradually more number of female crocodiles are laying fertile eggs so that there is recruitment of more and more hatchlings into the wild/nature. The census results also indicate that there is increase in the population of C. porosus in comparison to the last census, i.e. 582 nos. (1994 census) to 660 during 1995 census (13.40 % increase). Steps have been taken to provide protection to the wild population of *C. porosus* and their threatened mangrove habitat. -- Dr. Sudhakar Kar, *Research Officer (Wildlife), 7-Saheed Nagar, Bhubaneswar- 751007, Orissa, India.*

ESCAPE AND RECAPTURE OF MUGGER AT RAMATIRTHA. On the night of May 10, 1995, a mugger female at Ramatirtha Crocodile Centre had a territorial fight with another female at the common wall of the breeding pen and entered river Khairi-Bhandan which flows within 100 m. The escape could be traced on May 12, 1995, when emptying out the breeding pool did not show the female and the villagers informed about the sighting of a "crocodile" near their bathing ghat (place).

This particular female had repeated the act in May 1990 and was caught back from the river by using an indigenously developed snare device with live poultry as the bait. Initially it was necessary to keep daily track of the animal and develop a level of confidence in the mugger to come closer to a live bait offered by hand. Before setting the snare it was necessary to make some preparation at the capture site. The entire process had taken 14 days. The mugger had measured 2.10 m in total body length.

This time also, preparations were made at the capture site after it was "confirmed" that the mugger would come to accept a live bait through the snare. By using a similar method as on May 1990 the mugger was recaptured on May 24 at midnight and was shifted to captivity. On June 3, 1995, by which time the mugger had made several futile attempts to re-escape, young ones from her nest hatched and 5 of 24 hatchlings were released in her rearing pen. Subsequently, by the second day of release of hatchlings, maternal instincts superseded the desire to escape and F4 behaved as a good mother. This crocodile measures 2.30 m, now. In five years it has grown 20 cm. It is about 16 years old and is now housed in a separate pen, away from other breeders.-- L.A.K. Singh, *Project Tiger, Similipal Tiger Reserve, Khairi-Jashipur, Orissa, India.*

RESULTS OF THE PHVA ON INDIAN GHARIAL. A Population and Habitat Viability Analysis of the gharial in India was conducted in January 1995 to plan future conservation strategies. This is the first such analysis to be undertaken for a crocodilian species. Participants included all the researchers currently working with this species as well as representatives from State and National authorities involved in management and protection. A broad data base of available information on the biology, current status, captive breeding and re-stocking efforts was assembled and analyzed. Population modeling under different assumptions suggested that the Chambal population may be self-sustaining but smaller populations in the Mahanadi and other localities require continued replenishment. Major recommendations derived from this analysis were the preparation of a National Management Plan, continuous monitoring of protected and re-stocked populations, an analysis of genetic diversity and the effects of a bottleneck in the founder stock, increased public education and the continuation of restocking. Migration out of protected areas was identified as a significant factor slowing population recovery. Recommendations to standardize and invigorate monitoring and conservation programs were also made. A full report on the results of the PHVA is available as -- Rao, R. J., D. Basu, S. M. Hasan, B.B. Sharma, S. Molur *and* S. Walker *(Editors). 1995. Population and Habitat Viability Assessment (P.H.V.A) Workshop for Gharial, Report.* ZOOS' PRINT. *Vol. X, No. 8, August 1995:3-60.*

Iran:

BEHAVIOR OF IRANIAN CROCODILES DURING DROUGHT. A severe drought was recorded in the Gando protected area, the main habitat for Iranian crocodile or Gando, (*Crocodylus palustris*), starting in January 1994 and lasting up to August 1994. This period provided critical conditions for Gandos. Villagers and local people crucially affected by unprecedented drought, pumped out all of the waters in the ponds and waterways. Continuing the situation, the people were obliged to drill 2-4 m wells in parched pond bottoms in quest of drinking water.

The crocodiles attempted to burrow canals [burrows? -- *Eds.*] along river and pond banks. It is postulated that genetic habits, hormonal interactions and environmental situation were the likely stimulus for this behavior. Having a length of 5-10 m, the canals served as habitat for the crocodiles especially during severe drought, when the animals resorting to them, aptly protected themselves, by virtue of aestivation. Normally, a male and a female with offspring no more than one year of age used a single canal.

Individual crocodiles longer than 2 m were observed to migrate for food and suitable habitat from one pond to another. A general motivation is thought of as responsible for initiating local migratory behavior in crocodiles where weather condition is rather changeable. This adaptation is coupled with an arousal status in the animal, making it quite sensitive to a large and varied spectrum of incentives, mostly in favor of it, but also in rare cases culminates in the animals' death. Three crocodile deaths were recorded during the study.

In August 1994, dredging of the river in the area worsened the situation. Newly hatched crocodiles guided by their mothers to the ponds were buried under a layer of silt caused by dredging. Additionally, during the study period, 5-10 crocodiles (smaller than 1-5 m) were found dead due to one or another of the factors explained above. -- Haji Gholi Kami, *Dept. of Biology, University of Agricultural Sciences and Natural Resources, P.O. Box 49165, Gorgan, Iran;* Mohammad Saghari, *Dept. of Environment, P.O. Box 15875-5181, Tehran, Iran.*

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EASTERN ASIA & OCEANIA

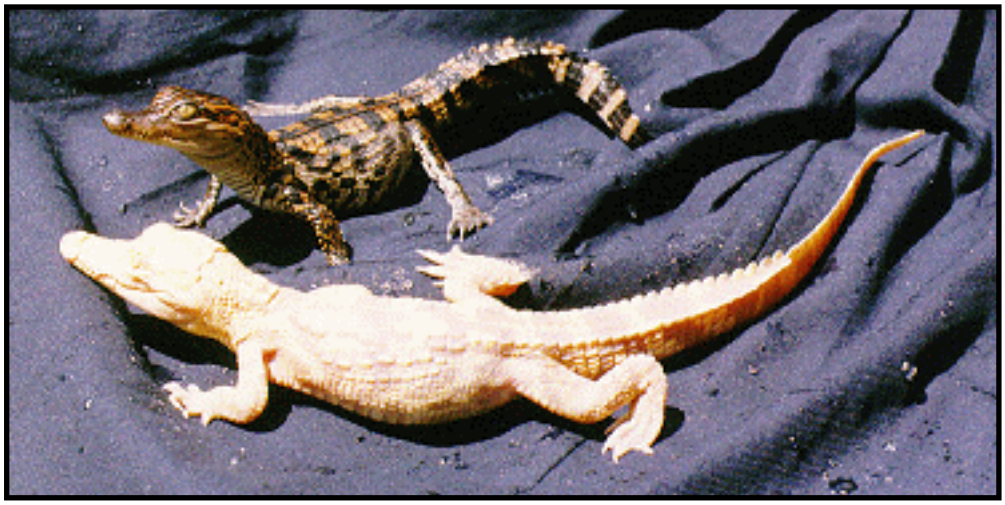
Cambodia:

DOUBLE CLUTCHES IN SIAMESE CROCODILES. In 1990, Mr. Luon Nam, owner of a small scale farm with 8 males and 3 males raised in a social pond claimed that one of his female crocodile had laid 2 clutches. The first clutch was 38 eggs and gave 35 hatchlings. He could not collect the second clutch (33 eggs) because it was the cleaning time and the crocodiles were basking on one another and all eggs of the second clutch were broken. Three years later, one 2.2 m long, 12 year-old female, also laid 2 clutches. The first clutch with 27 eggs, hatched 24 babies. The second clutch, 12 eggs, gave birth to 7 hatchlings.

This year 1995, the same female laid the first clutch with 38 eggs and hatched 33 head. At the beginning of July, she laid again the second clutch with 44 eggs.

In 1994, Mr. Chhorn Sun, owner of a small farm with 6 females and 3 males reported that one of his female crocodile 2.5 m long, laid 2 clutches. The first clutch counted 36 eggs and hatched 28 offspring after 71 days of incubation time. The second clutch with 26 eggs, gave no hatchlings because the owner did not know when the crocodile had laid the second clutch. It was the 3rd clutch she laid. The crocodiles were kept only one pair in a pond.

This year 1995, Mr. Moeung Preang, a 20 broodstocks crocodile farmer, reported that a 25 year old, 2.5 m long female had laid also 2 clutches. The first clutch with 42 eggs and has recently given 16 hatchling. The second, 19 eggs, has no opaque band and will therefore give no hatchling.



Albino and normal offspring, *C. siamensis*, Cambodia. N. Thuok photo.

Also this year, Mr. Chhay Ly, a 4 pair farm owner, got 4 albinos out of a clutch of 27 eggs, all of which hatched (see photo above). This is the 4th clutch she laid since 1992. The owner reported also that the 4 albinos are stronger and grow up faster than the others. Nao Thuok, *Director of Fisheries, Siem Reap Province, Cambodia.*

China:

CAPTIVE BREEDING CHINESE ALLIGATOR. In recent years, developments in the production of Chinese alligator's F2 have been progressing at the Anhui Research Center of Chinese Alligator Reproduction (ARCCAR). In 1989, ARCCAR established the first reproductive group of F2, which consists of 60 captive bred alligators (F1). In 1994, ARCCAR obtained 1200 alligator's eggs of F2, and these eggs' fertilization rate was 62 %. In 1995, due to the heavy rains and low summer temperature, reproduction was delayed by 20 days (to July 13th) and the number of eggs reduced by one third.

Another alligator farm, in Hainan Province, the Chinese alligators (F1), which are bred by Qiongshan Tian Yi Alligator Development Co., produced 20 eggs in 1994. But its fertilization rate was only 10 %, and they only obtained two young animals (F2). In 1995, because the Company failed to improve the ecological environment, and failed to clear away alligator's physiological barrier (which was caused by the weather condition). The alligator's appetite dropped day by day. Therefore, of all of the 65 females of F1, no one had reproduced. Only one of the four wild females reproduced 21 eggs (F1) and their fertilization rate was 60 %. More of the embryos died at the early stage, some embryos were abnormal and only two young animals were finally obtained. -- Zhang Zheng Dong, *Anhui Research Center of Chinese Alligator Reproduction (ARCCAR), Anhui, Peoples Republic of China.*

Malaysia:

SALTWATER CROC STUDY. World Wildlife Fund Malaysia has embarked on a 21 month study of the estuarine crocodile (*Crocodylus porosus*). Field work in Trengganu and Perak districts have been completed and studies began in the Pahak region in June. Surveys in the Pahak region may also be extended upstream to include surveys on *Tomistoma* that are reported there. -- *From* New Straits Times, *7 January 1995. Submitted by* Tan Hiok Jeng, *P.O. Box 50, Langkavi, Kedah 07000, Malaysia. 1995.*

Papua New Guinea:

RESPONSE FROM PNG ON CROCODILE MANAGEMENT. Following a letter sent to the PNG Department of Environment and Conservation from Professor H. Messel in February 1995, an independent specialist observer participated in the annual survey for *Crocodylus porosus* and produced a report with recommendations (C. Manolis, CSG Newsletter 14 (2):9-11). The Department is currently pursuing actions to address these recommendations and a program schedule has been designed to ensure that progress is made.

In a detailed response to both the CSG-raised issues and the recommendations of the Manolis report, the Department indicated that survey intensity and quality are being improved by the replacement of monitoring equipment and the development of a computer based statistical model to analyze quarterly harvest information retrieved from crocodile purchase dockets. Ground surveys in the New Guinea Islands and the Western and Gulf Provinces are proposed to identify and expand ground survey sites in areas where aerial surveys are either uneconomic or technically unfeasible. The Crocodile Unit has also undertaken a review of methods to use harvest data as an independent index of population status. The Department has made submissions to the National

Executive Council to request that revenues raised from crocodile skin exports could be deposited to a National Crocodile Unit trust fund and used to support survey work. Improvements in infrastructure, manpower and staff training are also being examined. The aerial survey program of nest density at standardized sites in Sepik River will continue to be conducted regularly as an appropriate and representative index of population responses to harvesting. The improvements recommended by the Manolis report are being integrated into the program.

The Department wishes to acknowledge the support of the Asian Conservation and Sustainable Use Group for financing the costs associated with the independent survey report. -- *From correspondence* Iamo Ila, *Secretary, Department of Environment and Conservation, P.O. Box 6601, Boroko, Papua New Guinea.*

Thailand:

CROCODILES ROCK THAILAND AFTER RAIN FREES 100. As quick as Thong-yoo Sirisarn could cry "crocodile," she was fending off suspicious questions from 30 journalists and a small contingent of police officers. No force of disbelief could budge the 67 year-old woman from her tale. She was sweeping her wooden house by the canal. She heard her grandson yell: "Crocodile! Crocodile!", "I saw it all - big mouth, big head, almost 1 meter long," she said.

Crocodile fever swept Bangkok after floods liberated more than 100 crocodiles from pits in small farms about 130 miles north of the capital. The crocodiles slipped into the Chao Phraya River, which runs into Bangkok, and reportedly have bitten two villagers while they were fishing. Rising floodwaters commonly bring rats and snakes to the capital, and it was only a small leap of logic for residents to become convinced the escaped crocodiles might also be headed their way. The possibility that such dangerous intruders could be lurking in the city's elaborate system of canals is generating more curiosity than fear.

Schoolchildren crowd the banks of the city's canals trying to catch a glimpse of the reptiles, and residents are trying to bait them to the surface. Prime Minister Banharn Silpa-archa is skeptical, but has nonetheless ordered officials to keep an eye out. Over a week's worth of newspaper and television coverage of impromptu rural crocodile hunts has captured the public's imagination. Each day newspaper photos have appeared showing a reptile trussed up and tossed into a pickup truck, school boys posing on its back. But crocodile sightings are unheard of in Bangkok, and many people are unwilling to suspend their disbelief.

To try to prove the story Thong-yoo's family tied some chicken bones to a buoy and threw it in the water. No crocodile appeared, but that doesn't mean a thing to Thong-yoo. "I know what a crocodile looks like, I know that it's different from a monitor lizard," a large reptile native to the region, Thong-yoo insisted. She said the crocodile swam along the surface, then dipped back into the water before resurfacing near a neighbor's dog cage. "Usually the dog barks a lot," said another witness, Payou Yimpreeda, 50. "Today it hasn't barked at all. It knows the crocodile is there." -- GAINESVILLE SUN, *September 29, 1995.*

FIRST BREEDING OF *TOMISTOMA* AT SAMUTPRAKAN. Some of the *Tomistoma* held at

Samutprakan Farm and Zoo, Thailand, have shown reproductive activity and two specimens nested in 1995 and laid eggs. So far the eggs have proved infertile, but it is hoped that later reproduction will be successful. A new larger breeding pond is under design and contact with other facilities breeding *Tomistoma* has been initiated. -- Dr. Panya Youngprapakorn, *Samutprakan Farm and Zoo, Taiban Rd., Samutprakan, Thailand.*

Tomistoma schlegelii at Samutprakan Farm and Zoo, with newly laid eggs. P. Youngprapakorn photo.

CENTRAL & SOUTH AMERICA

Belize:

CROCODILE RESEARCH IN BELIZE. This project was a continuation of a study initiated in 1992 with the objectives of gathering data on the nesting ecology and food habits of Morelet's crocodile (*Crocodylus moreletii*), and assessing populations in northern Belize. Additionally, in 1994 a project was initiated in conjunction with the University College of Belize and Coral Cay Conservation to survey American crocodile (*Crocodylus acutus*) populations in the Turneffe Atoll, a large coral atoll off the coast of Belize. In 1995, American crocodile surveys were also conducted in the proposed Bacalar Chico National Park with the assistance of the International Tropical Conservation Foundation, UNPD/Coastal Zone Management Unit, and the Belize Department's of Fisheries and Forestry.

Crocodylus moreletii. The Morelet's crocodile study was centered on Gold Button Ranch, a private cattle ranch in the Orange Walk District of northern Belize. In 1995, six nests were found at Gold Button Ranch, and six nests at other sites. Nesting effort appeared depressed in 1995 in comparison with previous years. Nesting was initiated in late June and early July following the onset of the wet season. Most nests were constructed on small islands which have a higher probability of escaping nest predators. Average clutch size in 1995 was 23.8, slightly less than in previous years, but not statistically significant. One nest was lost to raccoon predation and two to flooding. The fate of the remaining nests is unknown.

Thirty two crocodiles were captured and stomach-pumped. Yearlings and juveniles feed primarily on insects and small fish, while larger crocodiles consume an increasing amount of vertebrate prey (fish, turtles and rodents). Adult crocodiles have been observed feeding on fish, large crabs, wading birds and carrion. Apple snails are important prey for all size classes. Recaptures included 16 crocodiles that were marked in previous years and preliminary analysis suggest first-year survival is about 10%.

American crocodile, *Crocodylus acutus*, surveys were conducted in the Turneffe Atoll in May, July and October 1994 and June 1995. Sixty-seven crocodiles and 132.2 km have been surveyed. In general, low to moderate density populations have been found throughout the atoll with concentrations around Blackbird Cay, Calabash Cay in Northern (Vincents) Lagoon, and in turtlegrass beds along the leeward side of the atoll. Three nesting beaches have been located. The largest beach is on Northern Cay where five nests were located in 1994.

Three nests have been found at a smaller beach on Blackbird Cay. A third beach was located on Deadmans Cay in 1995 and a single nest found. However, this beach was recently cleared and a tourist facility constructed. It is unlikely this beach will be used by nesting crocodiles in the future. Destruction of nesting beaches through development remains the greatest thread to the continued viability of the Turneffe Atoll crocodile population. Potential nesting habitat appears limited and full protection is warranted.

American crocodiles construct both hole and mound nests in Belize. Based on eggshells and unhatched eggs found in nests, an average clutch size of 9.8 has been estimated. This is considerably smaller than clutch sizes reported in the literature and may indicate the Turneffe Atoll population is physiologically stressed. Freshwater availability is extremely limited and may effect the animals ability to osmoregulate.

Crocodile surveys were conducted in the proposed Bacalar Chico National Park in late June 1995. This area encompasses the northern end of Ambergris Cay and includes a mosaic of terrestrial, mangrove, and marine habitats. Survey were conducted from a canoe owing to shallow water depths throughout much of the park. Eight crocodiles, including a large adult, were observed and 42.8 km were surveyed. A single excavated nest was found on an island in Santa Cruz Lagoon and it is suspected that some nesting may also be occurring in wetlands adjacent to the park. Crocodiles are expected to be a major ecotourism attraction in the future. -- Steven Platt, *Department of Biological Sciences, 132 Long Hall, Clemson University, Clemson, SC 29634, USA.*

Colombia:

VIGOROUS RESPONSE TO ALLEGED BLACK CAIMAN TRADE. Me refiero a la situación expuesta en su carta del 26 de Mayo de 1995 dirigida al Dr. Obdulio Menghi, con copia a esta Autoridad Administrativa CITES, en relación al resurgimiento del tráfico ilegal de pieles de caimán negro (*Melanosuchus niger*).

Desde que tuvimos conocimiento del tema, precisamente durante la reunión regional del Crocodile Specialist Group celebrada en Argentina el mes de Mayo anterior, iniciamos las averiguaciones correspondientes a fin de establecer la magnitud y operatividad del ilícito para, posteriormente, implementar los correctivos necesarios.

Melanosuchus niger, approx. 3.5 - 4 m length, Sorocaba Zoo, Brazil. B. Schwedick photo.

Sin embargo, según la información obtenida a partir de CORPOAMAZONIA, entidad regional encargada del control, así como investigadores colombianos que trabajan en la región, no existe evidencia respecto a que el tráfico de pieles haya incrementado recientemente. A pesar de que la vigilancia se ha reforzado desde el mes de Mayo, no se ha identificado ningún indicio de comercio de pieles en Leticia.

Existen sí algunos casos esporádicos de decomiso de carne, la cual se hizo pasar como pescado en esta ciudad, durante la celebración de la Semana Santa. La información de estos decomisos y algunos otros adelantados en Leticia, actualmente se está recopilando a partir de las actas de decomiso de la Oficina Regional del INDERENA. De cualquier manera, ningún decomiso ha sido de gran magnitud estando limitados a pequeñas cantidades de carne confiscadas en el puerto de Leticia.

Con el fin de contar con elementos de juicio suficientes para un efectivo control al supuesto comercio de pieles, la Autoridad Colombiana requeriría de mayores detalles respecto a los informes de compradores colombianos que estarían demandando este producto. Vale la pena destacar el interés de Colombia para poner freno a este tipo de ilícito.

Con relación a este tema, quiro informarle que como parte de las acciones que el gobernierno colombiano desea implementar para propender por la conservación de la especie y prevenir su commercio ilegal, se encuentra en curso ante la Secretaría Pro-Tempore del Tratado de Cooperación Amazónica, una propuesta para el diseño de un Plan regional de manejo de las especie.

Con el objeto de concretar la propuesta y coordinar con las paises limítrofes su participación en la misma, se pretende celebrar un taller que permita definir acciones conjuntas orientadas a la conservación y uso sostentible de la especie. Dicho taller se celebraría en las instalaciones del

parque Nacional Natural Amacayacu, en el mes de diciembre del presente año, con participación de los paises de la cuenca amazónica. Durante el mismo se trataran varios temas relacionados con la conservació y uso sostentible de la especie, entre ellos: Estado de las investigaciones sobre poblaciones naturales de caiman negro en los paises amazónicos; instrumentos de cooperación entre los países; identifición y desarrollo de alternativas de aprovechamiento sostentible; consideraciones políticas, jurídicas, económicas, técnicas, sociales y culturales para la implementación de acciones para la conservación y manejo de la especie.

Mediante etsa propuesta, actualmente objecto de evaluación por parte de la CEMAA, Colombia espera además proveer un espacio de discusión que permita aclarar los verdaderos alcances, circunstancias y posibles responsables de un supuesto tráfico ilegal de pieles, asi como fortalecer los mecanismos de cooperación entre los paises. -- José Antonio Villa Lopera, *General Director of Forestry and Wildlife, CITES Management Authority, Colombia.*

VIGOROUS RESPONSE TO ALLEGED BLACK CAIMAN TRADE. *Free translation of the preceding article.* In reference to your letter of 26 May, 1995, addressed to Dr. Obdulio Menghi, related to the reappearance of the illegal traffic of the black caiman's skins (*Melanosuchus niger*). Since we received knowledge of the situation from the Crocodile Specialist Group Regional Meeting held in Argentine last May, we began an investigation in order to know the real magnitude of the problem and be able to find the right ways to stop it.

However, taking into consideration the information we obtained from CORPOAMAZONIA, the regional entity in charge of the control, and from Colombian researchers that work in the region, there is no evidence that this illegal traffic had risen recently. Since last May we have reinforced our vigilance but no indication of skin marketing in Leticia has been seen.

There were some isolated events of meat confiscation, which was passed as fish in the city during the Holy Week Celebration. The information about these confiscations is now being obtained from the records of INDERENA Regional Office. Anyway, no confiscation has been of great magnitude, being limited to only a small quantity of confiscated meat at Leticia harbor. In order to have a better understanding for an effective control of such skin market, Colombian Authorities are seeking more detailed information about Colombian purchasers that might be demanding this product. It is worth noting the interest of Colombia to stop this kind of illegal traffic.

In relation to this theme, I would like to inform you about actions that the Colombian government wishes to implement for the conservation of the species and the prevention of illegal trade. We have a proposal for a regional management plan for the species underway with the Secretary Pro-Tem of the Amazon Cooperation Treaty. In order to consolidate this proposal and coordinate the participation of neighboring countries, we are convening a meeting to define joint activities for the conservation and sustainable use of the species. This meeting will be held at the facilities of the Amacayacu Natural National Park this December, with the participation of the countries of the Amazon valley. During this meeting we will examine several themes, including: the current state of research on natural populations of black caiman in the region; instruments of cooperation between the countries; identification and development of alternatives for sustainable harvest; and consideration of policy, legal, economic, technical, social and cultural issues.

Through this proposal, which is currently under evaluation by CEMMA, Colombia hopes to provide a venue for discussion that will permit clarification of the true extent, circumstances and

possible perpetrators of suggested illegal trade of skins and also to fortify the cooperative mechanisms between the range states. -- Jose Antonio Villa Lopera, *General Director of Wildlife, CITES Management Authority, Colombia.*

Guyana:

CYANIDE SPILL. Shoals of dead fish and hogs floated down Guyana's biggest river Tuesday, victims of a cyanide waste spill that continue to escape from a gold mine operated by U.S. and Canadian firms.

More than 325 million gallons of cyanide waste had spilled into the Essequibo River near Omai since Saturday night, turning central Guyana's biggest source of water into a potentially deadly flow. The spill had traveled 50 miles downstream by Tuesday.

Yelling through bullhorns from boats, trucks and low-flying helicopters, health officials plied the river banks to warn about 18,000 Indians, loggers and miners not to touch the water.

The Health Ministry banned people from catching and eating fish, shrimp and other marine life and told farmers not to let their animals drink from the river. Officials began distributing bottled water, but most residents collected rainwater.

Montreal-based Cambior Ltd., the mine's majority owner said in a statement that the leak would be stopped within two days.

President Cheddi Jagan, in a nationally televised statement Tuesday evening, declared the area around the spill an environmental disaster area. He said Parliament would meet Thursday on the crisis and that environmental law would be reviewed. "I also want to repeat that when the investigators come, we will ensure that they respect our people, our laws and the environment," he said.

The spill occurred when the retaining wall of a holding pond broke, initially dumping 15.7 million gallons an hour of cyanide-tainted water into the Omai River, which feeds the larger Essequibo. The pond holds 860 million gallons.

The concentration of cyanide in the spilling water was diluted from 15 parts per million Sunday to around three parts per million, the company said. Cyanide can be fatal in concentrations above 2 parts per million. Lower doses ingested over a period of time can cause mental retardation.

Omai Gold Mines is 95 % owned by Cambior Ltd. of Canada and Golden Star Resources of Denver, USA, and 5 % owned by Guyana. It has now shut down all operations. -- *Associated Press in* THE ALLIGATOR *(University of Florida, Gainesville, USA) 25 August 1995.*

Honduras:

NEW CROCODILE FARM REGULATIONS. Officials of the CITES Management Authority of Honduras have drafted new regulations to control the operation of crocodile farms in the

country. The regulations have been developed by personnel of CODDEFOR (The National Forestry Commission) which is one of the agencies charged to administer CITES, with responsibility for terrestrial and freshwater organisms, under the authority of the Minister of the Environment. These activities are part of general reorganization of the Honduran CITES Authority responding to recommendations made by CSG, the CITES Secretariat and the CITES Animals Committee.

During a training seminar for CITES implementation held in Honduras, 18-22 September, the regulations were reviewed in detail by H. Jenkins, chairman of the Animals Committee and CSG member, Dr. O. Menghi of CITES, Dr. Susan Lieberman of the US Management Authority and P. Ross, CSG Executive Officer. The new regulations are based in the Administrative and Technical `Normas' for the management and harvest of wildlife (1993) developed in Honduras with assistance from FAO, and are firmly rooted in national legislation. The regulations provide for the licensing, operation and inspection of farms, reporting and inventory control, inspection of facilities, identification of specimens and products and a detailed process for tagging and documenting farm raised skins and the issuance of export permits. Model regulations from Venezuela, the United States and Colombia were consulted and the final draft incorporates appropriate parts of these models in a structure that is both legal and practical in Honduras. CODDEFOR has also assigned personnel to operate the regulations and provide a core for effective CITES implementation in the country. The Honduras Management Authority team also participated very effectively in the CITES training seminar, at one stage correctly challenging CITES Secretariat instructor Jean Patric Le Duc on an interpretation of CITES, in which they proved to be right! -- J. P. Ross, *Executive Officer, CSG.*

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Venezuela:

CENSO DE NIDOS DE BABAS (*CAIMAN CROCODILUS*) EN REGIONES ECOLÓGICAS. Durante el mes de Octubre de 1994 se realizó el estudio denominado "Censo de nidos de baba por regiones ecológicas", ejecutado conjuntamente entre el Instituto de Zoología Tropical (IZT) de la Faculltad de Ciencias de la Universidad Central de Venezuela (UCV) y el Servicio Autónomo PROFAUNA, con el objetivo de determinar un índice (nidos/ha) por región ecológica que le permitiera a PROFAUNA optimizar la asignación del recurso a los zoocriaderos comerciales de la especie, debido a que no se contaba con un trabajo de campo que le permitiera a este Servicio tener un punto de referencia sobre la disponibilidad real del recurso.

Se visitaron un total de 10 fincas, tomando las siguientes variables: número de nidos, formación vegetal aledaña al nido; alto y ancho en dos direcciones del nido; distancia al cuerpo de agua mas cercano; nivel de inundación; material y la condición del nido.

Mediante un muestreo aleatorio, se seleccionaron nidos para ser abiertos y se determinó el número de huevos, su fertilidad, y se tomaron medidas internas de la cámara: profundidad, alto y ancho en dos direcciones.

Se practicaron análisis de varianza de los datos obtenidos utilizando modelos de efecto fijo, donde las variables dependientes fueron las medidas externas del nido, profundidad de inundación, cobertura, distancia del nido al cuerpo de agua, altura del dosel, las medidas internas del nido, número de huevos total, fértiles e infértiles, y como factores de clasificación o variables independientes fueron las regiones ecológicas: Alto Apure, Bajo Apure, Cajón de Arauca, Llanos Boscosos y Guárico, la formación vegetal aledaña, el material y la condición del nido, con un nivel de significación del 5 %.

Entre los resultados mas importantes destacan diferencias significativas entre las regiones ecológicas exceptuando las variables siguientes: las medidas internas del nido (profundidad, alto y ancho de la cámara) y el número de huevos infértiles.

Se obtuvo diferencia significativa entre el índice de nidos por estructura vegetal, y el número de huevos por nido por región ecológica respectivamente, lo que se tradujo en propuestas diferentes para cada región, definidas en las siguientes ecuaciones.:

(Densidad Bosque) * (Area Bosque) + (Densidad Sabana) * (Area Sabana) = Número de Nidos.

Número de Nidos * Promedio de Huevos por Nido en la Región = Número de Huevos. -- Alvaro Velasco B., *Servicio Autónomo PROFAUNA, Edif. Camejo, Entrada Oeste, Mezzanina, C.S.B., Caracas 1010, Venezuela.*

BABAS NESTS CENSUS (*CAIMAN CROCODILUS*) IN ECOLOGICAL REGIONS. *Free translation of the preceding article.* During the month of October a study named "Babas nest census by ecological regions" was jointly executed by the Institute of Tropical Zoology (IZT) of the Science Faculty of the University of Central Venezuela and the Autonomous Service PROFAUNA, to determine an index (nests/ha) by each ecological region which will allow

PROFAUNA to make a more efficient resource assignment to the commercial farms of the species, because we have not had a reference point about the real availability of the resource.

A total of 10 farms were visited and the following variables were taken: nest number, vegetation formation near to the nest, canopy height (maximum, minimum and average), covering over the nest, height and width in two directions of the nest, distance from the nearest water, food level, material and nest conditions.

Using a random sample, nests were selected to be opened and the number of eggs were determined, fertility and the inner measures of the chamber were taken: depth, height and width in two directions.

Using fixed effect models, variance of analysis were done, where the dependent variables were the outer nest measurements, flood depth, covering, nest distance from water, canopy height, total number of eggs, fertility and as classification factors or independent variables were the ecological regions : Alto Apure, Bajo Apure, Cajón the Arauca, Llanos Boscosos y Guárico, the nearest vegetation formation and material and nest condition, with a significance level of 5 %.

Among the most important results are significant differences found among the ecological regions except for the following variables: inner nest measures, (depth, height and width of the chamber) and the number of infertile eggs.

Significant differences were obtained between the nest index by vegetation structure and the number of eggs per nest by ecological region, because of these results different solutions were given for each ecological region. -- Alvaro Velasco B., *Servicio Autonomo PROFAUNA. Edif. Camejo, Entrada Oeste, Mezzanina, C.S.B., Caracas 1010, Venezuela.*

EVALUACION DEL PROGRAMA DE REINTRODUCCION DE CAIMANES DEL ORINOCO EN EL REFUGIO DE FAUNA SILVESTRE CANO GUARITICO (ESTADO APURE, VENEZUELA) ENTRE 1990 Y 1995. Con la finalidad de evaluar el programa de reintroducción de Caimanes del Orinoco (*Crocodylus intermedius*) en el R.F.S. Caño Guaritíco, se realizó un analisis de la información centralizada en la Base de Datos de Caimanes del Grupo de Especialistas en Cocodrilos que coordina FUDENA. Los datos fueron recabados por investigadores de esta Fundación que laboraron en el Zoocriadero Masaguaral entre 1990 y 1994, e información de los Zoocriaderos UNELLEZ, El Frío y Puerto Miranda. Entre los resultados se tiene que aproximadamente 514 caimanes se han reintroducido en este refugio desde 1990 hasta 1995, 283 en Caño Guaritíco (55,1%), 227 en Caño Macanillal (44,2%) y 4 en Caño Mucuritas (0,7%). De los 514 caimanes, 271 provienen de Masaguaral (42,2%), 114 de El Frío (22,2%), 92 de la UNELLEZ (17,9%), y 41 de Puerto Miranda (7,9%). La proporción de sexos es 0,55:1 a favor de machos, considerando solo datos de 412 caimanes (80,2%) en la base de datos, 264 machos (64,07%), 144 hembras (34,95%) y 4 sin determinar (0,97%).

En términos de longitud total, en 1990 la LT promedio fue de 151,7 cm (DE= 22,25), en 1991 de 125,2 cm (DE= 30,9), en 1992 de 82,8 (DE= 35.1), 1993 de 79,7 cm (DE= 13,17) y en 1994 de 86,9 cm (DE= 16,08). La unificación del tamaño y disminución de la variabilidad posiblemente se deba a que en los últimos tres anos se han estandarizado los criterios de cría y año de liberación de cada centro, los cuales en términos generales han mejorado las instalaciones para la cría en

cautiverio. Cabe citar la ampliación realizada en el Zoocriadero Puerto Miranda, el cual cuenta actualmente con 7 lagunas en las cuales mantiene parejas de esta especie, mas 1 laguna donde existen un grupo de hembras aparte. En relación al seguimiento de caimanes reintroducidos en las localidades señaladas, no se ha realizado un estudio permanente, limitándose más bien a recorridos parciales y esporádicos que han realizado investigadores de diferentes instituciones que vienen trabajando en este programa (WCS, FUDENA, UNELLEZ, Fund. La Salle, PROFAUNA). Se han capturado 16 individuos, de los cuales un ejemplar capturado en Guaritíco, fue liberado en Macanillal, lo cual comprueba que los caimanes pueden migrar entre zonas. El crecimiento promedio de los caimanes capturados en Macanillal fue de 0,5 mm/día, siendo menor al registrado en Caño Guaritíco de 1,38 mm/dia. A finales de este año, Gustavo Hernández de FUDENA-WCS con el apoyo de Puerto Miranda y PROFAUNA, estará realizando estudios que ayuden a establecer el éxito y viabilidad de este programa, para lo cual se requiere de financiamiento y asistencia en el campo. -- Lic. Alfredo Arteaga, *Coordinador del Programa de Conservación de Cocodrilos de FUDENA. Apdo. 70376 Caracas 1071-A. Fax 02-2396547. E-mail: fudena@dino.conicit.ve*

EVALUATION OF THE ORINOCO CROCODILE REINTRODUCTION PROGRAM AT CAÑO GUARITICO WILDLIFE REFUGEE (APURE STATE, VENEZUELA) BETWEEN 1990 AND 1995. *Free translation of the preceding article.* An analysis of the centralized information was done from the database of the Crocodile Specialist Group of Venezuela coordinated by FUDENA to evaluate the Orinoco's caimans reintroduction program at the Caño Guarítico F.W.R. The data were collected by researchers of the Masaguaral Farm between 1990 and 1994 and information from this Foundation who worked in the UNELLEZ Farm, El Frío and Puerto Miranda. Among the results of the program are that around 514 crocodiles were reintroduced in this refuge from 1990 until 1995, 283 at Caño Guarítico (55.1 %), 227 at Caño Macanillal (44.2 %) and 4 at Caño Mucuritas (0.7 %). Of these 514 animals, 271 are from Masaguaral (42.2 %), 114 from El Frío (22.2 %), 92 from UNELLEZ (17.9 %) and 41 from Puerto Miranda (7.9 %). The sex proportion is 0.55:1 favoring males, only taking into account data from 412 crocodiles (80.2 %) from the database, 264 males (64.07 %), 144 females (34.95 %) and 4 without determination (0.97 %). In terms of total length, in 1990 the average TL was 151.7 cm (SD=22.25), in 1991 was 125.2 cm (SD=30.9), in 1992 was 82.8 cm (SD=35.1), in 1993 was 79.7 cm (SD=13.17) and in 1994 was 86.9 cm (SD=16.08). The size standardization and the variability decrease is because in the last three years the breeding criteria and the liberation year of each center have been standardized, and they have improved their installations for the raising in captivity. It is good to note the enlargement made at Puerto Miranda Farm, which at present has 7 lagoons, containing pairs of this species and also another lagoon where a group of females remains isolated. In relation to the tracking of the reintroduced caimans at the indicated areas, there has not been a permanent study, only sporadic and partial ones carried out by researchers of the different institutions that are working in this program. (WCS, FUDENA, UNELLEZ, Fund. La Salle, PROFAUNA). Sixteen specimens have been recaptured, one of them recaptured at Guarítico, was released at Macanillal indicating that caimans can migrate between zones. The average growth of the recaptured crocodiles at Macanillal was of 0.5 mm/day, lower than the recorded at Caño Guarítico of 1.38 mm/day. At the end of this year, Gustavo Hernández from FUDENA-WCS with the support of Puerto Miranda and PROFAUNA will be doing studies that would help to establish the success and viability of this program. -- Lic. Alfredo Arteaga, *Coordinator of the FUDENA Crocodile Conservation Program, Apdo 70376, Caracas 1071-A, Fax ; 02-2396547, E-mail: fudena@dino.conicit.ve*

REINTRODUCCION DE CAIMANES DEL ORINOCO EN EL RIO CAÑO DE AGUA, ESTADO DE COJEDES, VENEZUELA. El 4 de julio de 1995 se reintrodujeron 20 Caimanes del Orinoco, criados en cautiverio por espacio de un año y medio en la Estación Biológica El Frío, Estado Apure.

El sitio de liberación fue el río Caño de Agua, estado Cojedes, Venezuela, ubicado en las coordenadas N 9°19'43" y W 68°43'37", con una longitud total promedio de 104.95 cm ± 6.30, longitud ventral promedio de 54.85 cm ± 3.26 y un peso promedio de 3 790 kg ± 1344.

Estos animales fueron recolectados en el año 1994 en las cercanías del área de liberación y son los primeros ejemplares que se reintroducen en la zona, la cual mantiene una de las poblaciones más importantes de la especie en el país.

Esta reintroducción de caimanes forma parte del plan de acción y estratégico que viene desarrollando el Servicio Autónomo PROFAUNA, conjunto con el Grupo de Especialistas de Cocodrilos de Venezuela. -- Alvaro Velasco, *Servicio Autónomo PROFAUNA, Edif. Camejo, Entrada Oeste, Mezzanina, Caracas 1010, Venezuela.*

ORINOCO'S CROCODILE REINTRODUCTION IN CAÑO DE AGUA RIVER, COJEDES STATE, VENEZUELA. *Free translation of the preceding article.* On 4 July 1995, 20 Orinoco crocodiles were reintroduced, after being raised in captivity for a year and a half in the Biological Station El Frío, State of Apure.

The liberation spot was the Caño de Agua River, Cojedes State, Venezuela, at Latitude N 9°19'43" and Longitude W 68°43'37". Released animals had an average total length of 104.95 cm ± 6.30, ventral average length of 54.85 cm ± 3.26 and a mean weight of 3.79 kg ± 1.34.

These animals were collected in 1994 in the proximity of the liberation area and they are the first specimens that are reintroduced to the area, which maintains one of the most important populations of the species in the country.

This crocodile reintroduction is part of the strategy and action plan that the PROFAUNA Autonome Service is developing jointly with the Venezuela Crocodile Specialists Group. -- Alvaro Velasco, *Servicio Autónomo PROFAUNA, Edif. Camejo, Entrada Oeste, Mezzanina, Caracas 1010, Venezuela.*

NORTH AMERICA

Mexico:

THE *CROCODYLUS MORELETII* RECOVERY IN NORTHWEST OF CHIAPAS STATE, MEXICO. Twenty-five years ago Professor Miguel Alvarez del Toro, director of Tuxtla Gutierrez Zoo (currently known as ZOOMAT) at the request of Instituto Mexicano para los Recursos Naturales A.C. (IMERNAR) and the World Wildlife Fund (project 376) started a study on the captive biology of a crocodile which was hunted intensively and was almost extinct from many areas of Chiapas and from some other states in the Gulf Coast of Mexico. The project was on

Morelet's crocodile, known in Chiapas as Lagarto del Pantano or swamp crocodile.

When Professor Alvarez del Toro visited that zone in the 60's, the districts (counties) of Pichucalco, Reforma and Juarez were famous for the harvesting of crocodiles which inhabit that region. But what he found was mountains of bones and skulls and a few live animals, young and shy.

To find the crocodiles to be confined in the facilities of Rancho Alejandría, property of Guichard family in Juarez for the captive biology project was very difficult. Fourteen subadults crocs were put into a seminatural enclosure, basically a 150,000 square meter lagoon, with emergent vegetation and surrounded by wire mesh.

The field and the zoo results were very optimistic because in the Tuxtla zoo it was possible to obtain the first reproduction of the species in 1972 and good data were obtained in Rancho Alejandría for the publication of the book "Los Crocodylia de Mexico - estudio comparativo-", the basic book on the knowledge of these Mexican reptiles since that time.

With the passage of time, the Morelet's crocodiles hatched at ZOOMAT, and others donated to the zoo, were relocated in this district. Furthermore the population of crocs in that center bred satisfactorily and today it is common to see animals of all lengths (some of them bigger than 3 m TL) in all water bodies: small rivers, lagoons, swamps, and in artificial excavations made by the Mexican Petroleum Company (PEMEX) for some years. Crocodiles are common again in that district and people began to understand than they are more useful than harmful.

No matter the good results obtained, the zone is subject to big agricultural pressures which attempt to drain these important swamps and to affect not only the crocodiles but all the ecosystem which occurs there. Besides the place is important because it is the last remnant of the canacoites forest Bravasia integerrima in Mexico.

We hope that this place keeps its particular beauty and the authorities protect this important ecosystem in where the Morelet's crocodile have returned. -- Luis Zigler M.V.Z., *Institute of Natural History, A.P. 6, Tuxtla Gutierrez, C.P. 29000 Chiapas, Mexico.*

LA RECUPERACION DE *CROCODYLUS MORELETII* EN EL NW DEL ESTADO DE CHIAPAS. Hace mas de 25 años el Profesor Miguel Alvarez del Toro, director del zoológico de Tuxtla Gutierrez (actualmente conocido como ZOOMAT) tuvo las encomiendas del Instituto Mexicano para los Recursos Naturales Renovables A.C. y del Fondo Mundial para la Vida Silvestre WWF (proyecto 376) de iniciar un estudio sobre la biología en cautiverio de un cocodrilo que había sido intensamente aprovechado y casi extinguido de varias zonas de Chiapas y de varios estados Mexicanos en la vertiente del Golfo de México. Se trataba del cocodrilo de Morelet, conocido en Chiapas como lagarto o cocodrilo de pantano.

Cuando Don Miguel visitó la zona en la decada de los 60's, los municipios de Pichucalco, Reforma y Juárez eran famosos por la cosecha que se hacía sobre los cocodrilos que allí habitaban. Sin embargo, lo que el encontró fueron montañas de huesos y cráneos, y pocos animales, la mayoría jóvenes y muy ariscos.

Conseguir los cocodrilos que serían puestos en las instalaciones del rancho Alejandría, propiedad de la familia Guichard en el Municipio de Juaréz para el proyecto de bioloía en cautiverio fue muy difícil. Alrededor de 14 ejemplares subadultos fueron colocados en las instalaciones seminaturales, basicamente una laguna de 150,000 m2 con vegetación flotante cercada con malla.

Los resultados en el campo y en las instalaciones del zoológico fueron muy alentadores, ya que en el zoológico de Tuxtla se logró la primera reproducción de la especie en 1972 y en el rancho Alejandría se obtuvieron muy buenos datos para la publicación del libro "Los Crocodylia de México -estudio comparativo-", obra esencial para el conocimiento de estos reptiles mexicanos desde aquel tiempo.

Con el paso de los años, los cocodrilos de Morelet nacidos en el ZOOMAT y los que llegan donados se han reubicado en este municipio, además la población de cocodrilos de aquel centro se sigue reproduciendo satisfactoriamente y hoy en día es común ver ejemplares de todas tallas (inclusive mayores a 3 m de L.T.) en todos los cuerpos de agua: arroyos, lagunas, charcos, pantanos e incluso en grandes excavaciones artificiales hechas por la compañía petrolera de México (PEMEX) desde hace varios años. Los cocodrilos han vuelto a ser comunes en aquel municipio y la gente comienza a entender que son más benéficos que perjudiciales.

A pesar de los buenos resultados, la zona enfrenta serias presiones agrícolas que pretenden desecar estos importantes pantanos y afectar no solo a los cocodrilos sino tambien a todo el ecosistema que allí ocurre. Además el lugar es importante por ser el último reducto de la selva de canacoites Bravasia integerrima en México.

Espéramos que el sitio siga manteniendo su particular belleza y que las autoridades protejan este importante ecosistema en el que han retornado los cocodrilos de Morelet. -- Luis Zigler M.V.Z.
Instituto de Historia Natural, A.P. 6, Tuxtla Gutierréz, C.P. 29000 Chiapas, México.

UNO DE LOS POCOS CRIADEROS COMERCIALES DE COCODRILOS EN MEXICO.
Ubicado en el Estado de Sinaloa en la región noroeste de México, a 20 km al suroeste de Culiacán, Capital del Estado, Cocodrilos Mexicanos, S.A. de C.V. (COCOMEX-COCOSIN) ha estado operando desde 1989 dedicándose la reproducción y engorde de cocodrilos de la especie *Crocodylus moreletii*. COCOMEX inicio operaciones con cocodrilos reproductores proporcionados hace 6 años por la desaparecida Secretaría de Desarrollo Urbano y Ecología (SEDUE) actualmente Secretaría de Medio Ambiente, Recursos Naturales y Pesca- Instituto Nacional de Ecología (SEMARNAP-INE).

Los 365 animales con los que se inició la granja, animales de diversos tamaños entregados en un lapso de 2, 5 años, fueron concesionados por el Gobierno Federal y proceden de los criaderos oficiales que controla el Instituto Nacional de Ecología Autoridad Cites en México. Nuestro criadero está legalmente establecido y es el que mantiene la mayor cantidad de cocodrilos Moreletii en cautiverio en el país, contando con una población actual de alrededor de 4,000 cocodrilos de diferentes tamaños.

El criadero está ubicado en un terreno de 20 ha ocupando actualmente con instalaciones solo 4 ha y cuenta con un acuaterrario para reproductores de 8,000 m² , un acuaterrario para subadultos de de

8,011 m² , un acuaterrario para juveniles de 5,500 m² y un acuaterrario enfermería de 911 m² . También posee un cuarto de incubación para 6,000 huevos y una caseta de ambiente controlado (environmental chamber) que puede alojar 2 600 cocodrilos menores de 1 año. Desde 1990 hasta la fecha se han venido presentando anidaciones y nacimientos, estos últimos se han ido incrementando considerablemente año tras año conforme aumenta el número de animales que se integran a la población de reproductores. Actualmente tenemos alrededor de 160 hembras reproductoras que han puesto aproximadamente 4,500 y 5,500 huevos durante 1994 y 1995 respectivamente, para este año se espera nazcan unos 3,000 cocodrilos, lo cual aumentara nuestra población de cocodrilos a unos 7,000 individuos.

También se tiene el compromiso de entregar al Gobierno Federal el 10 % de los animales nacidos cada año en el criadero cuando estos tengan de 1 a 2 años de edad y sirvan para tareas de repoblamiento.

Para fines de Noviembre de este año se tiene contemplado se terminen de construir 10 casetas circulares de ambiente controlado (environmental chamber) de 10 m de diametro con calentamiento por debajo del piso, con estas casetas se estará utilizando la mas moderna tecnología para la crianza de cocodrilos. Asimismo se han implantado mejoras en el manejo y la alimentación de los animales para producir cocodrilos de talla comercial en un lapso de 24 a 30 meses.

El criadero recibe de 1 a 2 visitas por año de parte de agentes de la Autoridad de CITES en el País (INE-SEMARNAP) para constatar los nacimientos y el manejo de la granja.

Aunque el criadero no está ubicado en un sitio con gran afluencia de turistas anualmente se reciben cientos de visitantes provenientes de escuelas de todos los niveles educativos tanto del Estado de Sinaloa como de otros Estados de la República Mexicana, a quienes les motiva el conocer la Biología y Crianza de estos animales.

La crianza comercial de cocodrilos en México es una actividad incipiente, tan es así que COCOMEX será el primero de los criaderos comerciales en sacrificar cocodrilos para la venta de su piel y carne en el Mercado Nacional, pues hasta no obtener el Registro CITES del criadero no se estará en posibilidades de exportar. -- Biol. Francisco León, *Gerente de Producción, Cocodrilos Mexicanos, S.A. de C.V., Paseo Niños Heróes 276 Pte, C.P. 80 000, Culiacán, Sinaloa, Mexico.*

ONE OF THE CROCODILE BREEDING FARMS IN MEXICO. *Free translation of the preceding article.* Located in the Sinaloa State, in the northeast region of Mexico, 20 km to the southwest of Culiacan, State Capital, Cocrodilos Mexicanos, S.A. de C.V. (COCOMEX-COCOSIN) has been operating since 1989, having as its principal goal the reproduction and fattening of crocodiles of *Crocodylus moreletii*. Six years ago, COCOMEX started the work with reproductive crocodiles from the former Secretaria de Desarrollo Urbano y Ecologia (SEDUE) and now named Secretaria de Medio Ambiente, Recursos Naturales y Pesca - Instituto Nacional de Ecologia (SEMARNAP - INE).

The farm started with 365 animals of different sizes that were given over a period of 2-5 years by the Federal Government and that were from the official breeding farms ruled by the Instituto Nacional de Ecologia Autoridad CITES in Mexico. Our breeding farm is legally established and maintains the greatest quantity of Morelet's crocodiles in captivity in the country, having now a population around 4,000 crocodiles of different sizes.

The breeding farm is located in a 20 ha area, at present only 4 ha is occupied by building facilities. There is a pond for breeders of 8,000 m² , a pond for subadults of 8,011 m² , a pond for juveniles of 5,500 m² and a nursery pond of 911 m² , also there is an incubation chamber for 6,000 eggs and a environmental chamber with capacity of 2,600 crocodiles of less than 1 year's age. Since 1990 until now we were having nestings and hatchlings, increasing year after year as the number of reproductive animals has been increasing. At this time we have around 160 breeding females that have produced 4,500 and 5,500 eggs during 1994 and 1995, respectively. For this year a hatch of about 3,000 crocodiles is expected, so our crocodile population will increase to 7,000 specimens.

Also we have given a commitment to the Federal Government to deliver 10% of the animals born each year in the farm for restocking, when they reach the age of 1 to 2 years-old.

At the end of November of this year we plan to finish the construction of 10 circular environmental chambers of 10 m diameter with underfloor heating. Having these chambers we will be using the top technology for crocodile raising, indeed we have improved the handling and feeding of the animals in order to develop commercial size crocodiles in a time of 24 to 30 months. The farm receives 1 or 2 annual visits from agents of the CITES Management Authority in the country (INE - SEMARNAP) to corroborate the births and the handling of the farm.

Although the farm is not located at a tourist place annually we receive hundreds of visitors from schools of different educational levels of the Sinaloa State, and also from other States of the Mexican Republic, who are interested to know the biology and breeding of these animals.

The commercial breeding of crocodiles is an incipient activity in Mexico, in such a way that COCOMEX will be the first commercial breeding farm to sacrifice crocodiles for the purpose of selling skin and meat in the national market, because until we obtain the farm's Registration with CITES we cannot export them. A proposal to register the farm with CITES has been approved by the Mexican Management Authority and submitted to CITES. The proposal is currently waiting for the resolution of several questions raised by CITES parties concerning farm operations and Mexican control measures. -- Biol. Francisco J. León Ojeda, *Gerente de Producción, Cocodrilos Mexicanos, S.A. de C.V., Paseo Niños Heróes 276 Pte, C.P. 80 000, Culiacán, Sinaloa, Mexico.*

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United States:

GATOR HUNTS DOGS. Rufus Godwin's search for Flojo, his $5,000 purebred Walker fox-hunting dog, led to the depths of a Florida Panhandle swamp - and the belly of a 500-pound bull alligator. About 25 dogs have disappeared in the forest over the past 20 years, but their owners, had presumed people were stealing them. Instead, the huge gator had turned a game trail into his private diner, lunching on the canines as they ran across Coldwater Creek in pursuit of foxes or deer. The dog's barking apparently was his dinner bell, Godwin said.

Four days after Godwin's 6-year-old dog disappeared on a hunting trip in Blackwater River State Forest, about 45 miles northeast of Pensacola, he caught a faint signal from Flojo's electronic tracking collar. Jamie Sauls of Jay, who had accompanied Godwin, also was receiving signals from a collar worn by a dog he lost several weeks earlier. And they got a response from a third collar that had been on Elton Nowling's dog.

Seven collars including Flojo's flea collar and that of Nowling's dog, were found inside the 10-foot, 11-inch reptile after it was captured Aug. 15 by state-contracted gator hunters, who later killed the animal.-- THE GAINESVILLE SUN, *Tuesday, August 29, 1995.*

BIG COMEBACK FOR FLORIDA CROCS. This summer's hatching season for crocs has proved "extremely noteworthy," says Frank Mazzotti, a University of Florida researcher based near Fort Lauderdale. It's a record-breaking year for crocodile nesting at Turkey Point in south Dade County and looks to be a record-breaker for Everglades National Park as well.

Two nests were discovered across Florida Bay from Key Largo, on Cape Sable, where they have not been noted since late last century. And for the first time ever, a crocodile nest was found on Sanibel Island near Fort Myers. Once chased by development into a 50-square-kilometer patch of southern Dade County and the northern Florida Keys, crocodiles now are reproducing enough that they are spreading out again.

The number of crocodiles living in Florida - "It's a grand guess," Mazzotti acknowledges - is thought to be 400 to 500. The crocodile is far outnumbered by the alligator, which is thought to number perhaps 1 million in the state. South Florida's crocodiles were rescued from the brink of oblivion beginning in the 1970's. Florida Power & Light wanted to build a nuclear power plant at Turkey Point, but was challenged by environmentalists because a waste product, superheated water, seemed sure to kill seagrasses in Biscayne Bay. The power company's solution: 240 kilometers of shallow canals where the water would be cooled before it was dumped into the bay. As the canals were dug, the extra sand was piled alongside, fashioning a perfect place for crocodiles to nest. The normal hatchling survival rate of 5 per cent increased to between 15 and 20 per cent.

After crocodiles were declared endangered in 1975, scientists set out to restore the species to the point that 60 croc nests would be found annually. At the time, recalls researcher Paul Moler of the Florida Game and Fresh Water Fish Commission, achieving the goal seemed unlikely. Now? "Given the increases we've seen in the last 12 or 15 years, it's not outside the realm of possibility that you might see that someday," Moler says. -- *Submitted by* Jon Davidson, *Toronto, Canada, from* THE TORONTO STAR*, Saturday, August 26, 1995.*

CORRECTIONS

NEWSLETTER 14(2), Cover. The cover photograph of the last Newsletter showing hatchling *Caiman latirostris* hatched at the Buenos Aires Zoo, Argentina, should have been credited to Gentileza Laura Graxino. Nadia Boscarol forwarded the photo to the CSG. -- *Eds.*

CROCODILIAN BIBLIOGRAPHY, Newsletter 14(2):21. The correct address for the Mason Meers on-line

crocodilian bibliography is:

http://www.welch.jhu.edu/homepages/mmeers/html/croc.bib.cover.html

The terminal `l' was inadvertently omitted. -- *Eds.*

CSG ON-LINE

See the CSG world wide web pages at:

http://www.flmnh.ufl.edu/docs/departments/crocs.htm

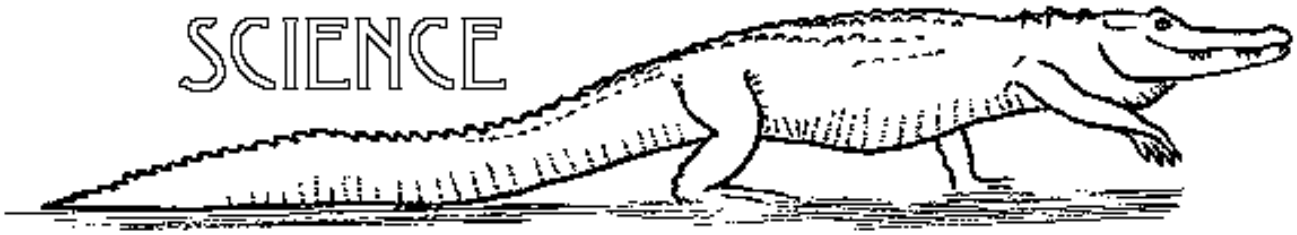
U.S. FISH AND WILDLIFE SERVICE ON THE INFORMATION SUPERHIGHWAY. The USFWS is now operating a World Wide Web home page on the Internet. For those of you with access, the URL. (Uniform Resource Locator) is:

http:// www.fws.gov/

Information contained at this site includes a list of the threatened and endangered species, information on fisheries management and conservation, and information on recreational opportunities on wildlife refuges.

Editor's note: The Parsons Group, Inc. offers a list of Biological Information available on the Internet. Contact our offices for details. --THE CONSERVATION DIGEST, June-July, 2(6), 1995, P.O. Box 892, Centerville, VA 22020, USA.

SCIENCE



DNA WORKSHOP PLANNED. A crocodilian DNA Workshop will be held 4-6 March 1996, at the Riverbanks Zoological Park and Botanical Garden in Colombia, South Carolina, USA. The workshop is sponsored by the Crocodile Specialist Group, The Riverbanks Zoological Park and Botanic garden, The Savannah River Ecology Laboratory and The University of South Carolina. The goal is to foster interactions among the various groups interested in the applications of DNA technology to crocodilians. A number of topics have already been identified for presentation and discussion, including the genetic diversity of captive breeding efforts, forensic applications, questions of population structure, systematics and evolution, issues of hybidization in both captive and wild animals, the developmental genetics of reptilian and avian skins and temperature control of sex determination and the relationship of the crocodilia to other "archosaurian" vertebrates. The use of DNA techniques for population management and conservation biology will provide a focus for discussions. The workshop will be open to all participants, including the zoo community, commercial interests, management and enforcement personnel in addition to researchers. A relatively informal format of presentations and discussion is anticipated. A registration fee of $50 will be collected to assist with organizational costs. Enquiries and applications to attend may be addressed to -- Ms. Barrie Brownlee, Institute of Public Affairs, The University of South

Carolina, Colombia SC 29208, USA. Phone: (1) 803 777 4568, Fax: (1) 803 777 4575, E-mail: brownlee@iopa.sc.edu

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A LECTOTYPE FOR THE SIAMESE CROCODILE. In a 1995 paper, Charles A. Ross, Greg Mayer and Roger Bour explain that Schneider (1801) named *Crocodilus siamensis* (now *Crocodylus siamensis*) on the basis of three specimens from Siam (Thailand) that were described and figured (but not named) in a 1688 publication describing observations of French Jesuit missionaries in Siam. None of the three specimens are known to be preserved. Cuvier considered the syntypical series to be a composite and proposed the name *C. galeatus* for one of the included specimens. Cuvier's replacement name is assessed and rejected as unjustified. In the interests of nomenclatural stability, one of the original 1688 figures is designated as a lectotype of *C. siamensis*. The type locality of *C. siamensis* is shown to be Louvo, Siam (= Ayutthaya, Thailand). -- *from* Ross, C. A., G. C. Mayer *and* R. Bour. *1995. Proceedings of the Biol. Soc. Washington. 108 (2):298-301.*

X-RAY OBSERVATIONS OF DIGESTION IN AN ALLIGATOR. In 1989, a wild caught (Fla. Game & Fresh Water Fish Com.), 56.5 cm S-V length, 4 yr-old female *Alligator mississippiensis* at the Museum of Comparative Zoology, Cambridge, USA, was x-rayed and found to be without gastroliths before cineradiographic observations of digestion commenced. For the initial observation without stones present, the alligator (while under Halothene anesthetic) was forced-fed 3 snail shells (1.5 cm diameter) filled with barium paste and capped with paraffin, and 4 neonate mice injected with a barium slurry, and 7 other neonate mice, using a flexible tube down the throat. Immediate x-rays showed the shells and barium-filled mice in the stomach. Eighteen hours later x-rays showed no change in the positions of the mice and shells. X-rays were repeated regularly, every 15 min, for the next 18 hrs. The only motion observed was due to pressure exerted on the stomach by the lungs during breathing. About 38 hr into the observation a bolus of food was formed, and passed into the large intestine at 46-54 hrs.

Later, 8 quartz pebbles (13 g total mass) from a wild Florida gator (FG&FWFC) were force-fed to the Harvard alligator, along with 2 barium marked snail shells (1.5 cm diameter), 2 empty snail shells, 2 marked gold fish (3 cm), and 10 additional unmarked goldfish. After 24 hours the animal was x-rayed at 15 min intervals. As in the observation without stones, the food was where it had been after feeding, dissolving slowly and gently. At 48 hr, a bolus was formed, and it passed into the large intestine during the next 8 hours.

During actual cineradiographic recordings, the alligator was tied (both fore and hind limbs behind its back) with tape, because the animal must remain stationary in a motion picture of stomach motion. Simple and complex waves of stomach contractions that Diefenbach (1975, Comp. Biochem. Physiol. 51A) measured were not observed, nor was the violent churning (Yale University) cited in CSG Newsletter 14 (2): 19. Rather, at Harvard (facilities provided by A. W. Crompton, experiment performed by C. Whittle, manuscript revised by F.D. Ross with advice from E.E. Williams), the food was digested very gently, and several small brittle fragments of snail shell were excreted unbroken. -- Christopher H. Whittle, *1241 1/2 Entrada Bonita SW, Albuquerque, NM 870105, USA.*

PART HUMAN, PART CROCODILE. Once a crocodile drags its prey underwater, there is not much hope for the victim. While the crocodile can remain submerged for up to an hour, its prey soon drowns. In 1977, German researchers discovered that crocodile hemoglobin has a special property that enables the reptile to stay underwater for long periods. Now it turns out that despite enormous differences in oxygen-carrying capacity, crocodile and human hemoglobin are surprisingly similar.

Hemoglobin molecules, found in the red blood cells of both humans and crocodiles, ferry oxygen through the body. In humans, hemoglobin releases only about a quarter of the oxygen it carries to surrounding tissues. But in crocodiles, the German team discovered, bicarbonate ions bind to hemoglobin, loosening its grip on oxygen so more is released to tissues. "Crocodile hemoglobin is very good at delivering oxygen where it's most required," says molecular biologist Kiyoshi Nagai of the Medical Research Council Laboratory of Molecular Biology in Cambridge, England.

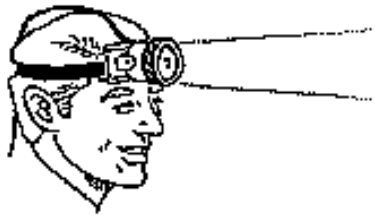
Crocodiles and humans diverged from a common ancestor some 300 million years ago, and more than a third of the amino acids in the sequence that makes up the protein are different in the two species. But the differences are not necessarily significant as Nagai and his colleague Hennakao Komiyama discovered when they created various hybrids of

the human and crocodile molecules. (They did that by synthesizing DNA that encoded some of the human and some of the crocodile amino acids and implanting the artificial gene into bacteria to produce the actual hemoglobin.) By noting which parts of the crocodile molecule had to be present to produce the bicarbonate effect, they got a rough idea of the location of the bicarbonate binding site.

Then the researchers began mutating single amino acids far from the site, making the hemoglobin progressively more human and less crocodilian while retaining the bicarbonate effect. Finally only 12 amino acids remained to account for the difference between human and crocodile hemoglobin.

"People ask us, If we had this hemoglobin, would we be able to stay underwater for one hour?" says Nagai. "But I think the answer is no." The bicarbonate effect is only one reason crocodiles can stay submerged for so long. They also consume oxygen much more slowly than we do. While we might not be able to hold our breath for an hour, there may yet be practical benefits to Nagai's research: he's working on a modified form of hemoglobin with improved oxygen-releasing capabilities that may reduce the need for blood transfusions. -- DISCOVER, *May 1995, Vol. 16, Number 5.*

PERSONALS



Howard Kelly, Graduate School of Business, Breakwater Campus, Private Bag, Rondebosch 7700, Cape Province, South Africa. E-mail: KLLHOW01@gsb2.uct.ac.za. As you can see from my new (temporary) address I have returned to University for a year to complete my MBA. I am doing my research in the fields of Environmental Management and Eco-Tourism in Southern Africa and would be happy to hear from people who may be interested in these fields. We finish on the 8th December then I will be returning to the farm. Grace and I are really enjoying Cape Town and especially watching the Springboks winning the World Rugby Cup, please officially convey our condolences to the other countries in the next Newsletter especially the Australians and English!! I have stepped down as Chairman of the NCFA this year and Andrew Ericsen of Cango farms is holding the fort.

Gregor Riese, 44 Pine St. East, Cammeray NSW 2062, Australia. I am now working for an environmental consulting company called Aquatech Pty. Ltd. based in Sydney. Since completing my thesis (Factors Affecting Food Intake and Growth in Captive Saltwater Crocodile, *Crocodylus porosus*) in January I have had little to do with crocodiles to date, but there's no harm in trying. People are welcome to write to me at the above address for a copy of my thesis. I'd appreciate if they included an estimate of the postage costs with the request (I hope I'm not being too presumptuous in assuming someone may want to read it).

Charles A. Ross, V. Z. Osteo. Prep. Facility, Museum Support Center, Smithsonian Institution, MRC 534, Washington, DC 20560, USA, Phone 301 238 3154, Fax 301 238 3155, announces his new address and phone numbers and his move to an outstation of the Smithsonian where he can pursue his crocodilian interests away from the daily bustle of the Smithsonian.

Gustavo Hernandez, c/o FUDENA, Apartado 70376, Caracas, Venezuela, sent us an announcement of his marriage to Paula Vas e Alvares in August this year in Lisbon, Portugal. Congratulations Gustavo and Paula, sorry we couldn't make the wedding, we hope it was a great party.

Adam Britton, School of Biological Sciences, University of Bristol, Woodland Road, Bristol, Avon BS8 1UG, UK, is

completing his PhD thesis on bats, but has a fascination for crocodilians and hopes to make a lateral move into crocodilian research. He is currently trying to collect more information about the caimans in Puerto Rico. He recently attended the International Bat Symposium in Boston, USA, and won the student prize of $100.00 for the best student paper, which he promptly presented to CSG to support the Newsletter. Thank you Adam.

EDITORIAL POLICY - The Newsletter must contain interesting and timely information. All news on crocodilian conservation, research, management, captive propagation, trade, laws and regulations is welcome. Photographs and other graphic materials are particularly welcome. Information is usually published, as submitted, over the author's name and mailing address. The editors also extract material from correspondence or other sources and these items are attributed to the source. The information in the Newsletter should be accurate, but time constraints prevent independent verification of every item. If inaccuracies do appear, please call them to the attention of the editors so that corrections can be published in later issues. The opinions expressed herein are those of the individuals identified and, unless specifically indicated as such, are not the opinions of the CSG, the SSC, or the IUCN-World Conservation Union.

13TH WORKING MEETING OF THE CROCODILE SPECIALIST GROUP

13th to 17th May 1996, Santa Fe, Argentina.

In 1996, the 13th Working Meeting of the Crocodile Specialist Group will be held in Santa Fe, Argentina. Host and organizer of the meeting is Alejandro Larriera of Proyecto Yacare, and Fundación Habitat & Desarrollo.

Details of hotels, flights (including transfer arrangements in Buenos Aires), registration fees, services and agendas of the meeting will be sent to you on receipt of this form. Please return this preliminary registration immediately to ensure that we secure the space and facilities you need.

The meeting hosts are able to provide basic accommodations without charge to a limited number of participants. Twenty positions are reserved for students and similar persons of limited financial resources from Latin America and 20 positions are available for other participants.

If you wish to be considered for this accommodation, please:

1. Submit a preliminary registration (below).
2. Please write directly to: J.P. Ross, Executive Officer CSG, Florida Museum of Natural History, Gainesville, FL 32611-7800, USA. Fax 904 392 9367, E-mail: prosscsg@flmnh.ufl.edu
3. Request consideration for accommodation and indicating your other sources of funding for airtravel and food.

Applicants will be informed of accommodation awards after 15 January 1996, later applications will be filled on a space available basis.

PRELIMINARY REGISTRATION

To receive registration materials and detailed information on bookings, accommodations and local transport, please return this form by mail, Fax or E-mail to :

Fundación Habitat y Desarrollo
San Lorenzo 1582
3000 Santa Fe, Argentina

FAX: 54 4 259 6154

E-Mail yacare@unl.edu.ar

FAMILY NAME (Apellido):

GIVEN NAMES (nombres):

AFFILIATION:

MAIL ADDRESS:

TEL:

FAX:

E-Mail:

How many people in your party will travel to Argentina?_____

(*) This is a preliminary registration to allow planning and booking of adequate space. Please return the form if you have the slightest possibility or intention of attending. Firm commitments to bookings and reservations will follow.

THE 13TH WORKING MEETING OF THE IUCN/SSC CROCODILE SPECIALIST GROUP

13th to 17th May 1996, Santa Fe, Argentina

CALL FOR PAPERS

Application to present papers or posters at the 13th Working Meeting, Santa Fe, Argentina, are invited on any topic concerning crocodilian conservation, biology, research management, husbandry or trade. Sessions are anticipated to be organized around the following themes depending upon the numbers of papers submitted.

- Conservation of crocodilians in Latin America. Current activities, recent advances and national reports from the region.
- Status and conservation of highly endangered species of crocodilian. Updates on status and recent advances concerning species identified for priority action in the CSG Action Plan.

- Advances in taxonomy and systematics of crocodilians. Recent results, analyses and interpretations, particularly of biochemical and DNA studies. Note, because the Proceedings are not peer reviewed, formal changes in nomenclature cannot be accepted for publication.
- Management and Conservation programs for crocodilians. Descriptions of current and planned national programs for management including legal basis, regulations, different kinds of use (farming, ranching, hunting), systems of trade control, population assessment, monitoring and funding mechanisms.
- Recent advances in research. New results on physiology, behavior, ecology, feeding, growth, reproduction, husbandry, embryology.
- Crocodilian skin production and trade.
- Current situation of caiman. Recent information on trade levels, production, management and conservation programs, population status.
- Other topics and posters.

Presented papers will be published in the Proceedings of the 13th Working Meeting.

Workshops are planned to assess each species of crocodilian under the new IUCN Red List Categories criteria to provide updated status categories for the 1996 edition of the IUCN Red List of threatened animals.

To present a paper or poster, please send the following information on a single page to the Executive Officer CSG.

1. Full title of your presentation.
2. The author(s) full names as they should appear in the program.
3. The mailing address of one author to whom all correspondence can be sent.
4. A brief summary of the presentation with an indication of which session it fits in.
5. A copy of your completed preregistration application to attend the meeting.

Applications should be received by 1 January 1996. Authors will be advised of acceptance and receive full instructions for the preparation of presentations and written papers by 15 February 1996. Late applications will be accepted only on a space available basis. Authors whose institutions require a formal invitations to the meeting should request letters immediately from the executive officer.

Send all correspondence to:

Dr. J.P. Ross, Executive Officer CSG
Florida Museum of Natural History, Gainesville, FL 32611-7800, USA
Fax: (1) 904 392 9367, E-mail: prosscsg@flmnh.ufl.edu

[STEERING COMMITTEE MEMBERS]----[TOP OF THIS PAGE]----[TABLE OF CONTENTS]