

# Growth Records of Baby Turtles

Introduction of Tortoise Conservation Reproduction Program in Wildlife Rescue Center, Taipei Zoo

■ Lu Yu ling & Fu Feng chi



Different kinds of tortoises relies different incubating temperature and humidity , mostly in the range of 28-31℃ and relative humidity about at 70-80% (RH) which is the most suitable for the embryo development of tortoise. Reptiles lay eggs which cannot be flipped and must be placed stably in a suitable substrate to develop slowly. Several months later, the baby tortoises will hatch out! The

plastron of newly hatched baby tortoises leaves yolk sac which has not absorbed completely; in the first few days, baby tortoises can still rely on the nutrients supply of yolk sac without eating. Only after yolk sac is completely absorbed and plastron fays, baby tortoises are trying to eat some leaves and vegetable fragments; then, we not only need to add appropriate amount of calcium, multivitamins and other nutrients, but also need to measure their weights and to monitor their health on a regular basis.



## Cactaeous Plants and Environmental Changes

■ Chen Yiming



This article originated from turtle experts from Conservation Center of Taipei Zoo who referred to cactus is an important source of nutritional supplements to tortoise and hoped to tie in the current “Turtles special edition” to make some introduction to the group of plants. In recent years, plant systematists take the *Opuntioideae* and the *Cactoideae* of the Cactaeous plants into the typical cacti and take the 17 species of Pereskia plants into the relictual cacti.

The *Opuntia* plants, which has about 200 species or so, are distributed widely in North and South America continent; the Erect Prickly-Pear (*Optuntia Stricta*) of them is with strong invasion, occupying habitat of native species, has been listed among the 100 world's worst harmful species by the International Union for Conservation of Nature (IUCN).

With the trend of future extreme climate change, under the influence of high temperature or reduced rainfall, drought environment continues to increase, not only moist forest composition may occur directional change, tend to drought-resistant species, even cactus plants that adapt to drought environment, but also may take the advantage of expanding their tropical territory massively. The relationships among plants, human and animals may have irreversible change; how to reduce man-made co-movement effects which is a priority.



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Turtles Special Edition

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Turtle Crisis: Top 25+ Endangered Tortoises and freshwater Turtles--2011

Read more about "Turtles Special Edition" special coverage in the No.125 issue of the Taipei Zoo Magazine !

# TAIPEI ZOO PAPER

## Sex Determination and Reproduction of Freshwater Turtles in Taiwan

■ Tien-Hsi Chen



There are only five native species of freshwater turtles in Taiwan, including *Mauremys sinensis*, *M. mutica*, *M. reevesii*, *Cuora flavomarginata* and *Pelodiscus sinensis*.

As to the gender of turtles, for general categories, as only as turtles grow up to a certain body size, they begin appearing distinguishable male or female characteristic, and the most common feature is the “tail” . The male's tail base would be coarser, cloacal opening is near the tail end, and normally which obviously exceed the rearmost outer edge of the back; female' s tale would be more slender, cloacal opening is located in rearmost inside edge of the back or nearby.

Sex differentiation of turtle is by the “temperature” sex-determining mode. In the process of incubation, the egg embryos will develop into a male turtle or female turtle is subject to the ambient temperature during incubation; such as male turtles are hatched by low temperature and female turtles are hatched by high temperature.

Among the freshwater turtles in Taiwan, *Cuora flavomarginata*, *M. reevesii*, *M. mutica* and *Mauremys sinensis* all belongs to the pattern of female hatches in higher incubating temperature..

## Burmese Star Tortoise Returning Homeland



■ Chen Chun fu and Chang Ming Hsung

The Taipei Zoo's International Cooperation Program of Rehabilitation and Return to the Original Habitats of International Endangered Species



With the support of Forestry Bureau under the Executive Yuan Council of Agriculture and Taipei Zoo Animal Adoption Programs, Taipei Zoo conducted a Re-introduction project for bringing the Burmese Star Tortoises back into the wild..Taipei Zoo specialists visited the wild habitat of Burmese Star Tortoise in Myanmar to inspect the conservation status, as well as for seeking a suitable halfway house for the tortoise before releasing them back to the wild. The research team visited Lawkananda Wildlife Sanctuary in,Bagan, Myanmar, which is one of the most successful public captive breeding facility of Burmese Star Tortoise in Myanmar. With the understanding of the crowded situation and current status of Lawkananda Wildlife Sanctuary, in early 2011,Turtle Survival Alliance, Behler Chelonian Center

Forestry Bureau and Taipei Zoo co-contributed the expansion funding for the facility, the construction was completed in July, 2011.

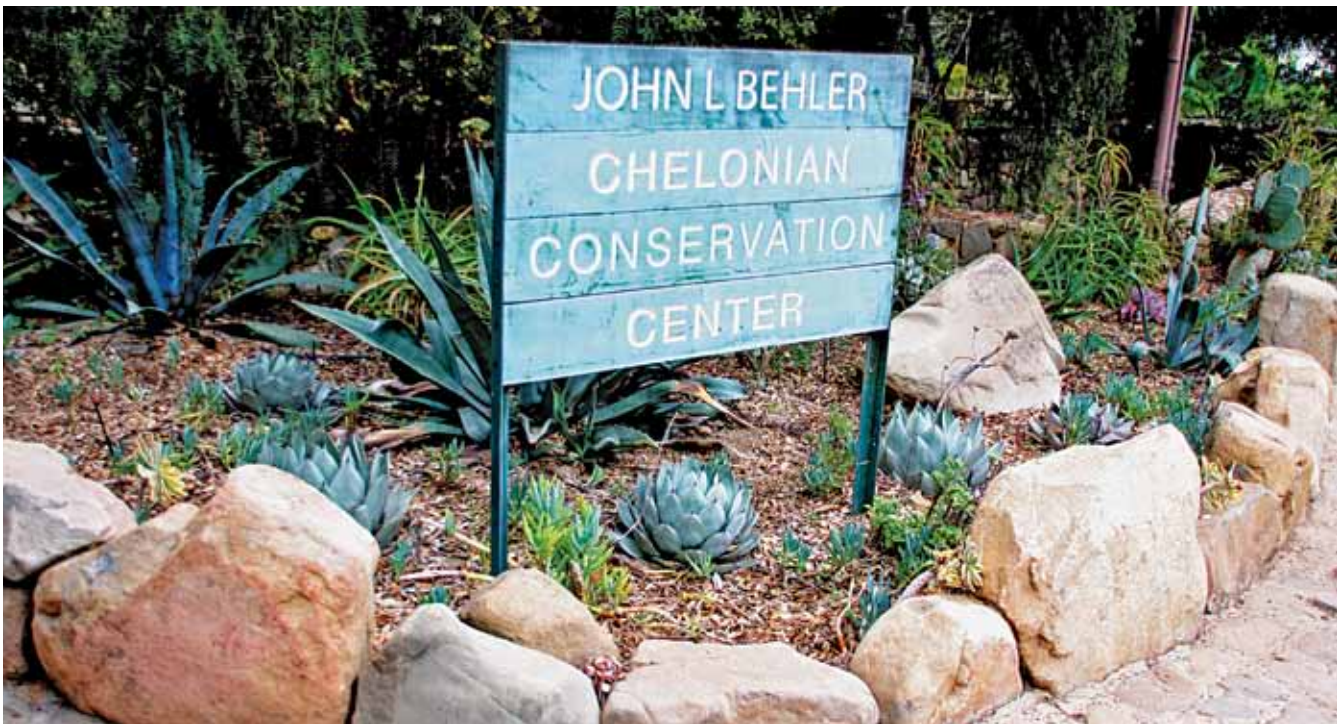


# Exploring the Mysterious Garden of the World's Most Endangered Turtles—The Behler Chelonian Center

■ Chen Chun Fu

The Behler Chelonian Center (BCC), a certified member of the Association of Zoos and Aquariums (AZA), specializing in captive breeding and management facility of the world's most critically endangered species of turtles and tortoises under the strict specifications and guidelines of AZA species survival program.. BCC is now under The Turtle Conservancy founded by Mr. Eric Goode In 2009, which is a non-profit organization in New York specializing in habitat restoration programs and research.

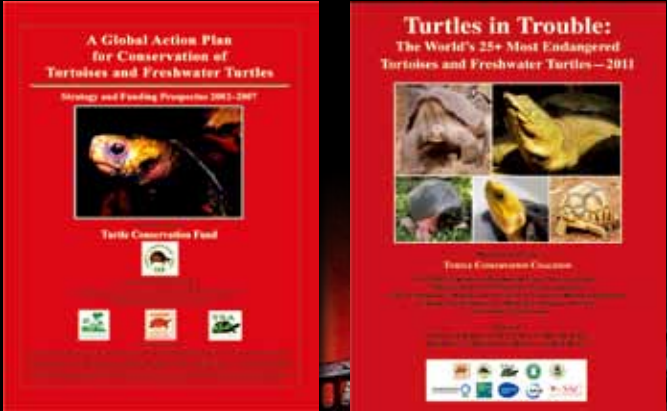
In 2008, Taipei Zoo began to cooperate with The Behler Chelonian Center in the conservation of the critically endangered Asian turtles. By the joint efforts of both institutions, we expected that our conservation programs will succeed in preserving these endangered turtles in the future.



# Turtle Crisis: Top 25+ Endangered Tortoises and freshwater Turtles--2011

■ Chen Chun Fu

There are about 328 currently recognized modern species of tortoise and freshwater turtle in the world, with about half of the species facing survival crisis as the deteriorate situation continues. In order to prevent the imminent threats of turtles which are suffering the possibility of species extinction, every four years, the world's top turtle scholars and researchers will assemble as a committee for reviewing the movements of worldwide turtle conservation during the past four years and sort out a list regarding the species status based on field ecological surveys and form into a global turtle conservation action plan for the reference of the ongoing conservation efforts. This article will introduces the reports start from the year 2003 and to the latest released "Top 25+ Endangered Tortoises and Freshwater Turtle—2011" in February 2011, moreover to the operation status the international conservation organizations that is involved in this evaluating process.



# Common Diseases of Turtles in Taiwan

■ Sera Y.H. Lai



The common diseases of native species of freshwater turtles in Taiwan are mainly trauma caused by fighting in forelimbs, tail or head, cellulitis induced by bacterial infection, rotten shell which is mostly damage being invaded by bacteria or fungus, conjunctivitis because of poor water quality, ear abscess and etc. The tortoises come from

abroad in Taiwan mainly suffer from respiratory tract infections or digestive tract disorders especially in winter with huge temperature deviations and high humidity. More than 90% of common illnesses in tortoise are caused by improper management, such as nutritional diseases which included with pyramid shell, gout, cystic calculi and

mineral element or vitamin deficiency. Keepers have to realize the living environment, habitats and diets of their turtles. Only with understanding of animals, keepers can provide the correct requirements for their turtles. The key points of animal health are suitable living environment, routine daily cleaning, profit and diverse food types for chelonians.



# Discussion on Tortoise Nutrition

■ Erich Sia

Different species of have various nutrition needs in reptiles; in other to determine the diets and nutrition problems of reptiles, it is necessary to realize the nutritional needs of reptiles from its origin habitat.

In general, the degradations of protein, fat and carbohydrates are mainly in the small intestine and the degradation of plant fibers are mainly in the large intestine through bacterial decomposition. Since tortoises are herbivorous animals, their length of the large intestine or the proportion is higher than carnivorous reptiles, it reflects the diversity of food choices for tortoises.

In recent years, tortoise food selections for breeders trended toward the food supply that matches natural cycles. Shoots, flowers and seeds are used; moreover, even growing cycle of a same plant , the various factors of leaf components during different seasons were taken into consideration.

