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IUCN TORTOISE AND FRESHWATER TURTLE
SPECIALIST GROUP NEWSLETTER
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Group Co-Chairmen: Peter C. H. Pritchard - Ian Swingland

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Editorial

Much of what we do to conserve chelonians today is based on what is practical and/or what seems logical. In truth there are few tried and proven methods for rebuilding depleted chelonian populations. Many of our methods are used because they are traditional. For example we establish hatcheries because sea turtle workers have hatcheries, etc. In 1983 Nicholas Mrosovsky wrote a controversial booklet entitled Conserving Sea Turtles in which he raised many questions concerning the traditional methods. It is quite possible that much of what we have done in the past has been worthless or even worse may have exacerbated the problem (eg. widespread adoption of styrofoam boxes for incubation).

A solution to the problem of determining which techniques work and which do not is to monitor the success (or lack of success) of ongoing programs. The problem with the solution is few programs have been in existence for long enough periods to produce any definite results. The turtles with which we are concerned are typically slow maturing animals. Any seeds of conservation sewn for such beasts may require years/decades to germinate and grow.

One of the longest running conservation programs for a freshwater turtle is the river terrapin program on the Perak River of Malaysia. This program, begun by Mohamed Khan (now Director General of the Dept. of Wildlife and National Parks) in 1967, presently includes a hatchery along with facilities for headstarting and captive breeding. In 1975 I worked with the program and censused the numbers of nesting females to provide a baseline for monitoring its success. Earlier this year I returned to recensus the population and to determine if there were any greater percentage of young females returning to the nesting beaches. Unfortunately the latter objective could not be realized. The government beach where I had worked previously was landlocked by a change in river course and I could not persuade the owners of private beaches to allow me to examine their turtles up close. I was able to obtain accurate counts of the nesting females, however, and found that the present nesting population was only about half of the minimum number calculated for the early 70s (400 vs. 190). Does this indicate the program is not working? Not necessarily, for it may take female river terrapins 20 years or more to mature and the conservation program is only 20 years old. Hence this would be the

earliest that we might expect to find females raised at the hatchery returning to nest. I cite this particular instance because it exemplifies the difficulty involved in testing conservation techniques.

With few proven conservation techniques available and species disappearing too rapidly for us to sit back and wait several decades until they can be proven, the safest course of action I can recommend is to follow nature's lead as closely as possible. For example if a hatchery is needed, natural nesting conditions should be duplicated as closely as possible. Place the eggs in size groups similar to the natural clutch; bury them to depths of actual nests at sites having the same exposure and substrate of the nesting site. Allow hatchlings to enter their natural habitats as soon as they would naturally. Although some experimentation is desirable to develop new methods, a conservation program should not be based entirely upon some unproven, unnatural technique. The most successful conservation action that I have found for turtles in southern Asia is establishing refuges or sanctuaries. Where habitat and an adequate breeding nucleus of the target species are present, the best course of action may be just to protect them from exploitation. Nature does the rest. The refuge concept offers the additional benefit of conserving a community of species not just a target species. This became very evident to me when I visited India's impressive system of crocodile preserves. Hunting and fishing were prohibited in most of these areas and consequently they teemed with wildlife. I was particularly impressed with the diversity and abundance of chelonians. Species rarely seen in other parts of the river were common in the refuge. The only other sites where I saw such a diversity of chelonians were in stretches of rivers near certain Hindu temples where wildlife received religious protection.

The point is that expensive, elaborate, or high tech solutions are not necessarily the answer to chelonian conservation problems. This is particularly true in developing countries. In such countries and with our limited knowledge of what actually works, the simplest and cheapest methods are safest and could well prove to be the best.

INDIAN WILDLIFE ACT AMENDMENTS INCREASE TURTLE PROTECTION

The Indian Wildlife (Protection) Act of 1972 is one of the most important pieces of legislation protecting endangered species in India. The act includes several schedules or lists of species which provide varying levels of protection. Chelonians are represented on two lists, Schedule I which offers near complete protection and Schedule IV which allows exploitation by permit. The lists have been amended several times since their inception. The most recent amendments have increased the numbers of chelonians on Schedule I from 8 to 15 (See below). Schedule IV lists all

species of the families Trionychidae and Testudinidae not listed on Schedule I.

Certain problems remain with the listing. In particular certain species listed on Schedule I are moderately common (Kachuga tecta, Trionyx gangeticus, and Trionyx hurum) to very common (Lissemys punctata). While it is better to have too many listed than to have too few, inclusion of common species on the list tends to weaken its credibility and reduces its significance. Nevertheless, I am pleased with the additions to the list which are all seemingly endangered and reflect recommendations made to the Indian government following my 82-83 studies in the country.

Chelonians of IWL(P)A 1972 - Schedule I
(* signifies new additions)

Emydidae
- Batagur baska*
- Geoclemys hamiltoni*
- Geoemyda silvatica*
- Kachuga kachuga*
- K. tecta
- Melanochelys tricarinata*

Trionychidae
- Lissemys punctata
- Pelochelys bibroni*
- Trionyx gangeticus
- T. hurum

All Sea Turtles

TURTLE PROJECT AIMS AT CLEANSING GANGA

The quality of water in the Ganga, India's largest and most revered river, has progressively deteriorated as human populations have increased along her banks. Along with the typical sources of pollution associated with population growth, India has a somewhat unique water pollution problem --corpses. Various sites along the Ganga are considered particularly holy to Hindus and are popular sites for cremation (often on floating rafts). Due to the expense of firewood, bodies may not be completely burned before entering the Ganga while others may simply be placed in the river directly without burning. Necrophagous chelonians have helped to reduce such pollution in the past but currently their numbers are too low to be effective in this capacity.

To remedy this situation the state of Uttar Pradesh has begun a 13.5 lakh (lakh = hundred thousand rupees) turtle management project to rebuild the depleted populations. Elements of the project include:

1. A hatchery for Trionyx gangeticus and Lissemys punctata with an annual target of 30,000 eggs.
2. Headstarting of 6000 hatchlings of rarer species per year.
3. Increased enforcement against poaching and illegal transportation of turtles.
4. Establishment of four sanctuaries or closed areas amounting to 220 river kilometers on the Ghagra, Jamuna, and Ganga Rivers including a 40 km stretch centered around Varanasi where the project will be headquartered.

MORE CHELONIAN CONSERVATION PLANS FOR INDIA

Dr. M. K. Ranjitsinh, Joint Secretary for Wildlife in India's Ministry of Environment and Forests, recently wrote the T&T Specialist Group for names of experts in the captive breeding of tortoises. As part of India's awakened interest in chelonian conservation, a captive breeding project is being proposed for the species of tortoises which occur in the country as well as some freshwater species. Readers wishing to volunteer expertise or suggestions should contact Dr. Walter Sachsse, chairman of our captive breeding subgroup.

PANCAKE TORTOISE SURVEY

Roger C. Wood (Stockton State College, Pomona, New Jersey) spent several weeks in Kenya in 1987, undertaking a preliminary survey of the Pancake Tortoise (Malacochersus tornieri) in cooperation with Alex MacKay of the National Museum of Kenya. He reports "Preliminary results indicate the following:

1) Pancake tortoises have a much wider geographic distribution in Kenya than has previously been realized;
2) The one population that we studied intensively occurs in an area where pancake tortoises were heavily collected for the pet trade in past years but seems fairly healthy. While the highly cryptic habits of these creatures make them difficult to locate, our impression is that they are not really rare.
3) The collection of pancake tortoises for export is now apparently totally prohibited by the Kenya Government and the Kenyan people do not appear to eat or have any other kind of active interest in the species. In this sense the existing populations are not obviously threatened. However, in our study area and probably elsewhere within the Kenyan range of pancake tortoises, land is being cleared at a rapid pace for agricultural purposes. Disruption or elimination of the indigenous thorn scrub vegetation characteristic of the region may, in fact, be the most serious threat to the continued existence of pancake tortoises in Kenya.

A considerable amount of field work needs to be done in Kenya to assess the status of this species, including:
a) Determination of population densities in several different areas within the range;
b) Determination of the full range of the species within Kenya;
c) Analysis of the population structure in terms of reproductive success, movement of individuals, etc.;
d) Comparison of specimens from Kenya with the slightly better known populations in Tanzania in order to assess

whether or not there are significant morphological differences.

I hope to continue field work with my Kenyan colleagues in the near future. Finding the necessary funding, as is always the case, is what will determine how soon and how much of this work we will be able to undertake. Similar work needs to be done in Tanzania as well."

I was able to visit Roger's main study site near Kalanga Corner in November 1987, several months after his visit. We found three pancake tortoises in a couple of hours search, one of them marked. (Roger marked a total of 33 specimens). I also held discussions with one of the principal wildlife exporters in Tanzania, and learned that he had 300 pancake tortoises in his compound. Nevertheless, although in the last year or two animal wholesalers in Miami have had large stocks of pancake tortoises, the market may now be saturated. After about a decade of unavailability following the closure of export from Kenya, the first Tanzanian exports sold for nearly $300 each, but now they are hardly attracting buyers even at $40.

Submitted by Peter C. H. Pritchard

REVISED REPTILE IMPORT POLICY IN SWEDEN

Sweden has recently changed its policy for importation of reptiles. It is now permissible to import reptiles providing they are not listed under the Washington convention and that required export-licenses have been obtained from the country of origin. A group of zoologists and amateur herpetologists have been authorized to identify the species and check them for Salmonella.

As snake owners must license their pets, which requires meeting certain care conditions, turtles have become the most popular reptiles in the trade. In the month following adoption of the new regulations, one dealer alone imported hundreds of the following species: Pseudemys scripta, Clemmys insculpta, Graptemys sp., Terrapene carolina, and Terrapene ornata. Similar shipments from Africa and Asia are expected shortly.

Sweden's new regulations will be reexamined at the end of six months (Jan 88?). Whether the regulations continue will be based on findings from the Salmonella survey and determination of whether free import is in agreement with the Swedish policy of animal trading. Mats Olsson is concerned about the effects of the Swedish trade on chelonian populations in the countries of origin. In an effort to influence the government's decision, he requests any information concerning faunal impoverishment of chelonians by collectors or other material relevant to the problem. Olsson may be contacted at University of Göteborg, Dept. of Zoology, Box 25059, S-400 31, Göteborg, Sweden.

INTERNATIONAL SPECIES INVENTORY SYSTEM

The ISIS inventory of captive collections has been updated to 30 June 1987. The inventory which is based on 75000 live specimens being kept in 240 institutions in 18 countries is best for mammals and birds and has just begun for herps. Readers desiring information on captive collections can write: ISIS-Minnesota Zoological Garden, 12101 Johnny Cake Ridge Road, Apple Valley, Minnesota 55124, USA.

WORLD CONGRESS OF HERPETOLOGY

The First World Congress of Herpetology will be held at the University of Kent in England, September 1989. Those members and correspondents of the Tortoise and Freshwater Turtle Group who would like to have further information should write to the Director, Dr. Ian R. Swingland, Ecology Research Group, Rutherford College, The University, Canterbury, Kent CT2 7NX, England for the first circular. He is most concerned that all members and correspondents of our Specialist Group as well those of the Marine Turtle and Crocodile Specialist Groups have the opportunity to attend, since there will be a large number of symposia, roundtables, and other meetings which are of direct interest to those involved in species conservation.

CONSERVATION LOSSES

With much regret I report the deaths of two ardent supporters of turtle conservation during this past year --- Dr. Archie Carr (1909 - 1987) and Miss J. Vijaya (1959 - 1987).

It is difficult to think about turtles without Archie Carr's name coming to mind. Although best known for his research and conservation work with sea turtles, much of Archie's early research concerned freshwater chelonians. His Handbook of Turtles was in no small part responsible for cultivating the interest in turtles which produced a large number of cheloniophiles and turtle biologists among my generation. His multitude of other writings have educated us to the importance of conservation and the joys and excitement of field biology. Although his passing is an immeasurable loss to biology and the conservation movement, he has left us the legacy of his writings, thus assuring that his spirit and wisdom will continue to influence generations to come.

Unlike Archie Carr, Ms. J. Vijaya's name is not internationally known but her spirit and enthusiasm for conservation and field biology were in many ways reminiscent of his. During most of her short career, Viji was associated with the Madras Snake Park and the Madras Crocodile Bank (conservation oriented organizations operated

by Romulus Whitaker) in India. During this period she became a champion for India's turtles and tortoises. From 1980 to 1986 she wrote some thirty notes and articles (mostly on chelonians and their conservation) for such publications as Hamadryad, Hornbill, Indian Express, Journal of the Bombay Natural History Society, Oryx, and Tiger Paper. Perhaps she is best known for rediscovering the rare cane turtle, Geoemyda silvatica, some seventy years after its original description and later living six months in a cave within the hill forests of Kerala in order to study the little animal. Viji died in April after a long illness. She was only with us briefly but her writing and efforts have played an important part in educating the Indian public to the plight of turtles within their country. The enlightened conservation actions and programs for Indian chelonians mentioned at the beginning of this newsletter demonstrate that her contributions have not been wasted.

CAPTIVE BREEDING PROPOSAL FOR WESTERN SWAMP TURTLE

Dr. Gerald Kuchling has responded to news in the inaugural issue of the Newsletter that the captive breeding program for Pseudemydura is at a standstill, with a proposal to improve the current program. The proposal has been submitted to Dr. Andrew Burbidge, group member in charge of the program. Dr. Kuchling has provided a copy (appended) to the Newsletter for group information and comment.

Dr. Kuchling is currently working on the reproductive biology and physiology of Chelodina oblonga in Western Australia. He can be contacted at the Dept. of Zoology, The University of Western Australia, Nedlands, Western Australia 6009.

GENETIC POLYMORPHISM OF TESTUDO HERMANNI

Dr. Charles P. Blanc has submitted a report of a study on the Hermann's tortoise for distribution with the newsletter (appended). Dr. Blanc can be contacted by writing Laboratoire de Zoogéographie, Université Paul Valery, B.P. 5043, F - 3402, MONTPELLIER CEDEX-FRANCE.

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01.09.1987

cc: Prof.Dr.Sachsse
Dr.Swingland
Dr.Pritchard

Proposal for a program to improve the captive breeding situation of the Western Swamp Turtle Pseudemydura umbrina

During the last months international attention was focused on the situation of the extremely endangered chelid Pseudemydura umbrina which seems to be very close to the step of extinction (Pritchard, IUCN - Tortoise and Freshwater Turtle Specialist Group Newsletter, May 1987; Sachsse, in lit. 11.Aug. 1987). With only one or two mature females in the wild (the last was sighted at about 5 years ago) the only hope lies in captive breeding. However, during the last years no eggs have been produced in the captive colony (Burbidge, in lit. 31.Aug.1987).

My main field of research is the reproductive biology and physiology of tortoises and turtles, especially the regulation of reproductive cycles by internal and environmental factors. My present research program on Chelodina oblonga in Western Australia enables me to observe the captive breeding situation of Pseudemydura umbrina and to make proposals to improve the results:

Three main problems have to be approached:

1. Getting the females to produce eggs
2. Increase the fertilisation rate of the eggs (which was less than 50 % in 1980, the last season with reproduction in captivity)
3. Improve the hatch-rate and survival and growth of hatchlings.

The long term perspective must be to establish a captive population with a surplus of surviving captive hatched animals of a balanced sex ratio which may be used to restock the populations in the wild. I suggest the following measures to be taken to solve the problems mentioned above:

ad 1. The first thing which I have already started to do is a general survey of the reproductive condition of all animals in captivity. With the aid of an ultra-sound scanning method (which I recently developed to study ovarian changes in chelonians; publication in preparation) I was able to show that the three females which have not produced eggs in the last years have enlarged follicles (between 14 and 16 mm diameter, 1.9.1987) in the ovaries. A fourth female which has been reared in the Zoological garden shows as well some follicular enlargement (up to 12 mm diameter, 1.9.1987) presumably for the first time. These four females should be able to produce eggs during the running season (in the wild egg laying occure end of November/early December), provided that attention will be payed to the following points:

- The nourishment of the females should be optimized: I will try to develop a food mixture with gelatin which resambles as closely as possible the natural diet.
- It must be taken carethat the females are not always chased out of the water by the males trying to copulate. This may result dimimished feeding and increased stress. Certainly spring (Sept.-Oct.-Nov.) is the main feeding time especially for the females which have to produce eggs during this time. Therefore it would be the best to build three or four small pools in the enclosure instead of one large pool to enable the animals to separate from each other.
- All radiography of the females should be stopped, ultrasonography is accurate to detect eggs ready to be layed without the risk of damage to the germ cells.

ad 2. In all temperate zone species of chelonians which have been studie d up to now spermatogenesis occure during the hottest time of the year and requires high temperatures. The exposition of the enclosures to sunlight and shadow seems suitable and may correspond to the natural conditions. However, in the moment tap water is constantly trickled through the pool, water temperature never exceeds 23 to 24° C. In the wild, water temperatures exceed 28 - 30° C during summer and body temperatures of active turtles range up to 28° C. Water temperatures higher than 28-30°C may induce turtles to aestivate (Burbidge, 1981: Aust.Wildl.Res. 8,203-23).

Spermatogenesis and normal sperm production may not require aestivation but it is possible that the lower water temperatures caused by the constant flow of tap water through the turtle pool decrease sperm production and subsequently the fertilization rate of the eggs.

Because of these theoretical reflections I suggest to stop trickling tap water all over the year through the turtle pool. Only evaporating water should be substituted. Or - see the preceeding section - three or four separate pools would allow to offer different temperature situations which can be chosen by the turtles themselves.

ad 3. The problems with artificial incubation of Pseudemydura eggs have been discussed (Burbidge, in lit.31.Aug.1987) and, as suggested, different temperatures should be tried. In the wild the sex ratio is well balanced. The turtle nests in the Perth Zoo presumably have produced both sexes too. In other Australian chelids temperature dependent sex determination could not be found.

However, to avoid mistakes I will try to sex all captive bred hatchlings which are preserved in the Western Australian Museum. This will be done by histological examination of the gonads. It may provide data on the sex ratio of captive bred Pseudemydura.

Survival and growth rate of hatchlings should be improved by using a special food mixture as proposed for the females (in addition to living larvae and crustaceans) and by building a nursery pool with subdivisions to seperate hatchlings and to observe food intake of individual animals. A special nursery pool would not show the high daily temperature fluctuations which occure in small Aquaria and would provide more constant environmental conditions for the young turtles.

All proposed measures require neither much time nor large amounts of money and are meant to improve the captive breeding situation immediately, with the hope that the standstill in captive breeding will be overcome in the running season.

POLYMORPHISME GENETIQUE DE
Testudo hermanni hermanni Gmelin, 1789
Population du massif des Maures, France.

L'espèce sud-européenne Testudo hermanni est représentée par deux formes distinguées actuellement (Bour, 1987) par les trinômes T. h. hermanni Gmelin,1789 pour la sous-espèce occidentale et T. h. boettgeri Mojsisovics, 1889 pour la sous-espèce orientale.

T. h. hermanni (T. h. h.) est signalée en France continentale par la seule population du massif des Maures qui en représente la terra-typica. Les travaux récents de Cheylan (1984) et de Stubbs (1985) ont mis en évidence une régression inquiétante des effectifs, notamment des juvéniles. Les données biologiques et écologiques sur cette population sont complétées, ici, par une étude du polymorphisme génétique. Ce travail est le premier concernant cette espèce et, d'ailleurs, le genre Testudo dans son acception actuelle.

Sur vingt individus provenant de différents secteurs du massif des Maures a été pratiquée une ponction cardiaque assurant une survie parfait ; les deux fractions plasma et hémolysat ont été soumises à des électrophorèses sur gel de polyacrylamide, d'amidon et d'acétate de cellulose.

Onze systèmes : ADH, AK, FUM, G6PDH, IDH, LDH, MDH, 6PGD, PGI, PGM et SOD, codés par 14 locus présumés, ont été retenus pour le calcul des paramètres de la diversité génétique.

Tous les individus sont monomorphes pour tous les locus analysés sauf un seul qui présente trois allèles particuliers aux locus respectifs AK-1, AK-2 et AK-3 (fréquence de ces allèles : 5.6 %). En conséquence, la population des Maures de T. h. h. montre :

a) un pourcentage de locus polymorphes assez élevé (P = 21.4 %), dû à la présence de trois locus polymorphes sur les 14 locus retenus ;

b) un nombre moyen d'allèles par locus A égal à 1.21 ;

c) un taux d'hétérozygotie observée Ho nul ;

d) un taux d'hétérozygotie calculée Hc = 0.023 qui reste cependant faible ; aucun locus ne montre de déficit significatif d'hétérozygotie.

Le pourcentage de locus polymorphes chez T. h. h., P = 21.4 %, est sensiblement supérieur à celui observé chez la sous-espèce la plus polymorphe de Geochelone elephantopus chathamensis (16.6 %) des Galapagos (Marlow et al., 1981) ; il est considérablement plus faible que chez Pseudemys scripta de la famille des Emydidae, P = 61 % (Scribner et al., 1986) et chez Kinosternon integrum de la

famille des Kinosternidae, P = 61.5 % (Seidel et al., 1986).

Le taux moyen d'hétérozygotie Hc, égal à 0.023, chez T. h. h., est supérieur à celui de cinq des sept sous-espèces de G. elephantopus des Galapagos (Testudinidae) ; il est inférieur à celui de toutes les espèces de Kinosternidae et d'Emydidae analysées.

Diverses hypothèses susceptibles de rendre compte de la diversité génétique décelée dans notre échantillon de T. h. h. représentant de la population du massif des Maures, telles que son isolement insulaire, l'existence d'un goulet démographique ancien. la taille de la population actuelle, la position phylogénétique du taxon, ont été discutées.

Remerciements. Cette étude a été réalisée grâce à la convention EGP n° 4324 du Ministère de l'Environnement. Nous avons le plaisir de remercier, pour leur aide B. Devaux responsable de l'association SOPTOM, M. Cheylan et D. Stubbs.

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