Living Fossils

Tuatara: “Hanging on by a Claw”

The Tuatara is a reptile that today inhabits only New Zealand. It is the sole surviving member of a group that co-existed with early dinosaurs. Its closest relatives died out about 60 million years ago but the Tuatara manages to “hang on by a claw.”

In 1877, Sir Walter Buller, a naturalist who collected specimens for the British Museum, identified a new species of Tuatara. He named it Sphenodon guntheri after Dr. Albert Gunther, Curator, British Museum. In 1989, Prof. Charles Daugherty, discovered that there are two species of Tuatara: Sphenodon punctatus and Sphenodon guntheri. There are only about 400 adult Sphenodon guntheri left on Earth. There are around 50,000 Sphenodon punctatus alive today. Sphenodon diversum identified in 1885 by William Colenso, is an extinct species.

Tuatara was classified as lizard and misclassification continued until 1867, when Dr. Günther, proposed the Order Rhyncho-cephalia (“beak-head”) for the Tuatara and its fossil relatives. However, soon it became a “Wastebasket taxon” to dump all sorts of semi-understood animals. In 1925, Samuel Wendell Williston proposed Order Spheno-dontia (“wedge-tooth”) to include only Tuatara and their closest fossil relatives.

The nocturnal Tuatara resembles a large lizard. The name is derived from the Maori word meaning “peaks on the back”, which refers to the distinctive crest of spines it bears on its back. Its colour ranges from olive green to brown to orange-red. It has unique dentition, lacks external ears but has a ‘third eye’ covered by opaque scales. It has one of the slowest growth rates of any reptile. However, many live to be a hundred and more. It also has an excruciatingly slow reproduction rate. The female lays 6-10 eggs about 8-9 months after mating and the babies take between 11-16 months to hatch. A male Tuatara takes 70 years to fully mature but reaches sexual maturity about age 20. Henry, a captive male Tuatara, has recently become a father at the age of 111.

The New Zealand Department of Conservation has taken the initiative to help conserve the Tuatara. Hatchlings are protected till they can survive in the wild, a process called “head-starting.” They are then released on islands free of predators. Unfortunately, Tuatara gender balance and global warming are on a collision course because Tuatara eggs incubated at 21° C have an equal chance of being born either male or female, at 22° C, eighty percent are likely to be males; at 20° C, eighty percent are likely to be females; at 18° C, all are female.

A paradoxical finding is that the DNA of the living fossil is evolving swiftly. Researchers at the Allan Wilson Centre for Molecular Ecology and Evolution, New Zealand, studied DNA from 8,000-year-old Tuatara bones and compared it to living Tuatara DNA. David Lambert, Project Leader said, “What we found is that the Tuatara has the highest molecular evolutionary rate that anyone has measured.” This is not the only genetic surprise the Tuatara has sprung on scientists. Over the last five years, Charles Daugherty and his colleagues have undertaken an intensive study of the different Tuatara populations. The genetic tests revealed that Tuatara were not all the same. S. guntheri is considered a separate species. S. punctatus has three subspecies, of which one is the apparently extinct Little Barrier Island Tuatara, the second is named S. punctatus punctatus, and the last has no name yet. This finding will impact conservation efforts as Tuatara populations have been managed as if they consisted of only one species, and individual island-populations were not considered unique.

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