CROCODILE SPECIALIST GROUP

NEWSLETTER

VOLUME 20 No. 4 ■ OCTOBER 2001 – DECEMBER 2001

IUCN - World Conservation Union ■ Species Survival Commission

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IUCN — The World Conservation Union
Species Survival Commission

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COVER PHOTO. Siamese crocodile, *Crocodylus siamensis*, adult approximately 3m. Photographed in the wild at Khao Ang Rue Nai Wildlife Sanctuary in western Thailand. See page 78. Y. Temsiripong photo.

The CSG NEWSLETTER is produced and distributed by the Crocodile Specialist Group of the Species Survival Commission, IUCN – The World Conservation Union. CSG NEWSLETTER provides information on the conservation, status, news and current events concerning crocodilians, and on the activities of the CSG. The NEWSLETTER is distributed to CSG members and, upon request, to other interested individuals and organizations. All subscribers are asked to contribute news and other materials. A voluntary contribution (suggested $40.00 US per year) is requested from subscribers to defray expenses of producing the NEWSLETTER. All communications should be addressed to: Dr. J. P. Ross, Executive Officer CSG, Florida Museum of Natural History, Gainesville, FL 32611, USA. Fax 1 352 392 9367, E-mail prosscsg@flmnh.ufl.edu

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Editorial

CHINA MOVES TO CONSERVE ALLIGATORS. In a December 18 e-mail message to CSG Regional Vice Chairman Grahame Webb, Mr. Weisheng Wang, State Forestry Administration coordinator for the Chinese alligator project advised that the draft plan prepared at the workshop in August had been officially approved. The State Forestry Administration has allocated a budget of $2 million US dollars for the Re-Introduction program in Anhui Province and approval of reintroduction in Zhejiang Province is expected. However, before these plans can be implemented and the funds applied, preliminary research and preparation needs to be conducted. Due to administrative and funding structures in China, this preliminary work needs additional external funding. Mr. Wang has appealed to CSG on behalf of his agency to assist with both technical guidance and funding to initiate the preparatory phase, with an estimated cost of $25,000.

This represents a magnificent response to CSG concerns and to the joint Chinese- — CSG recommendations made at the Hefei and Guanzhou workshops earlier in the year. Credit for this progress must be laid primarily with the activities of our Chinese colleagues. We also should recognize the crucial role played by Grahame Webb, Charlie Manolis and colleagues in developing ties to China. The numerous contributors to the Chinese Alligator Fund (CAF) should be proud that the seed money they provided is catalyzing such an energetic response in China. We are presently pursuing funding opportunities that will provide a match to the $12,000 provided to date by CAF and cooperating partners for Chinese alligator conservation. With two matching contributions of similar size the funds to initiate the project should be realized. — Perran Ross, *Executive Officer and Editor.*

AUSSIE NEWSLETTERS LOST IN MAIL. Polite inquiries began in November and have grown to an aggrieved roar from Australian subscribers who did not receive the July – September issue Vol 20 (3) of the Newsletter. Newsletters for Australia were placed into the mail on 14 October but have not been received. We assume that confusion and disruption of US mail service as a result of terrorism in September is the cause. The missing volume has been mailed under separate cover to all Australian subscribers. Other subscribers who did not receive the issue should advise the editorial office, including their correct mail address. — Perran Ross, *Executive Officer and editor <prosscsg@flmnh.ufl.edu>, phone 1 352 846 2566 or fax 1 352 392 9367.*

Views and Opinions

SCIENCE OR POLITICS: THE CASE OF *CAIMAN YACARE*. The elevation of *Caiman crocodilus yacare* to full species is a controversial step (Busack and Pandya 2001). However, when I suggest to my students that they follow good scientific practice, they tell me that they want to do good science but do not want to be bad conservationists. Their quandary arises because they recognise yacare caiman as a distinct taxon and the 1998 Action Plan (2nd edition) followed Medem (1983) in recognizing the yacare caiman as a distinct species. More recently, Busack and Pandya (2001) commented "we do not feel that considering *C. yacare* a subspecies of *C. crocodilus*, as proposed by some, is warranted," and formally reassigned *C. yacare* to a full species.

Some conservationists may find it politically expedient to regard the yacare caiman as a full species. Valuing political expediency over science has not had a happy history for crocodilians or other taxa, but in some cases could be justified on the cautionary principle. If either *C. c. yacare* or *C. c. crocodilus* were endangered, and there was even a remote possibility that they were distinct species, it might be wise to treat them as full species. However, both taxa are among the most common large vertebrates in South America and it is difficult to see what the caution could protect, except perhaps the profits of some other producer countries.

Busack and Pandya (2001) carried out an extensive study of the variation within the proposed subspecies of *C. crocodilus* using discriminant function analysis, and concluded that most of the subspecies of *C. crocodilus* are not sufficiently distinct from each other to warrant subspecific status. I concur with them on this point. However, I believe that their approach to attempting to determine whether the Pantanal caiman is a distinct species (evolutionarily distinct lineage) was flawed. Discriminant function is a very powerful technique for differentiating among samples. However, extrapolation to populations is more difficult (Williams 1983, Williams and Titus 1998). The technique can effectively separate groups on the basis of random numbers (Manly 1997)! The effectiveness of the discriminant functions needs to be tested on a validation set not used for creating the functions. If Busack and Pandya did this, they did not mention it in their paper.

Independent of the analysis used, in order to determine whether populations are evolutionarily distinct lineages, it is necessary to have detailed information from the zone of contact. Busack and Pandya wrote, "Only six specimens that came from areas suspected to contain two or more taxa .... were available to us. We did not include them in our assessment because we felt that our search for a clear definition of species or subspecies status would be confounded by inclusion of specimens which might possibly be intergrades or hybrids." This clearly biases the analyses towards recognition of populations as distinct taxa. This strengthens their conclusions in relation to the indistinctness of most proposed subspecies, but invalidates their conclusions as to the specific status of the yacare caiman.

Salomon (2001) has recently published a synthesis of evolutionary biogeography and speciation. As he has no specific interest in crocodilians, his review in a leading journal can be considered unbiased in relation to the question of the yacare caiman. I suggest that it be used as the basis for decisions by the CSG.

The case of the yacare caiman falls most closely in Salomon's Scenario 2: "The contact zone remains a narrow belt almost exclusively populated by hybrids, the parental forms forming a very small minority – each parental form contributing less than 5% of all individuals of the belt according to the criterion of Haffer (1986).

On either side of the belt, each taxon is concentrated in its allopatric distribution area, where the hybrids are counterselected. Because of the narrowness of the hybridization belt, intergradation is always intense although much more restricted spatially than in the former case; however, introgression is more pronounced. A and B constitute a pair of *megasubspecies"* (his emphasis). Of course, in the case of the *Caiman crocodilus*, we have no evidence that hybrids are counterselected outside the hybrid zone. It is much more likely that the pattern arises simply because of the geographically constricted contact zone. However, if researchers want to call the taxa "megasubspecies" to emphasize their distinctness, it would not bother me.

Salomon (2001) gives other scenarios (3 and 4) with strong behavioral or physiological selection against hybrids within the hybrid zone but continued gene exchange. These scenarios are against the available evidence for *Caiman crocodilus*, but if someone studies the 1000 km or so hybrid zone in the Rio Madeira, and shows that there is selection against hybrids within this area, then they will be justified in calling the taxa *semispecies* sensu Haffer (1986). Salomon only gets to full species in scenarios 5 and 6.

The paper by Busack and Pandya (2001) is an extremely important contribution to our knowledge of the *Caiman crocodilus* complex. However, their support of *C. yacare* as a distinct species is not based on an appropriate sampling regime, has not been verified by an independent statistical test, and does not follow generally accepted definitions of evolutionarily distinct lineages. Many more taxa of crocodilians have been proposed in the literature than are generally recognized today, even though detailed distributional, morphological and biochemical analyses have not been made of most of them. It is not necessary to use a taxon name just because it has been formally proposed. Let's bury *Caiman yacare* until someone can study the zone of intergrade and make a convincing case that it is really an evolutionarily independent lineage that does not take advantage of the Rio Madeira for regular gene exchange with *Caiman crocodilus crocodilus*.

Acknowledgements – Perran Ross gave valuable suggestions on the manuscript and provided the paper by Busack and Pandya. Comments by Steve Busack helped clarify my intent. — William E. Magnusson, *Dept. Ecologia INPA, CP 478 Manaus, AM 69.011970, Brazil.*

Literature Cited

Busack, S. and S. Pandya. 2001. Geographic variation in *Caiman crocodilus* and *Caiman yacare* (Crocodylia: Alligatoridae): systematic and legal implications. Herpetologica 57(3):294-312.

Haffer, J. 1986. Superspecies and species limits in the vertebrates. Zeitschrift für zoologische Systematik und Evolutionforschung 24:169-190.

Salomon, M. 2001. Evolutionary biogeography and speciation: essay on a synthesis. Journal of Biogeography 28:13-27.

Manly, B. F. J. 1997. Randomization, Bootstrap and Monte Carlo Methods in Biology. Chapman & Hall, London.

Medem, F. 1983. Los Crocodylia de Sur America Volumen II. Colciencias, Bogotá.

Williams, B. K. 1983. Some observations on the use of discriminant analysis in ecology. Ecology 64:1283-1291.

Williams, B. K. & K. Titus 1988. Assessment of sampling stability in ecological applications of discriminant analysis. Ecology 69:1275-1291.

RESPONSE TO MAGNUSSON. While *Caiman yacare* is often assigned subspecies status within *C. crocodilus*, this assignment has never been formally proposed, nor have the data supporting such assignment been clearly documented (Busack and Pandya 2001:295)...Daudin (1801[1802]:407 et seq.) provided a description...and formally assigned the name *Crocodylus yacare* to the Paraguayan and Brazilian populations of "yacaré" previously documented by Felix de Azara (1801) (Busack and Pandya 2001:296)". Our decision to correct a centuries old error, while certainly related to science, had nothing to do with politics; of named taxa within the genus *Caiman*, we found only *C. crocodilus* and *C. yacare* to warrant nomenclatural status. Whether *C. yacare* is considered a subspecies or a full species is not the issue addressed here; Daudin described it as a full species and no researcher to date has provided any evidence to refute this original determination. As a result of Magnusson's (2001) criticism, I now realize that, rather than state (p. 307) "we hereby elevate...", we should have stated "we hereby restore *C. c. yacare* to its original status as *C. yacare*". I apologize for our inadvertently taking credit for Daudin's original determination.

Magnusson (2001) makes the point that Discriminant Function Analysis (DFA) is a very powerful tool for differentiating among samples, and I agree. After Principal Components

Analysis (which does not require *a priori* groups, but is used to identify suites of similar characteristics) clearly demonstrated that no substitute grouping of specimens was superior to grouping by named subspecies (Busack and Pandya, Table 4, Fig. 5), we applied DFA — a technique that does require *a priori* groups. We did not assign specimens to the OTUs (named subspecies in this case) we tested as past and present *Caiman* biologists did; we simply gathered and organized the data and tested classifications and determinations provided by others who study crocodilians.

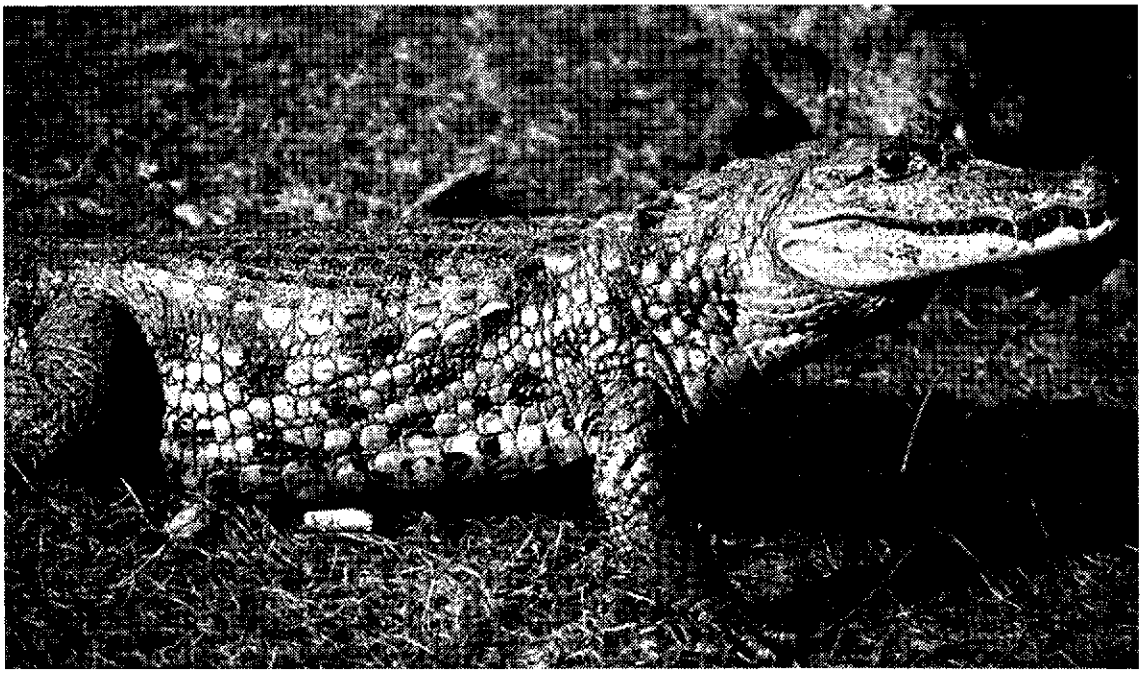


Figure. *Caiman crocodilus* from Colombia showing the typical jaw coloration and lateral scale characters. F. W. King photo.

I suggest that Magnusson revisit the section with regard to six specimens we did not include in our analysis (p. 297). Our words were carefully chosen — if one is looking for characteristics that may provide a basis for assessing differentiation among (and attaching formal taxonomic designations to) populations, regardless of whether those populations are sympatric, parapatric, or allopatric, inclusion of possible intergrades or hybrids (suggesting subspecies or species, respectively) in the data set is counter productive. And, again, we offered no conclusions with regard to the specific status of the yacare caiman; we simply restored it to the taxonomic status from which it was mysteriously removed with neither formal justification nor argument.

Science is defined in terms of rigor and repeatability, and our study clearly meets both requirements. We provided a detailed map illustrating localities for materials we sampled and augmented that map with museum catalogue numbers and collection localities for all specimens we examined. We discussed the data we recorded and specified how those data were chosen, determined, scored and analyzed. Prior to publication, we presented our methods and results at meetings in Santa Fe, Argentina (1996, CSG, SSC/IUCN), New Orleans, Louisiana (1996, A.S.I.H.), and Washington, D. C. (1997, USFWS, Scientific Authority; Smithsonian Institution, Zoology Seminar) and received and responded to all commentary in a responsible fashion. Finally, the manuscript was subjected to rigorous peer-review.

But the issue is more than scientific analysis, nomenclatural stability and the basic rules of priority also come into play. Without belaboring the point, I'll simply state that taxonomic changes made without justification, while expedient, confound our understanding of natural systems. The International Commission of Zoological Nomenclature, acting as a judicial body,

publishes several hundred pages every year correcting nomenclatural errors and missteps.

Orogenesis and divine intervention aside, our data indicate there are two discoverable entities (taxa) involved, whether those entities are considered species or subspecies, should not be important for conservation or legislation. That named taxa be properly diagnosed is, however, very important to both conservation and legislation.

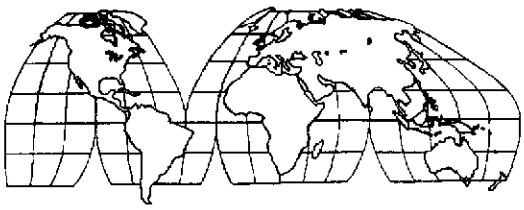
Our results demonstrated that several named taxa, in fact, were not properly diagnosed. We identified those taxa, explained why we considered them to be inappropriately named, and formally recommended nomenclatural modifications. You wish to "bury" yet another taxon? Be my guest, but, please, let's see the data supporting your decision. — Stephen D. Busack, *North Carolina Museum of Natural Sciences, 11 West Jones St., Raleigh NC 27601, USA*

Literature Cited

Busack, S. D., and S. Pandya. 2001. Geographic variation in *Caiman crocodilus* and *Caiman yacare* (Crocodylia:Alligatoridae): systematic and legal implications. Herpetologica 57:294-312.

Magnusson, W. E. 2001. Science or politics: the case of *Caiman crocodilus yacare*. CGS Newsletter 20 (4): 72-73.

Regional Reports



Eastern Asia, Oceania and Australia

Indonesia

MONITORING CROCODILES IN IRIAN JAYA. New surveys of *C. porosus* in the Fak-fak District of southwest Iran Jaya and *C. novaeguineae* on the middle Mamberano river are presented in two recent reports by Helen Kurniati of the Indonesian Institute of Science (LIPI).

Surveys of *C. porosus* have been conducted on the rivers draining into Kaimana and Arguni bay approximately annually in 1990-1998 although some rivers were missed in some years and no surveys were made in 1997. Surveys using standard spotlight techniques and covering distances of 5-47 km per river were undertaken in the Barusa, Gasawi, Buruai, Garawa and Kamabu rivers and Suwiki lake.

The results indicate *C. porosus* remains present at all sites in mean densities ranging from 0.27 – 4.09 individuals/km with considerable variation between sites and from year to year. Survey routes are in all cases identical (located by GPS) and conducted under suitable weather, tidal and seasonal conditions. An analysis by regression equations reveals non-significant trends (i.e., no decline evident) except for Suwaki lake, site of the highest observed densities which has shown a steady increase in density to the present levels of 6-7 individuals/km. This lake is managed by local people who impose their own harvest restrictions. Densities at the other sites are consistent with harvested populations, but any trends in density are obscured by intercensus variation.

On the Mamberano River surveys from 1987-2001 indicate densities of *C. novaeguineae* remain stable. In the most recent survey in November –December 2001, 162.5 km of rivers and lakes at 14 localities were examined by spotlight survey. Densities ranged from less than one to over 20/km with a median density of 5-10/km in most locations. Regression analysis revealed no trend from surveys in 1985 (WWF), 1990 (FAO) and 1988-1992 (KSDA).

In addition, harvest data of live crocodiles and harvested skins from 1995 to 2001 for one of the three legal companies operating in the region are reported. Live crocodiles of > 60cm length captured for crocodile farms decreased from 6,661 in 1995 to 762 in 2001. Wild harvested skins increased from 2,234 to 4,379 in the same period.

These surveys were conducted by Helen Kurniati of LIPI in conjunction with personnel from PHPA and with funding from the Indonesian Government, Indonesian Crocodile Farmers Association and CV Bintang Mas, a crocodile farm and trading company. — extracted from reports by Helen Kurniati:

Kurniati, H. A. Prasado, N H. Murdani, O. Howay, A. Kilungga, D. Makabory & K. Marandey. 2001. CROCODILE SPOTLIGHT SURVEYS IN MID-ZONE MEMBERANO RIVER, IRIAN JAYA, INDONESIA, & Kurniati, K. & Y. Rumbarar. 1999. MONITORING OF CROCODYLUS POROSUS POPULATION IN KAIMANA AND ARGUNI BAY, FAK-FAK DISTRICT, IRIAN JAYA, Indonesian Institute of Science (LIPI), Cibinong, Java, Indonesia <mzb@indo.net.id>.

REPTILE SKIN COMPANY DEVELOPS CROCODILE FARM. Ekanindya Karsa Company is a reptile skin company that located at Jalan Raya Serang, West Java, Indonesia. The company processes raw materials to finished products such as bags and wallets for men and women. Marketplace for the products is domestic and international markets, and most of the products are exported to Japan.

Source of the raw materials such as crocodile skin *Crocodylus porosus* and *C. novaeguineae*, lizard skin *Varanus salvator*, snake skin *Python reticulatus, P. curtus* and small materials from *Naja sputatrix* have been processed in the company. Source of lizard skins and snake skins are from the wild, whereas most of crocodile skins materials are from the other crocodile farms that have a quota to hunt from the wild or ranching.

Because of high demand of crocodile skin product right now, but quota number to hunt crocodiles from the wild is limited, Ekanindya Karsa Company firm will get crocodile skin materials by itself in the future by developing a crocodile farm; the farm is in the same area as the factory.

The crocodile farm was built in August 2000 and stocked with 150 F_2 female *Crocodylus porosus* from Belanakan Crocodile farm, Perhutani, West Java; and 70 F_2 male *C. porosus* from Charoen Pokphand Company in Palembang, South Sumatra.

The parent stock have body lengths between 2 meter to 3 meter and are housed in breeding pens 45 m x 45 m with a breeding pool in size 20 m x 20. On 23rd August 2001, a female with total body length 1.6 meter laid 37 eggs. This was the first clutch egg for the crocodile farm.

To anticipate numerous eggs in the future, the company has built an incubator 3m x 3m x 3m equipped with thermostat. To keep incubator room warm, styrafoam is used to cover the wall and water is run from the top to the floor along the incubator wall inside. For the present, a small incubator size 1mt x 70cm x 63 cm and also equipped with thermostat is used to incubate 37 eggs. The small incubator was made from wood with acrylic covering the wall inside; 4 bulb lamps (@10 watt) are used as the heat source (the temperature set at 37^{0}C). To keep humidity, 2 gallons of water are put at the bottom. Some ponds for hatchling pens have been under construction.

The company has built 12 growing pens 10m x 5m. Right now the growing pens are used to keep and grow juveniles that are bought from Charoen Pokphand Company and also juveniles from Irian Jaya. Besides 12 growing pens, the company built 10 experiment pens (size of each pen is 1m x 2 m), which are used for research on crocodile nutrition.

General problems that always happen in crocodile farms especially in developing countries is the high cost of crocodile food. To anticipate this problem, Ekanindya Karsa Company has negotiated with Charoen Pokphand Company to give a low price for their chicken heads. The price of one-kilogram of chicken heads is between 6 cent to 10 cent US$.

Ekanindya Company has a serious intention to do well in the future. The owner has invested around $120,000 US to buy individual parent stock and to build pens and infrastructure of the crocodile farm. The owner of the farm gives permission and facilities to researchers from LIPI (Indonesian Institute of Sciences) to pursue their interest in crocodile nutrition. — Hellen Kurniati *Widyasatwaloka Building-LIPI, Jalan Raya Cibinong Km 46, Cibinong 16911,West Java, Indonesia, P.O Box 25 Cibinong Email: <mzb@indo.net.id>* and Rachmat Wiradinata, *Ekanindya Karsa Company, Jalan Raya Serpong no. 67, Bumi Serpong Damai, Tangerang 15326, Indonesia. Email: <sales@raflo.co.id>.*

Malaysia

A VISIT TO THE *TOMISTOMA* BREEDING FARM IN KUCHING, SARAWAK, EAST MALAYSIA. It is very worrying to note that practically all false gharials kept in zoos and other collections are wild-caught and that breeding successes with this species are rarely reported. For the reason I grasped the opportunity in July 2001 to visit the crocodile farm of Mr. Johnson Jong near

Kuching, Sarawak, East Malaysia, when Prof. I. Das invited me to Kuching.

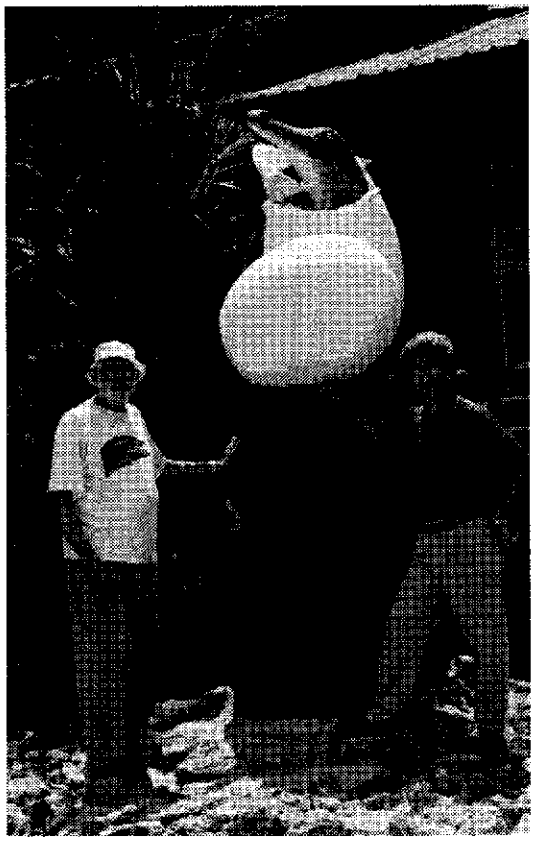


Fig. 1: Mr. Jong and the author at the entrance to "Jong's Crocodile Farm" near Kuching, East Malaysia.

The farm mainly exports live *Crocodylus porosus* to zoos and safari parks. It also serves as a tourist attraction. In addition, ten breeding pairs of *T. schlegelii* occupy a large, ± 0,3 ha enclosure, which is densely forested (see figure) and has several earth ponds. This probably comes close to their natural habitat. Several females were found guarding their nests. However, although the egg production in this pen is fine, fertility is not. In 1999, there were three hatchlings (Fig. 5). No hatchlings were obtained from last year's production, but this year four clutches of eggs were collected after I had left. Of these four clutches three contained infertile eggs only, while the fourth clutch had 10 out of 19 fertile eggs.

This species appears to be intensely territorial. Even during my visit, males were seen chasing each other out of favorite ponds. Could it be that each breeding pair needs a large enclosure for itself? That the males are too busy keeping competitors out of their territory and do not find the time for mating? Mr. Jong told me that he intended to enlarge the present enclosure further into the adjacent forest. My suggestion to this was that he should create a new large enclosure and place only one breeding pair into it and then wait for the results.

Other factors may also be involved: Do the false gharials need deep, clear running water or is the muddy water in the relatively shallow earth ponds adequate? Do they need fish in their diet for the poly-unsaturated fatty acids (PUFAs)? Could specific feed additives solve the problem?

From a conservation point of view this is a project that needs more attention and support. Could anybody with further insight and experience please comment? — F. W. Huchzermeyer, *P. O. Box 12499, 0110 Onderstepoort, South Africa.* <*crocvet@mweb.co.za*>

[*Eds. Bill Zeigler shared his 'formula' for breeding Tomistoma with us some time ago and we have subsequently suggested it to several facilities now successfully breeding this species.*]

THOUGHTS ON SETTING UP A SOUND BREEDING PROGRAMS FOR *TOMISTOMA*. I successfully bred *Tomistoma* at Miami Metro Zoo, USA, in the early 90's. First, I feel that there is definitely a territorial problem when two or more males are kept together. At the same time there is also a female territorial conflict. The stress from both will lower reproductive success through infertility.

These animals live in slow moving backwaters, oxbows and areas that are choked by aquatic and semi-aquatic vegetation. Most of the water is fairly shallow. This in turn allows a number of animals to live in close proximity yet maintain a small territory that keeps them visually isolated.

Second, the females are also very aggressive towards males and tend to dominate males that are smaller than the females. They take over what small pools or open water is available to them in the wild (primary hunting grounds) chasing the smaller males out. This may be a primary dispersing mechanism causing males to disperse more rapidly than in most crocs. It would be interesting to study a populated wetland area regarding dispersal of young.

Earth breeding ponds with breeding adults in the thickly forested enclosures. Jong's Crocodile farm, Kuching, Malaysia. F. Huchzermayer photo.

Female *Tomistoma schlegelii* guarding her nest at Jong's Crocodile Farm.. [Note typical position in a sunny patch at the base of a tree. Eds.]. F. Huchzermayer photo.

What you end up with is similar to many larger terrestrial carnivores. One large male overlapping the territory of many females. This has to be taken into consideration when setting up a breeding strategy.

If I were to set up a commercial breeding program I would place a number of females into small single enclosures of say 30 feet square Each enclosure would be visually isolated from the other females either by being heavily vegetated or by some other physical barrier. I wouldn't worry about hormonal contact; I feel that helps the females, especially those who if by themselves would not normally cycle.

Each enclosure would have a pool, oval or odd shaped, to allow for an area in one corner to have a greater land space than the other corners to act as the nesting site. This area would always be away from all the other female enclosures. The pool would be shallow (1m) and well covered with aquatic plants.

All of these would be connected by a hallway that would allow for movement of a large male in and out of each enclosure. As I mentioned before I feel the male has to be substantially bigger than the female you are trying to breed or the female will dominate them and no breeding will take place.

Well there you have it. I would be willing to assist as a consultant any one developing a set up. — Bill Zeigler, *Zeigler and Zeigler Inc. Exhibit Designs, 8440 SE. 21st Ave, Ocala, FL 34480, USA. <bzeigler@atlantic.net>*

Thailand

MORE PHOTO'S OF WILD SIAMESE CROCODILE. Following reports of recent sightings of wild crocodiles in Thailand, researchers at Wildlife Conservation Society were excited to find that a camera trap set up to record tigers and other large fauna at the Khao Ang Rue Nai Wildlife Sanctuary in western Thailand had captured the first photograph of a wild Siamese crocodile.

Following up on this lead, Yosapong Temsiripong, coordinator of the Siamese crocodile reintroduction feasibility assessment supported by Crocodile Management Association of Thailand, visited the area and was able to see a wild crocodile and photograph it, although at rather long range and fuzzy focus, and submitted the photograph to the Newsletter. Unfortunately the photo was insufficiently clear to reproduce. Undismayed, Yosapong returned to the site with a longer lens and captured the excellent image that appears on our cover.

Studies are now in progress to establish whether the presence of at least one wild crocodile at the site indicates that it might suitable for reintroduction of the species. A detailed report is expected. — *Editors, from correspondence with* Yosapong Temsiripong *Crocodile Research Laboratory, CMAT, 336 Moo 6 Surasak, Sriracha, Chonburi, 20110, Thailand.*

WHITE ALLIGATOR FOR THAILAND. Samatprakan Crocodile Farm and Zoo added a valuable white alligator from the United States to its extensive collection of crocodilians, which includes albino or leucystic examples of several species. The specimen is one a large group of albinos originating at La Voi farm in Louisiana and now housed in several US zoos and collections.

The specimen is nine years old and about 7 feet long and was provided by Alligator Adventures of Myrtle Beach SC, USA after a long process of permitting for export. The specimen was shipped from the USA to Thailand in late October accompanied by Dr. Sam Seashole, veterinarian and part owner of Alligator Adventures, and curator Adam Smith. In Samutprakarn, Uthen Youngprapakorn, Director and also founder of Utairatch Crocodile Farm, accepted the specimen at a ceremony attended by the local governor, dignitaries and hundreds of spectators. The specimen will be kept in a temperature controlled indoor enclosure to protect it from sunburn. From *Bangkok Post 28 October 2001.*

West Asia

India

NANDANKANAN GHARIAL CAPTIVE BREEDING PROGRAM. After a 20 year program of successful captive breeding, the gharial program at Nandanakan has ceased due to the death of its one breeding male. The breeding enclosure of 7,600m^2 was built in 1975 as part of India's early crocodilian conservation program. The enclosure was designed to simulate the natural

habitat of the species with deep, slow moving water, a sand bank for nesting and basking sites. A male and two females were introduced in 1976 but despite mating behavior, no eggs resulted and the male suffered a genital prolapse while mating. Four more females were introduced in 1979.

At this crucial moment the Frankfurt Zoological Society in West Germany arranged the loan of a male from the Frankfurt Zoo and this animal was introduced to the enclosure in early 1980. This individual replaced the ineffective male, who died a few months later and breeding was immediately successful and continued until the present. An additional female was introduced to the enclosure in 1987 and the group has been very successful until the death of the male in February 2000.

Over the 20 year period the seven females laid a total of 2,253 eggs in 69 clutches resulting in 1,458 live hatchlings. Individual females produced between 6 and 13 clutches in the 20 year period. Clutch size varied from 2 to 57 eggs (mean 32.6). Egg weight has a mean of 155 g (range 105-195) and dimensions of 8.1 x 5.7 cm (range 5.2 x 3.9 – 9.2 x 5.8). Incubation period averaged 65.5 days with some variation between females. The male grew from 3.85 m to 4.00m and from 195 kg to 229 kg between 1980 and 2000.

Productivity of captive Gharial.1980-1999

Female	Clutches	Total Eggs	Live Young	Avg. days Incubation
#1	6	151	90	62.8
#2	12	338	228	67.4
#3	10	265	154	67.1
#4	13	453	316	62
#5	12	467	283	65.3
#6	11	419	327	67
#7	5	160	15	68

The following general observations were recorded from the group. First breeding occurs around 3m length and from 10 to 17 years of age. The breeding season is from January to June with courtship and mating occurring in January and February. Females appear to initiate courtship and mating was observed in the water during the day. The male made jaw claps and a guttural sound throughout the breeding season. Breeders take little or no food during the breeding season.

The nests are holes 20- 40 cm deep located in the sand bank 5.7 –11m from the pool and 1.2 – 1.5 m above it. The eggs cause the nest to form an irregular rectangular mound 12-28 cm high and 1.2 – 1.5 m circumference. Females aggressively guarded their nests, emerging from the water to do so, which is unusual for these timid crocodiles. Temperature in the nests were recorded between 28° and 33° C. The female shows maternal behavior, responding to hatchling sounds by opening the nest with the jaws and front feet and sometimes carrying young to the water, although most hatchlings walk to the water unassisted. The male also shows great interest in hatching, approaching the pool side nearest the nest. Hatchlings often clamber over the male.

These observations can be safely extrapolated to nature as the facility is located just 5km from the river Mahanadi which is in the natural range of the species. The great value of the breeding loan of the Frankfurt male that contributed both knowledge and breeding success is commendable. — S. Maharana, *Reader in Zoology, P.G Dept. of Zoology, Khallicote Auto College, Berhampur 760001, Orissa, India.*

Latin America

Brazil

THE SÃO FRANCISCO RIVER 'CODFISH': THE NORTHERNMOST WILD POPULATIONS OF THE BROAD-SNOUTED CAIMAN (*CAIMAN LATIROSTRIS*). The geographic distribution of the broad-snouted caiman spreads over the hydrographic basins of Paraná and São Francisco rivers, including northern Uruguay and Argentina, southern Paraguay, southeastern Bolivia, and south to northeast Brazil (Grombridge 1987). Small coastal river drainages are also inhabited by the species in Brazil from Banhado do Taim (32°32' S and 52°23' W), Rio Grande do Sul (Melo. *In press*) to the north of São Francisco river estuary. The species can also be found in mangroves and islands close to the coast, like Ilha do Cardoso in southern São Paulo (Moulton et al., 1999). However, the northern limit of the species geographic distribution is, actually, unknown.

Paulo E. Vanzolini (1972) mentions the State of Rio Grande do Norte, whereas Neill (1971)

considers the State of Pernambuco and Brazaitis et al. (1990) suggest the border between Paraíba and Rio Grande do Norte. Unfortunately, none of the authors above present field evidence or collected specimens to support their opinion.

Crocodilians depend on wetlands to survive. The broad-snouted caiman is essentially a palustrine – not riverine – species (Lang 1987). The interior region of northeastern Brazil is predominantly semi-arid and only its coastal region is relatively humid supporting the northern limit of Atlantic Forest. We may suppose the northern limit of the broad-snouted caiman distribution is dictated by the existence of permanent wetlands associated with Atlantic forest patches from Alagoas to Pernambuco and Paraíba, eventually, but possibly not permanently, including the southern region of Rio Grande do Norte. For these reasons wild remnant populations of the species in those places should be considered for conservation purposes.

In November 1999, I made a preliminary survey based on night counts in some areas of eastern Alagoas and Pernambuco. No specimens were captured, but identifications of detected animals as *C. latirostris* were completely confident. The environments included wetlands and lakes. When possible, I estimated perimeter. For this calculation, I recorded the boat speed as 7 to 10 km/h with a GPS Garmin 12 for a period of 4.2 hours. Lake perimeter at that time was then estimated as 29.4 to 42 km.

Alagoas is the most densely human populated State of Brazil. More than 700 politically organized fishermen communities are officially recognized by the State (Lira 1998). Broad-snouted caiman is sold in local markets as salted fish meat, called by local people as "São Francisco codfish" or simply "river codfish" (*bacalhau do São Francisco* or *bacalhau de rio*, in Portuguese, respectively). Many evidences indicate that some poor fishermen provide this market. However, most of its original wetlands and lakes remain relatively well conserved. Under these circumstances, sustainability of an organized "ranching" or "cropping" program involving local people should be assigned.

In Pernambuco, the metropolitan area of Recife – the State capital – has deeply affected caiman habitats by urbanization and pollution. Tourism has been attracting former fishermen as a major economic activity. Under these circumstances, conservation efforts should be concentrated on tourism, not on direct economic exploitation of caiman products. In João Pessoa, capital of Paraíba State, the City Zoo (Parque Zoológico Arruda Câmara) keeps a group of

Table 1. Age-class considered for the presented study

Age-class	Description
Adults	dorsal cranial length (DCL) equal to or longer than 15 cm (snout-vent length approximately 70 cm)
Young	dorsal cranial length (DCL) between 5 and 15 cm (snout-vent length approximately between 20 and 70 cm)
Hatchlings	dorsal cranial length (DCL) smaller than 5 cm (snout-vent length smaller than 20 cm).

individuals body length by their head length based on previous experience (Verdade 2000). I considered the age-classes presented in Table 1. The sites surveyed in Alagoas and Pernambuco are presented in Table 2.

All of these sites are associated with or near human dense populated areas with clear evidences of high hunting pressure. However, caiman reproductive activity has been detected in two sites (nest in Tapacurá and hatchlings in Lagoa Vermelha). Caiman population density has been estimated in Lagoa Vermelha as 6 to 8 individuals per linear kilometer of lake approximately 30 broad-snouted caiman including adults and young. Although, historical records are unclear, they indicate the colony founders were caught at the country side of the State (Jair Azevedo, Zoo Director, pers. comm.). However, there is no evidence of large populations in Paraíba or Rio Grande do Norte.

The occurrence of both hunting pressure and habitat loss on the wild northernmost populations of the broad-snouted caiman stresses the importance of this region for its conservation. Field surveys in Paraíba and possibly in southern Rio Grande do Norte might clarify the northern

actual limit of the species geographic distribution.

Acknowledgements: I wish to thank Maria Cristina and Sílvio Ruffo for the logistic support in Alagoas; Paulo Montenegro for the logistic support in Pernambuco, and Jair Azevedo for the information about the species in Paraiba. —

Table 2. Survey of Caiman latirostris in sites of Alagoas and Pernambuco, northeast Brazil.

State	Site	Coordinates	Habitat type	Apparent * population	Age-distribution
Alagoas	Poço do Cruiri	10°24.038'S, 36°22.545'W	wetland	2	1 adult, 1 young
	Riacho Salgado	10°25.517'S, 36°22.750'W	lake associated with wetland	1	1 adult
	Lagoa Vermelha	10°03.408'S, 36°05.210'W	lake	239	6 adults, 64 young, 47 hatchlings, and 122 undetermined
Pernambuco	Parque Dois Irmãos	8°00.802'S, 34°56.657'W	four connected lakes	10	3 adults, 5 young, and 2 undetermined
	Estação Ecológica de Tapacurá	8°02.415'S, 35°11.782'W	Artificial reservoir	0	old abandoned nest with eggs' debris

*: Total number of individuals by night-count

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Literature Cited

Brazaitis, P., C. Yamashita and G. Rebelo. 1990. A summary of the CITES Central Southe America Caiman study. Phase I: Brazil. pp.100-115. In: Crocodiles. Proc. 9th Work. Meet. Croc. Spec. Group. IUCN – The World Conservation Union, Gland, Switzerland.

Grombridge, B. 1987. The distribution and status of world crocodilians. pp.9-21. In: G.J.W. Webb, S.C. Manolis and P.J. Whitehead [Eds.]. Wildlife Management: Crocodiles and Alligators. Surrey Beatty, Chipping Norton, Australia.

Lang, J. W. 1987. Crocodilian behaviour: implications for management. pp.273-294. In: G.J.W. Webb, S.C. Manolis and P.J. Whitehead [Eds.]. Wildlife Management: Crocodiles and Alligators. Surrey Beatty, Chipping Norton, Australia.

Lira, F.J. 1998. Realidade, Desafios e Possibilidades. Edufal, Maceió, Brasil. 137pp.

Melo, M.T.Q. In press. Dieta de *Caiman latirostris* no sul do Brasil. In: L.M. Verdade and A. Larriera [Eds.]. La Conservación y el Manejo de Caimanes y Cocodrilos de América Latina. Vol. 2. FEALQ, Piracicaba, Brasil.

Moulton, T. P., W.E. Magnusson and M.T.Q. Melo. 1999. Growth of *Caiman latirostris* inhabiting a coastal environment at Ilha do Cardoso, SP, Brazil. *Journal of Herpetology* 33(3):479-484.

Neill, W. T. 1971. The Last of the Ruling Reptiles. Columbia University Press, New York.

Ross, J.P. 1999. Bases biológicas para el uso sustentable de los crocodilianos. pp.275-280. In: T.G. Fang, O.L. Montenegro, and R.E. Bodmer [Eds.]. Manejo y Conservación de Fauna Silvestre en América Latina. Instituto de Ecologia, La Paz, Bolivia.

Vanzolini, P. E. 1972. Répteis e anfíbios ameaçados de extinção no Brasil. pp.155-157. In: Espécies da Fauna Brasileira Ameaçadas de Extinção. Academia Brasileira de Ciências, Rio de Janeiro.

Verdade, L.M. 2000. Regression equations between body and head measurements in the broad-snouted caiman (*Caiman latirostris*). *Revista Brasileira de Biologia* 60(3):469-482

French Guiana

DEFENSIVE BEHAVIOR OF BLACK CAIMAN. After many difficulties with our *Melanosuchus* study in the Kaw natural reserve, the project is now underway. The National Geographic team (Croc Chronicles and Brady Barr) just spent 10 days with us in the Kaw reserve filming our project. But this mail is rather to relate you an interesting observation.

I began to mark black caiman in the swamp. Since the French Ministry of Environment is funding a genetic study to assess population size and diversity (I will use microsatelites), I mark and sample in a single handling. Three weeks ago, I went to sample in an isolated pond, where no one had ever been. This is an inacessible area in the center of the Reserve, reached only by helicopter, where we use a small portable boat. During the 3 first hours of the night, I surveyed the pond. After a brief rest on the bank, I went back for capture/sampling. A large animal (>4 m length) was then just "waiting" for me close (2 m) to my boat. I had not seen the animal during the survey. After a few minutes, it gave a first and sudden intimidation: he swam towards the boat, gave a blow with its head, went under the boat, lifted it, and went back.

After this, we decided to go to the other extremity of the pond (300 m away) to begin our captures. Thirty minutes later, we had marked 3 animals and the big one was again just behind the boat. We changed the sampling area, captured another 2, and we saw the big one swimming straight on us. The animal continued to follow us closely until 03:00 AM, when we decided to stop. When we wake up at 06:00, the animal was still 3 m away from our boat!!

But even more interesting, during the sampling, I missed a rather small (80 cm) *Melanosuchus*. The big one was just behind our boat, it swam towards the small one, and caught the animal (see Photo below). The small one seemed to be in a rather uncomfortable position,

but the big one did not seem to "want" to kill. It remained at the water surface, and never entirely closed its jaw. We watched him for 30 min, but he did not move nor release the small one. So I decided to continue my samples. I went 300 m away. After 20 minutes the big one was once more behind me! —without the small in the jaws.

We cannot decide if this is a protective behavior even with a 80cm length "young"? A predatory behavior? or something else ? — Benoit Thoisy, *c/o Kwata, B.P. 672, Cayenne Cedex, French Guiana, <thoisy@nplus.gf>.*

Honduras

CROCODILES IN ISLAS DE LA BAHÍA. We recently verified and reported (Kaiser et al., 2001, Herpetol. Rev. 32:164–165) the presence of *Crocodylus acutus* on Isla Roatán, one of the Islas de la Bahía off the Caribbean coast of Honduras. Presence of these animals had previously not been confirmed, and discussions in the literature were focusing on the potential presence of crocodiles in the Islas de la Bahía

only as strays from the mainland. Although a poplation had been present on Isla Utila, the island closest to the mainland, this population was considered extirpated as early as the 1970s (Wilson & Hahn, 1973, Bull. Florida State Mus., Biol. Sci. 17:93–150). No vouchers exist from Isla Guanaja, the easternmost of the larger islands and the farthest from the mainland. During two consecutive years (1999, 2000), we investigated the presence and distribution of *C. acutus* in the Islas de la Bahía, and following is a condensed report of our findings.

The search for crocodile populations in the Islas de la Bahía was apparently overlooked by the scientific community, presumably because these islands are not known as a herpetological hot spot. At a time where return from publicly funded projects must be maximized, the Bay Islands may not have been as attractive as the Central American mainland. We mention this to explain why the presence of a large reptilian predator, such as a crocodile, was not verified much sooner. Crocodiles are occasionally seen by local residents, sometimes dug up and hunted, but there has never been scientifically applicable evidence to verify their presence. Most locals know crocodiles exist on these islands, but there has not been much of an interest in crocodiles in the Islas de la Bahía, where the main research focus is marine life. We have conducted courses in Tropical Field Biology on Roatán, and it is through these that opportunity and preparedness met in the search for Bay Island crocodiles.

Utila is the island closest to the Honduran mainland, and the island is characterized by a main peak and many hectares of surrounding mangrove forest. Portions of the mangrove habitat become inundated with water regularly, whereas other, inland areas exist as a vast swamp land with difficult access. It is in these swamps where the native spiny-tailed iguana (*Ctenosaura bakeri*) finds suitable habitat. Because of the inland terrain's inhospitabilty to humans, the mangrove habitats near water's edge are also relatively undisturbed, save for occasional fishing. Mangroves surrounding Utila are nearly completely, and the habitat is eminently suitable for a crocodile population. Anecdotal reports from locals confirm that crocodiles are present, though the extent of their distribution can only be estimated by conducting night transects to look for eye shine.

The topography of Roatán is very different than that of Utila. Roatán is an eel-shaped island with a hilly backbone. At its western and eastern extremes, mangrove habitats are extensive, and there is a patchy distribution of mangroves and sand-filled coral breaks to allow ready access to land for a large reptile. We found one extensive crocodile burrow on the central north coast of Roatán, whose ca. 200-cm-long inhabitant's snout we saw, though we were unable to see the animal in its entirety. Based on anecdotal reports, we consider all of the mangrove habitats as well as coral breaks suitable for *C. acutus*, and we suspect that most of these habitats are occupied at least periodically.

At the eastern end of Roatán, between the eastern tip of the island and the western end of the neighboring Isla Santa Elena, is a continuous mangrove habitat of approximate dimensions 4 x 2 km and with several channels cutting into the mangroves, including one that completely traverses the habitat. Our surveys have shown that *C. acutus* is common in this habitat. We surveyed this area informally during two nights, observing over a dozen eye shines while slowly boating past the mangroves. This locality is where we found a female with hatchlings, confirming that the species is not transitory but settled and reproductively active. We presume the mangrove habitats surrounding both Roatán and Santa Elena are similarly occupied by crocodile populations.

Between Santa Elena and the Guanaja, the island furthest from the Honduran coast, are two small, privately-owned islands where crocodiles might occur: Islas Morat (area ca. 75 ha) and Barbareta (area 506 ha). Though small, these islands mirror the herpetofauna on Roatán to some degree (Grismer et al., 2001, Herpetol. Rev. 134–134), and they do have some mangrove areas available to serve as crocodile habitat. Crocodiles have not been reported for either one of these islands, but we believe that this is likely a function of limited visits.

Isla Guanaja's mangroves were devastated by Hurricane Mitch in 1998. In the main mangrove channel separating two parts of the island, apparently no mangroves survived the hurricane's onslaught. This channel, however, is human made and extensively used for boating; it may not have provided sufficient tranquility for a sustained crocodile presence. However, along the northern coast of Guanaja, some mangroves are regrowing and may in the future provide suitable crocodile habitat. Though Wilson and Hahn (op. cit.) did not consider Guanaja when discussing *C.*

acutus in the Bay Islands, local residents have reported the presence of crocodiles in coastal Guanaja for several generations, with its greatest density in the island's northeast. This population apparently is no longer extant post-hurricane, though it may only have temporarily relocated to a site with remaining mangroves.

The Islas de la Bahía, just like many other Caribbean islands, present excellent opportunities for populations of *C. acutus* to thrive. These islands are removed from some of the human-caused pressures mainland crocodile populations experience, and there are swaths of undisturbed habitat in which reproduction can occur in sheltered conditions. As mainland *C. acutus* populations are victimized by the expansions of humans into their habitat, it may be that island populations, such as those in the Islas de la Bahía and on islands off the coast of the Yúcatan Peninsula, may become important reservoirs for the species. — Hinrich Kaiser (*hkaiser@lasierra.edu*) and L. Lee Grismer (*lgrismer@lasierra.edu*), *Department of Biology, La Sierra University, Riverside, California 92515, USA.*

Venezuela

WORKSHOP FOR THE CONSERVATION OF THE ORINOCO CROCODILE (*CROCODYLUS INTERMEDIUS*) IN COLOMBIA AND VENEZUELA. Between the 12 and 13 of December, 2001 the Workshop for the Conservation of the Orinoco Crocodile (*Crocodylus intermedius*) in Colombia and Venezuela, was carried out to evaluate the conservation programs in both countries and to define combined strategies that allow to achieve their recovery and the breeding in captivity. The species is commonly called 'Caiman del Orinoco' in both countries. The workshop was held in Caracas, Venezuela, organized by the General Direction of Fauna of the Ministry of the Environment and the Natural Resources jointly with the Coordination of Extension of the Ability of Sciences, Central University of Venezuela,

Representatives of the Ministry of Environment and Universities of both countries, professionals and technicians, Non Government Organizations, breeders, producers and leather industry representatives participated. The workshop consisted of two sections, the first day the following oral presentations of special invited persons were presented:

Wild population status of Orinoco Caiman (*Crocodylus intermedius*) in Venezuela. Dr. Andrés Eloy Seijas.

Program of Conservation of the Caiman llanero in Colombia. Advance and perspectives. MSc. Diana Vaca & Dr. Gonzalo Andrade.

Status and Distribution of *Crocodylus intermedius* in Colombia: Summary of censuses 1994 - 1997. Dr. Miguel Rodríguez.

Upgrade of the population status of *Crocodylus intermedius* in the Arauca Department. Mrs. Sandra Barahona.

Evaluations of Orinoco Caiman (*Crocodylus intermedius*) reintroduced in the Caño Guaritico Wildlife Refuge and its Surroundings. Mr. Carlos Chávez.

Conservation program of Orinoco Caiman (*Crocodylus intermedius*) in Venezuela: Captive breeding situation. Mr. Alvaro Velasco and Mr. Manuel Denis.

Ex-situ management of *C. intermedius* in Colombia. Dr. Jaime Ramírez.

Using the market to create incentives for the conservation of crocodilians: A review. Dr. Jon Hutton.

Conservation of *Crocodylus intermedius* and the role of captive breeding. Dr. Robert Jenkins.

CITES and their legal framework in the conservation of crocodiles. Mr. Roberto Ramos.

The local sustainable development and the biodiversity preservation. The case of the Orinoco Caiman in the Cojedes river, Municipio Ricaurte, Cojedes state, Venezuela. Marcos Sanchez Esparragoza.

On the second day three work tables were organized on the following topics, natural populations, captive breeding and sustainable use.

Among the important results we can mention the Declaration of Caracas. The declaration proposes developing a transborder binacional project for the handling of natural resources in basins shared presently in the area of distribution of the *Crocodylus intermedius*. It is proposed to designate three Technical Commissions composed equally of professionals and technicians of both countries, and representatives of public and private institutions involved in the conservation of the species, for the elaboration of proposals to be executed in short, medium and large term, on the following topics:

1. legal, administrative revision, technique and scientific;

2. exchange information and professional formation;

3. design of proposals projects.

With the financial support of JLIA "CITES" Promotion Committee (Mr. Yoichi Takehara) and Italhide (Mr. Enrico Chiesa), a book will be published that will contain the text of all the presentations and resolutions from the workshop, in Spanish and English that will be presented in the next meeting of the Crocodile Specialist Group - IUCN, to take place in October of 2002 in Gainesville, Florida. — Alvaro Velasco, *Deputy Vice Chairman, Latin American and the Caribbean Region, CSG-UICN/SSC.*

North America

Mexico

CROCODILIAN EARTHQUAKE. The events took place during a research visit to the breeding center "El Tanque" ("the tank"), located at La Palma municipality in the state of Nayarit. The visit was in relation to a research project to know the relationship between physical factors of the environment and reproductive events of *C. acutus.*

On 20 February 2001, several reproductive behavioral patterns were observed such as head slapping, roaring or sub-audible vibrations, defense of territory (females) (Garrick and Lance,1977) and even a pair mating!

During lunch time we were in front of pool Number 5 (100 m^2 total area with a 25 m^2 pool of 90 cm in depth) in which a couple of *C. acutus* live. We (Jesús Romero, Diana Ponce, S. Huerta and P. Ponce) were sitting in plastic chairs a couple of meters away from the pool. The border of the pool is about one meter from the wire fence.

All day long we observed the male ("Firulais" LT 3.24 m & 175 kg) inside the pool and the female ("Griselda" LT 3m & 153 kg) outside, in her nesting area. Griselda frequently had behavior patterns of territorial defense, she even hit the fence with her mouth, either when we passed by, or when tourists or the farm's personnel did so.

At 3:40 pm, Firulais was located in the corner of the pool closest to us. He raised his head and tail making an arch above the water and opening the mouth slightly; took some air and showed his back above the water. Immediately after we began to hear a muffled sound, very low in pitch and volume; Firulais's body started to vibrate and sink slowly, the water over his back squirted and agitated a few centimeters and then a shaking was felt in the ground.

Garrick and Lang (1977) mentioned that sub-audible vibrations, that travel through water, can be produced by several species such as *Alligator mississippiensis*; *C. niloticus* and *C. acutus.* According to the studies of reproductive behavior, crocodilians present different complex processes that are used in courting, either visual signals or others transmitted through water or air since they have evolved in sub-aquatic environments. Even though such behaviors are similar to all crocodilians they can vary depending on the species.

According to our observations, we could verify that infra-sound is very potent and can travel through ground as well as through water and air.

The female, Griselda, was originally seen in the estuaries of San Blas, Nayarit. In 1990 she was taken from her owners in the port of San Blas and brought to the breeding center. The reason for this is that she was in a stone locked-in area of 1.2 by 2 m with no water. According to her previous owners she was 17 years old, she was 2.70 m long and weighted no more than 100 Kg. In 1991 she nested for the first time and has continued year after year, with an average of 40 a 45 eggs per nesting.

Firulais, the male, is from the estuaries in San Blas. In 1989 he was already part of the collection of the breeding center. At that time he was somewhere between 1.6 m and 1.8 m in length and was about 6 years old. Firualis was always a distinctive dominant male.

Griselda had previously been with other males, but she was remarkably aggressive with them once the mating season was over. Nevertheless, from the moment when Griselda and Firulais were put together in the same pond they mated, and they have been together since then.

Acknowledgements. We are in debt to Shaun K. O'Neil, Paty Ascencio, Alan Heinze and all

the Crocodile Breeding Center staff (El Tanque, in Nayarit), also we are in debt with some friends in SEMARNAT, Nayarit.— Paulino Ponce & Sara Huerta. *Bosque Tropical, A. C. Apartado Postal 5-515, Guadalajara, Jalisco, 45042 MÉXICO. <bosquetropical@email.com>*, and M.V.Z. J. de Jesús Romero Villaruel *Responsable de Especies Prioritarias, Área de Vida Silvestre, Subdelegación de Medio Ambiente, SEMARNAT, Nayarit. Av. Allende 110 Ote, Zona Centro, Tepic, 63000 Nayarit, MÉXICO.*

EFFECTS OF A SUBMERGED NET ON POPULATION SIZE AND STRUCTURE OF AN AMERICAN CROCODILE POPULATION (*CROCODYLUS ACUTUS*) IN LAKE AMELA, COLIMA, MEXICO. A nesting population of *Crocodylus acutus* exists in Lake Amela a fresh water lake that has become the largest reservoir in the region with a surface area of 1160 hectares and now irrigates the Tecoman Valley. The lake is 7 km long, orientated north/south. It is 33 meters above sea level with sub-humid climate and a water temperature range of 24° to 34°C. Two cooperative groups of fisherman fish for Tilapia (*Oreocromis mossambicus*). The current yield of less than 60 tons was taken by twenty fisherman this year. Fifteen years ago the fishery yielded 800 tons (Borondon 1987) and supported more than 60 fisherman. Following this fishery collapse, two new groups from these original cooperatives of fisherman, established a floating cage aquaculture project with sex reversed tilapia, partially financed by the government. The two projects were initiated in 1997.

In the dry season of 1998 and 1999, attacks from crocodiles on fish cages became frequent at one of the two floating fish farms. To protect their farm the aquaculturist's inserted a plastic net with a mesh size of 25 cm (made from banana packing) surrounding the floating cages. The net was effective at capturing large specimens, extracting between 100 to 130 adults in 15 months. Hunting and commercialization of crocodiles and crocodile products is prohibited by law (Ley general de Vida Silvestre 1998), so the fishermen dumped the dead crocodiles in the inaccessible swamps near to the lake shore to avoid prosecution by the authorities. No commercialization of crocodile products was undertaken and although attacks have diminished drastically, some crocodiles still get trapped in the net. In addition, during 1998 there was an illegal harvesting effort, which removed approximately thirty individuals from 1800 — 2500 mm long. This was determined from locating skeletons and craniums.

Night censuses of crocodile numbers were undertaken in 1994-1996 and in 2000. Censuses were done on moonless nights, using flashlights from a boat moving at approx. 5 knots, 15m from the lakeshore. Flashlight was swept along the shoreline and periodically to open water, where eye reflections were counted. Total counts for eye reflections in one night are defined as total eye count (TEC). The minimum known alive (MKA) was the highest TEC for all surveys done in that year. When crocodiles where spotted by their eye reflection, we approached them in an attempt to estimate rostrum length (RL). Total length (TL) was calculated from its linear relation (r = 0.99); TL (cm) = RL(mm)(11.07) - 162. By knowing TL, crocodiles were classified by size class: 25 to 90 cm, 90.1 to 180 cm and 180.1 and larger animals. These size classes represent juvenile, sub-adult and adults respectively. Size class frequencies from the two MKA dates for the years of 1996 and 2000 were compared with the non parametrical Chi-2 test with a sample size n = 58, CLS (1996)+CLS(2000). The null hypothesis establishes that population size structures are not modified with the harvesting or extraction events. The extractions that occurred in 1997 and 1998 were calculated to be from 120 to 160 individuals of adult and sub adult size classes. Censuses were done before and after the extraction.

Table 1. Minimum Known Alive (MKA)

Year	MKA	Number of census
1994	- 305 -	4
1995	- 319 -	4
1996	- 76 -	3
2000	- 76 -	4

More than three hundred crocodiles were observed in 1994 and 1995. The "same" MKA of seventy-six crocodiles where observed in 1996 and 2000 before and after the extractions. The crocodile population in Lake Amela today, has room for expansion when compared to the years of 1994 and 1995. The crocodile population in the lake can be considered to be below the carrying capacity of the ecosystem. Intra-specific aggressions are probably lower than in 1995 and the sub-adults size class reacts to new density

dependent conditions. Despite the removal of dozens of middle and large size crocodiles, eye counts remained similar as well as MKA for 1996 and 2000. There is a suggested correlation (Cott 1961) between extraction of crocodiles and the decline in fisheries as has happened at Amela. I do not think crocodile extraction is the reason for the fishery collapse, but rather it is a result of over-fishing (Borondon 1987). However, it is a related problem involving a lack of knowledge and understanding of the sustainable use and conservation of wetlands for these fishermen whose family's depend on them attempting to make a modest living from the open resources of the Lake.

The largest count (MKA) of each year also allowed the best estimation of population size structures. Frequencies where compared with Chi^2 for the goodness of fit (df = 2, a = 0.05). The critical value is 5.9 with a sample size of 58 (Zar 1996). The null hypothesis is rejected and the conclusion is that the population size structure has changed in the year 2000 as compared to that observed in 1996.

Harvest events change the size structure of *Caiman crocodilus* populations in Venezuela (Velasco 1995). These observations lead me to think that large American crocodile populations respond to extractions in a similar way to *Caiman* populations. The increased numbers of sub-adult size is the result of decreased pressure from the adults and spaces left open from extractions allow the juvenile class increased rate of recruitment to sub-adult class. The sub-adult becomes the best-represented size class after extraction events of adults of *Crocodylus acutus* populations that are actively nesting and producing juveniles. A similar size structure of sub-adults as the best represented size class was found in Potrero Grande Colima in 1996, where extractions are also reported (Castillo 1997). Although sub-adults replace adults in night count observations, direct extractions are not economically sustainable in the long term (Abercrombie 1998). Crocodile extractions from large populations for their use in reproduction in farms with controlled egg production, could be an alternate possibility to resource management and conservation. Crocodile populations in Colima are large and are present in most of the extended tropical wetlands. I surmise that far more than one hundred wild nests are laid in suitable habitat in the state of Colima. Thirty-five nests where located after hatching in July in a few nesting sites in 2001. To document and protect crocodile nesting activity and nesting sites, would be the most effective conservation effort. Irregular crocodile extraction in Colima has been occurring since 1996 (Castillo 1997), but several interuptions of this activity gave wetlands populations time to recover. A considerable amount of suitable habitat for mating and feeding remains unoccupied for crocodiles in Colima's wetlands despite the presence of several large populations such as those in Lake Amela Potrero Gande and Cuyutlan. Also crocodiles do exist adjacent to areas of human activity. The fear of early humans to the presence of large Jurassic reptiles is the conclusion that results of the current simpatry between humans and crocodiles in Colima. — Francisco A. Castillo S. *Universidad de Colima. Facultad de Veterinaria y Zootecnia. Tel- Fax 01152 331 48252 . e-mail <picaso@palmera.colimanet.com>.*

Literature Cited

Abercrombie, C. 1989. Population dynamics of the American Alligator. Pages 1-6 in Crocodiles management and Conservation. IUCN-World Conservation Union, Gland Switzerland.

Borondon, F. A., C. Solis, and L. Coba 1987. Investigacion Biologico Pesquera del recurso Tilapia *Oreocromis aureus* en la Laguna de Amela, Colima, Mexico. Secretaria de Pesca, Instituto Nacional de la Pesca, Centro Regional de Investigacion Pesquera. Manzanillo, Colima.

Casas, A. G. and R. Trujillo 1994. Climate and distribution of *Crocodylus* acutus in the Mexican pacific coast. Biogeographica 70(2):69-75

Castillo, F.A.,1997 Observations on two American crocodile populations in Colima State, Mexico, with possible management implications. Thesis submitted to the graduate faculty of Auburn University in partial fulfillment of the requirements for the degree of Master in Science.

Cott, H.B. 1961. Scientific results of an inquiry into the ecology and economic status of the Nile crocodile (*Crocodylus niloticus*) in Uganda and northern Rodesia. Trans. .Zool. Soc. London, 29:211-365

Vlasco, A. and J. Ayarazaguena. 1995.Situacion actual de las Poblaciones de Baba (*Caiman crocodilus*) sometidas a aprovechamiento comercial en los llanos Venezolanos ed. Amigos de Donana. Caracas, Venezuela.

Zar, H.J. 1996. Biostatistical Analysis. Third edition. Prentice Hall. Upper Saddle River, New Jersey.

USA

INTERNATIONAL CROCODILIAN ASSOCIATION. On 18 August 2001, a group of scientists, veterinarians, zoo professionals and laypersons met in Daytona, Fl, USA, to discuss the involvement and ability of a wide variety of individuals and entities, with broad backgrounds, to participate in and/or contribute to crocodilian related issues and concerns. The meeting was moderated by Dr. James Perran Ross, Executive Officer of IUCN's, Crocodile Specialist Group (CSG).

The discussion centered around developing a multi-level organization that would provide opportunities of involvement from the young novice to those who were considered experts not only in the field of crocodilians but in professions and trades that could benefit crocodilian programs.

The group also discussed how such an "Association" would interface with already existing crocodilian organizations such as, the Species Survival Commission's, Crocodile Specialist Group and the American Zoo and Aquarium Association's, Crocodile Advisory Group. It was agreed that the "Association" would benefit such groups by its ability to provide supplemental support for already existing programs when requested by these other organizations. The Association's non-political position would also allow it to work in areas and on subject matters that precluded other organizations with political and/or commercial concerns or interests.

The result of the meeting was a unanimous decision by the group to create an "International Crocodilian Association", open to individuals and NGO membership. Its' goals would be to:

Create an Association independent of any special interests groups.

Develop the Association to provide a wide variety of opportunities for individuals ranging from novice to highly trained and experienced crocodilian experts.

To encourage the participation of individuals and NGOs who have knowledge and expertise in areas other than crocodilians that would provide support for crocodilian programs, e.g. generals contractor, water quality experts and life support systems specialists.

Develop a membership directory listing the interests and expertise of each member.

Develop a directory of veterinarians who have experience with crocodilians.

Develop educational programs for schools and communities that promote crocodilian awareness and conservation.

Create a team of individuals who could provide rapid assessment services regarding crocodilian related matters and issues for private crocodilian holders, NGOs and governments. (Crocodilian Rapid Assessment Team, C-RAT)

Create a mentoring program for those who want to become more active with crocodilians.

Create a mechanism to disseminate information to members regarding:

On going crocodilian in-situ and ex-situ programs that they may be able to participate in or contribute too.

Captive husbandry, facility or exhibit design and management techniques.

Veterinarian aid and information on health issues.

Provide a venue where members can express their ideas and views to others with the same interests.

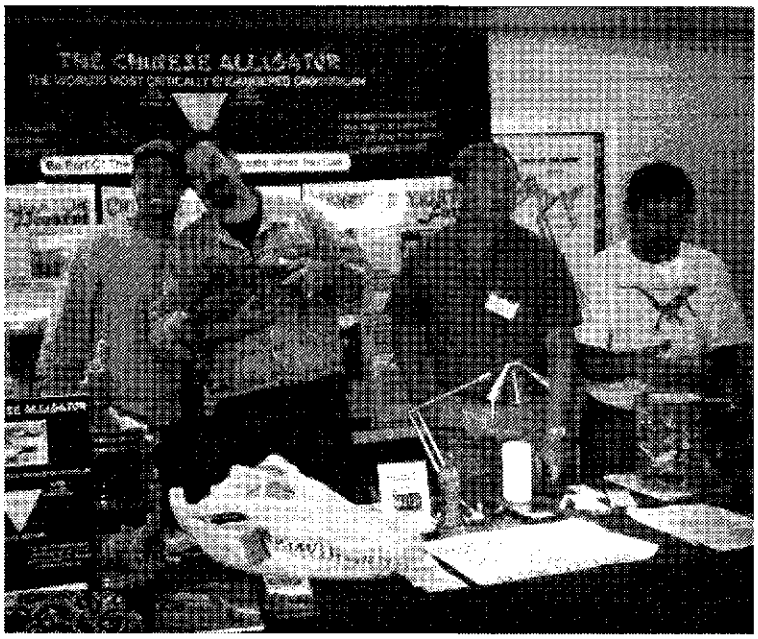
Develop subgroups to support the association's operations regarding the development of public education programs, fund raising, project development, peer review of publications, marketing strategies to promote crocodilian awareness and special events and other activities involving the Association.

Create a trust that would provide funding through grants, to support education, research, conservation and other crocodilian matters the Association deemed appropriate.

At this time a steering committee is developing the infrastructure for the Association and its operations including membership. As the Association develops it will continue to update the scientific and non-scientific communities. The International Crocodilian Association looks forward to interacting with all interested parties. — William Zeigler, *8440 Sth 21st Drive, Ocala, FL, USA <bzeigler@atlantic.net>* & and Terry Cullen, *The Cullen Vivarium Wildlife Conservancy, P.O. Box 878, Milwaukee, WI 53201 USA.*

CHINESE ALLIGATOR FUNDRAISER. The National Reptile Breeders Expo is the largest commercial reptile show in the USA and probably in the world. Several thousand breeders and

commercial vendors offer their wares, including captive bred reptile pets, equipment, cages, books diets and items covering every aspect of the reptile pet trade. These wares are eagerly sampled by an estimated 25,000 visitors over the two day event, held in Daytona Beach, FL, USA.



Daytona Fundraiser, l-r Flavio Morrissey, Terry Cullen and Moo Shoo, Lonnie McKaskill, Perran Ross.

At this years event, 18-19 August, a group of alligator lovers coordinated by CSG member Terry Cullen and Lonnie McAskill held a fund raiser that netted $4,000 to support Chinese alligator conservation in China. In space provided free by the Expo organiser, Wayne Hill, Cullen, McAskill and friends offered donated items for sale, raffled a lifelike mold of a Nile crocodile skull and offered photo opportunities to the passing crowd, A detailed mural of informational posters prepared by WCS enhanced the display. Star of the show was Moo Shoo, Terry's 10 year old Chinese alligator. Terry has worked for some time to make Moo Shoo used to handling and crowds, and she took to the celebrity life like a pro, snuggling on Terry's, and several other handlers lap and posing for photo's, all without restraint and never a sign of aggression or stress. The funds raised have been transferred to the Chinese State Forestry Administration to assist the costs of producing a proceedings of the workshops held in August and September in China. Thanks are due to Wayne Hill, Bill Ziegler, Joe Wasilewski, Flavio Morrissey. — Terry Cullen, *The Cullen Vivarium and Wildlife Conservancy, P.O. Box 878, Milwaukee, WI 53201 USA*, and Lonnie McAskill, *Disney Wild Kingdom, Kissimmee FL, USA.*

CROCODILIAN BIOLOGY AND CAPTIVE MANAGEMENT COURSE ANNOUNCED. The AZA Board of Regents presents the second offering of the taxon-specific training course focusing on the biology and captive management of the Crocodylia. This course is developed and taught by members of the AZA Crocodilian Advisory Group. This five-day training program will concentrate on the captive maintenance techniques, husbandry, breeding, and special requirements for the care of crocodiles, caiman, gharials, and alligators in zoos. The school will be a balanced program of classroom lecture, demonstrations, and hands-on wet labs. Relevant topics on basic crocodilian biology including taxonomy, reproductive biology, behavior, anatomy, physiology, and conservation will be included as the foundation for captive management practices.

Management subjects will include enclosure design, social groups, introductions, breeding, nesting, egg incubation, training, sexing, capture techniques, chemical immobilization, diet, medical care, and population management. An optional one-day field trip may be scheduled immediately after the course to view wild alligators during the breeding season in Florida. The course will be held at the St. Augustine Alligator Farm in St. Augustine, Florida, from 4 – 9 May 2002. Applications may be obtained from Lauren Duerr, AZA Training Administrator at (301) 562-0777 ext. 238 or through e-mail at <lduerr@aza.org>. Course tuition is $600 for AZA individual members and $650 for non-members. Priority will be given to individuals that work with crocodilians and individuals that work at AZA accredited institutions who have institutional support from their Executive

Director. Students will be required to sign a release and be covered by workman's compensation from their institution during the course. If you are interested, please apply as soon as possible as this course is expected to fill quickly. — R. Andrew Odum, *Curator, Department of Herpetology, Toledo Zoological Society, PO. Box 140130, 2700 Broadway, Toledo, OH 43614, USA*

FIRE DAMAGES ALLIGATOR TANNERY. - A fire severely damaged an alligator skin tannery that processes 5,000 hides a month. The cause of the fire in early December at Roggwiller Tannery of Louisiana in Layayette, Louisiana, is unknown, said fire investigator, Alton Trahan.

The call for help to firefighters came in at 12:34 p.m. The fire started just as a slow-moving train was rolling by the burning building. The train kept firefighters from North Lafayette from the scene of the fire for about 5 minutes, Trahan said. "The train did block us," Trahan said. "By the time we got here, it was already burning," Trahan said, however, the train was not a factor in getting the fire under control.

Firefighters worked hard to keep the fire away from chemicals used to tan the hides, which were located in the northwest portion of the large red brick building. Firefighters also kept a hose on the side of the building to keep the intense heat from catching the nearby Chastant Bros. feed store building on fire. Bellows of thick, black smoke could be seen for miles throughout the afternoon.

"Nobody got hurt. That's all I'm concerned about," said Leroy Herstard, a plant supervisor who called 911 for help. The fire and smoke were most intense in the southwest corner of the large building, where a welding shop is located on the first floor, and an electrical service shop is located on the second floor.

Herstard said large electrical transformers are located in the area where the fire and smoke was most intense. Herstard and other employees heard two loud explosions, probably coming from welding tanks that ignited from the intense heat, they said.

Bernard de Reynies, chief executive officer of the tannery, said the company is owned by TCIM of Paris. He said the company processes 5,000 alligator hides a month. While losses of material were considerable, the company is bringing new and updated equipment and expects to resume activities within a couple of months. — Todd Billiot, *LAFAYETTE TIMES Posted on December 1, 2001*.

GATOR BITES OFF PART OF 81-YEAR-OLD MAN'S LEG IN FATAL ATTACK. An elderly man walking his dog by a canal lost part of a leg and died in an attack by an 11-foot alligator investigators believe first went after his dog, then turned on the man when he tried to protect his pet.

Robert Steele, 81, was rushed Tuesday to Healthpark Medical Center, where he was declared dead. His right leg below the knee was missing.``Why he got attacked, we're not sure, but he may have been protecting his dog," said Sanibel Police Cmdr. Bill Tomlinson. ``I had no idea it was an alligator," his wife, Ellen Steele, said after the late afternoon incident by the couple's home on well-to-do Sanibel Island. ``His legs were still in the water and there was no blood. We live among alligators. We protect them. They have never attacked us before." Ellen Steele, also 81, thought her husband was drowning in the canal when she heard him start screaming. She ran to him and pulled him as far up the canal's bank as she could before calling 911. Paramedics reported that by the time they arrived, though, Robert Steele had lost a lot of blood and was in cardiac arrest.

Less than an hour later, officers of the Florida Fish and Wildlife Conservation Commission reached the scene with two alligator trappers. They quickly spotted the right alligator. `We saw it surface on the other bank with the leg in his mouth," said Tomlinson. ``It was pretty skittish because it had what it wanted." Wildlife Officer JoAnne Adams then shot the alligator in the head, and officers dragged it ashore.

Steele was the thirteenth person killed in a Florida alligator attack in the last 50 years, including a 71-year-old Sarasota man killed in May and a 2-year-old girl killed the following month. — *The Miami Herald and wire service sources .submitted by* Phil Hall, *Florida Museum of Natural History, Gainesville, FL 32611 USA..*

FLORIDA TEEN-AGER RESCUES BEST FRIEND AFTER GATOR ATTACK IN LAKE. After 14-year-old Edna Wilks was pulled under water by an alligator, she surfaced — her arm still in the gator's mouth -- and began prying at its jaws with

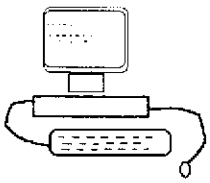
her other hand. By the time the reptile let go, her friends had all fled.

Except one. Best friend Amanda Valance stayed behind and pulled her to shore as the gator followed. Edna received blood transfusions, treatment for a broken arm and underwent surgery to clean debris from the arm's muscles. If Amanda, also 14, hadn't been brave enough to stay, Edna is sure the alligator would have killed her. "We've been best friends for about 2 1/2 years and now she's more than my best friend, she's my hero," Edna said.

The girls and four friends were floating at night on Boogie Boards in Little Lake Conway when an alligator grabbed Edna's arm and pulled her under the water. She realized it was an alligator and started screaming. "He was spinning me in the water real fast and jerking me." She heard a loud crack as the gator snapped her arm bones. After the spinning stopped, she surfaced and was able to take a deep breath, her arm still in the gator's mouth. She began prying at the gator's jaws and the animal finally let go. By that time, the other children had fled for shore. "For five split seconds, I felt like I had to leave, but I could not do that to her," Amanda said. The girl stayed a couple of feet away throughout the attack. When Edna popped free, she grabbed her and helped her onto a Boogie Board. Then she pulled the board to shore, as the gator trailed behind. The alligator was still hanging around and followed them halfway to shore. The whole time Amanda was swimming she was thinking the alligator was going to get her feet.

The Florida Fish and Wildlife Conservation Commission later killed two gators nearby — one 6 feet, 5 inches long, the other 11 feet, 2 inches. The larger gator was big enough to have killed someone, said Lt. Joy Hill, a commission spokeswoman. "I'm very blessed," Edna said. "I know that I wouldn't be here right now without my friend Amanda. She saved me and she deserves everything in the world." —

CSG On-Line



WILDLIFEDECISIONSUPPORT.COM is proud to announce the launch of its online wildlife community website. The site gives access to specialised information for the wildlife professional - including rehabilitators, veterinarians, ranchers, researchers, game capturers, managers and students.

The website, at http://WildlifeDecisionSupport.com, includes the full text of the current edition of the Capture and Care Manual which is out of print. The Manual, a combined effort by 22 specialist authors, has become the definitive reference on the translocation of African wildlife. The site also enables people to share their knowledge and experiences with one another in an interactive, immediate manner. A regular newsletter is sent to members. For more information, visit — http://WildlifeDecisionSupport.com or call Riley O'Brien *at 012-991-3083. <Mail ranger@WildlifeDecisionSupport.com>.*

THE LOUISIANA FUR AND ALLIGATOR ADVISORY COUNCIL has recently posted a new webpage at www.alligatorfur.com. The mission of the Council is to promote the conservation and management of the Louisisana fur and alligator resource through public education, marketing, promotion, and legislative action. This website is a big step towards achieving these goals.

Teachers can check out our education and biology pages, geared towards helping meet your requirements with science benchmarks. We have lots of activities, lesson plans, and worksheets designed around state and national benchmarks. The biology pages give information on general biology, diet and habitat of Louisiana's fur bearing animals. Our educational materials can be downloaded in html, pdf (for Adobe Acrobat Reader), or Microsoft Word format. We've also included information on hunting and trapping regulations, resources for high fashion retailers,

alligator recipes and much more. If you find our site interesting, give us a link back to it from your site. For more information (or just to touch base and say "hello" contact: — Tanya Sturman *318-354-1229 304 Second St., Natchitoches, LA 71457 USA <furandgator@yahoo.com>*.

PROYECTO YACARE- YACARES SANTAFESINOS WEB PAGE. Our web page it is available at: http://www.mupcn.com.ar/yacare/ — Alejandro Larriera, *Regional Vice Chairman ,Crocodile Specialist Group (CSG/SSC/IUCN), Latin American and the Caribbean Region,* <yacare@arnet.com.ar>

Trade

CITES

Universal tagging system for the identification of crocodilian skins. Notification No. 2001/057 Geneva, 10 August 2001 CONCERNING: Implementation of Resolution Conf. 11.12

In accordance with paragraph 1 of Annex 2 to Resolution Conf. 11.12, the Secretariat hereby communicates a revised list of manufacturers able to produce tags for the marking of crocodilian skins in accordance with that Resolution:

a) ALBCO (PVT) Ltd
Attn: A.L. Balarin
Corner Dumfries and Bristol Roads
Workington, HARARE
Zimbabwe
Tel.: +263 (4) 75 40 02/7
Fax: +263 (4) 75 40 08
Email: albco@africaonline.co.zw

b) ALPHEX, Industrias Plásticas
Gerente: Jenny Fuentes Sandoval
Calle 163A No. 35 - 17
SANTAFÉ DE BOGOTÁ
Colombia
Tel.: +57 (1) 677 68 55; 528 73 98;
Fax: +57 (1) 677 68 66
Email: alphex@andinet.com

c) ALUVIN Securiseal (PTY)
Corner Refinery Road and Sharland Street
Driehoek, Germiston
South Africa
Tel.: +27 (11) 825 36 48
Fax: +27 (11) 825 61 23
Email: admin@aluvin.co.za

d) American Castings & Manufacturing Corporation
51 Commercial Street
PLAINVIEW, NY 11803
United States of America
Tel.: +1 (516) 349 70 10;
toll free: +1 (800) 342 03 33
Fax: +1 (516) 349 83 89
Email: info@americancasting.com

e) E.J. Brooks Company
8 Microlab Road
P.O. Box 475
LIVINGSTON, NJ 07039-1602
United States of America
Tel.: +1 (973) 597 29 00
Fax: +1 (973) 597 29 70
Email: peggy.hand@ejbrooks.com

f) ITW Fastex General Products
P.O. Box 535
BRAESIDE, Victoria 3195
Australia
Tel.: +61 (3) 95 58 22 55
Fax: +61 (3) 95 58 22 65
Email: itwfastx@fastex.com.au

g) La Casa del Precinto, C.A.
Calle Capitolio o República Dominicana
Edificio Alpha, Planta Baja – Local No. 4
Boleíta Sur, CARACAS
Venezuela
Tel.: +58 (2) 239 02 18; 239 69 69;
Fax: +58 (2) 239 49 49

2. The Secretariat takes this opportunity to remind Parties that, in accordance with Resolution Conf. 11.12, Annex 2, any Party that is using a supplier other than one mentioned above should inform the Secretariat as soon as possible, so that it can, if appropriate, be added to the list of approved suppliers.

3. This Notification replaces Notifications to the Parties Nos. 962 of 7 March 1997 and 2000/042 of 31 July 2000.

Veterinary Science

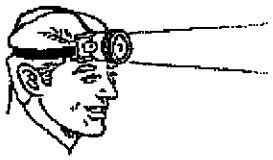
PHOTOCOPYING, A SIMPLE, FAST TECHNIQUE FOR DOCUMENTING PATHOLOGICAL CONDITIONS OF CROCODILES. Often a camera is not available when one does a necropsy. Even if it is available, it may take weeks for the film roll to

be completed and developed. Frequently the need arises for pictorial documentation for case reports.

We noticed when copying books that the copy often includes the fingers of the person holding the book and this gave us the idea of photocopying lesions. We place the organ or whole (small) animal on a clean acetate film, such as used for overhead projection, with the side to be copied down, place the whole on a photocopier and cover it with a sheet of white paper. The acetate film prevents soiling the copier (that would be resented by the clerical staff!) and the white paper provides contrast and defines paper size.

We have found that the belly skin of crocodiles is particularly suitable for this technique , but other organs and lesions can be copied quite satisfactorily. We have also used photocopies to document foreign bodies found in the stomach of ostriches. Such copies provide an instant record for reports and your own files. Note that the figures shown here have been reduced and copied again and so are not representative of the clarity that can be achieved directly from the copier. — F. W. Huchzermayer, *P.O., Box 12499, Ondertepoort, South Africa <crocvet@mweb.co.za>*

Personals



Lorrie Collins *Kehlings 1, D-88279, Amtzell, Germany, <IB-Collins@t-online.de>* joyfully announces the birth of son Ben last September. In view of the demands of motherhood Lorrie has withdrawn form the CSG Steering Committee but hopes to remain in contact with CSG.

David Morgan, (New address) *Joint Nature Conservation Committee, Ave de Gaulois 18, 1040 Brussels, Belgium,* has finally ended his contract at the Europena Commission and will now represent the UK CITES Scientific Authority promoting biodiversity conservation inside the European Union.

Jose Juan Perez Ramiriez is now Subdirector for the Fauna and Fauna Protection area of Yum Balam- Si an Kian Biosphere reserve, *Blvd. Kukulkan Km 4.8 Z.H. Cancun QR 77500, Mexico, <cocodrilin59@hotmail.com>*

Beatriz Figuero Ocaña, advises us of a change of location and new address- *Calle Imperial No. 3, Piso 2 B, CP 47003, Valladolid, Spain <bfcocos@hotmail.com>*. Beatriz has a scholarship for two years and has begun doctoral studies at the University in Valladolid. She is accompanied by her six year old daughter. Beatriz continues to be involved in research at her home institution in Tabasco, using the internet and the time difference to keep in contact.

EDITORIAL POLICY - 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. 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 are not the opinions of CSG, the SSC, or the IUCN-World Conservation Union unless so indicated.

Steering Committee of the Crocodile Specialist Group

Chairman: Professor Harry Messel, School of Physics, University of Sydney, Australia.
For further information on the CSG and its programs, on crocodile conservation, biology, management, farming, ranching, or trade, contact the Executive Officer or Regional Vice Chairmen:

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