Eretmochelys imbricata (Hawksbill Turtle)

Family: Cheloniidae (Sea Turtles)
Order: Testudines (Turtles and Tortoises)
Class: Reptilia (Reptiles)

Fig. 1. Hawksbill turtle, *Eretmochelys imbricata.*

[http://animals.nationalgeographic.com/animals/reptiles/hawksbill-turtle/ 10th Nov 2011]

TRAITS. Sea turtles are among nature's most fascinating, and extraordinary creatures. They have been termed the world's greatest nomads, capable of navigating thousands of miles between nesting and feeding areas. *Eretmochelys imbricata* can be found throughout the tropical and subtropical coral reefs environment in the world (Van Dam & Diez, 1998). They have 5 key distinguishing features form other oceanic turtles. These are-their heads have 2 pairs of pre-frontal scales (i.e. scales in front of the eyes).Hawksbill's jaw isn't serrated, whereas the carapace is bone-like without ridges (Ernst et al., 1994). The carapace (shell) is elliptical with 4 large overlapping scutes (scales) present; there are also 4 lateral scutes as seen in Fig. 1. Generally the carapace is orange/brown or yellow. Their flippers have 2 claws on each of the forelimb, and the head has a hawk-like beak from which the common name is derived. *Eretmochelys imbricata* is a Latin name derived from the features of the turtle and translates to

the oar like flippers on a turtle with overlapping scales (Turtle Trax, 1999). These creatures exhibit sexual dimorphism with the male more colourful and shaped differently. The males are known by a more pronounced pigmentation, concave plastron with longer claws and a copious tail (Van Dam & Diez, 1998). Adults are 71-89 cm carapace length, and 101-154 lbs with males and females averaging the same.

ECOLOGY. *Eretmochelys imbricata* are not generally considered social animals although some have been recorded to congregate offshore. (Ernst et al., 1994) They are diurnal and highly migratory and can be found in coral reefs, sponge reefs, walls of coral reefs and other hard bottom oceanic environments (Meylan and Donnelly, 1999). Hawksbills have a broad ranging diet including: sponges, corallimorpharians, algae, zooanthids and small invertebrates (Bjorndal, 1997). They are omnivores that eat molluscs, fish, crustaceans with the preferred feeding ground being shallow shoals with brown algae.

SOCIAL ORGANIZATION. *Eretmochelys imbricata* unlike most birds and mammals do not form pair bonds or social groups and neither male nor female provide any care to the offspring besides nesting. The male's contribution is therefore limited to fertilization and genetic effects and this plays a more important role in mate choice and paternity distributions. The number of mates chosen by the female is determined by her decisions and her capacity to store sperm and this helps keep genetic diversity high in the population (Pope, 1939).

REPRODUCTIVE BEHAVIOUR. Beach Selection: There are several variables that influence nesting site selection by hawksbill including; beach morphology (beach slope, orientation) oceanographic conditions as well as micro scale variables like; humidity, pH, temperature of sand, grain size and compression of sand. Most turtles return faithfully to the same beach for nesting. They usually appear a few hundred yardS form where they previously nested and are thought to be guided by magnetic fields and the lunar phases (Ernst et al., 1994). Hawksbills prefer beaches with steep slopes and shaded areas.

Nesting Behaviour: The females' peak nesting season is from July-October. Nesting occurs mostly at night. The female emerges slowly from the ocean, frequently stopping to scope out her spot. A "false crawl " is where the female comes out of the ocean and then suddenly retreats; this can occur due to disturbances such as artificial lighting or human disturbances (New York States Department of Environmental Conservation,2003). *Ertmochelys imbricata* nest 3-6 times per season and deposit an average of 160 soft shelled eggs in a nest at 15-21 day intervals. They nest at intervals of 2-4 years and like some reptiles show temperature dependent sex development with warmer temperatures giving rise to more females.

Constructing the nest: Females select a dry area of the shore and initiate the construction of a "body pit" (Fig. 2) by excavating with her flippers and rotating her body (Pope,1939). This lasts approximately 35 minutes. At that juncture the turtle makes an egg cavity using the cupped hind flippers as shovels. The tear drop shaped egg chamber is partially tilted as seen in Fig. 3.

FORAGING BEHAVIOUR. *Ertmochelys imbricata* are omnivores that usually sppotted in hard bottomed reef environments containing Porifera. In general hawksbills are found in depths no deeper than 60 feet (Blumenthal et al. 2009). The juveniles enter a pelagic phase like other marine reptiles and feed on the grass beds. After attaining a size of 35 inches they switch habitats

to coral reef beds where they have a varied omnivore diet consisting of algae, jelly fish and anemones.

SEXUAL BEHAVIOUR. Courtship and mating transpires during a narrow receptive time before the nesting season. Males do not come ashore once they have left their natal beach. The courtship procedure involves the nuzzling of the female by nibbling the behind her head and hindmost flippers. The males climbs onto the female's back by gripping her shell and then the tail elongates and folds under the females shell to copulate as shown in Fig. 4. Copulation normally initiates in shallow water near the coast can last up to 1-3 hours. Sometimes several males compete for a female (Blumenthal et al 2009).

ANTIPREDATOR BEHAVIOUR. The hard nature of the hawksbill shell protects against predation. Their most common predators are sharks, pelagic fishes and possibly crocodiles. The greatest threat to these creatures that have been listed critically endangered by the IUCN is man-made anthropogenic effects such as harvesting for shells and capture in fishing nets (Meylan & Donnelly, 1999). Predator evasion is enabled through diving ability. There is a positive correlation between body size and dive duration, with larger turtles having more depth and duration capacity. The post-hatchling turtles occupy the pelagic environment taking shelter in floating algal mats to avoid predation (Musick and Limpus, 1997). To protect eggs nesting females dig a deep egg-cavity 40-50 cm. Depth disrupts prey detection and consumption: deeper eggs less easily detected since there is a decrease in the strength of olfactory cues. Another advantage of concealing the eggs in the sand is the decrease in predation peril minus the need of constant safeguarding.

JUVENILE BEHAVIOUR. Hawksbill turtles use different habitats based on their stages of their life cycle. Eggs take an average 60 days to hatch with the hatchlings weighing approximately 24 grams. The hatchlings emerge from the nest in large numbers as shown in Fig. 5 and instinctively enter the sea based on lunar reflections and phases (Van Dam & Diez, 1998). These post hatchlings occupy the pelagic environment. The juveniles cannot dive in deep waters and can be found in a large group that offers protection, feeding on the surface. The hatchlings live in buoyant oceanic vegetation such as *Sargassum* (Musick and Limpus, 1997). Hawksbill reach maturity after 30-35 years, sexual maturity and development of gametes is determined by individual genetics and diet quality/quantity (Bjorndal, 1997).

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Posted online: 2011

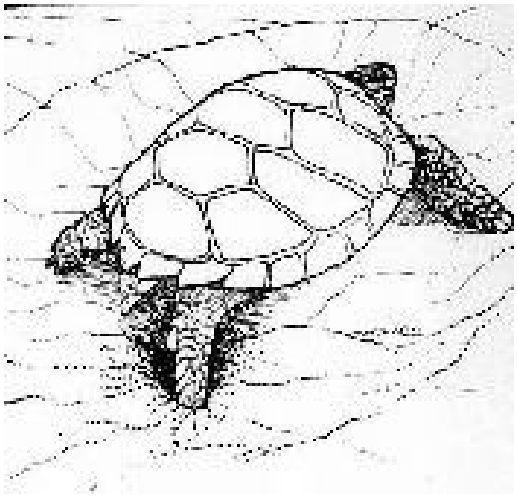

Fig. 2. Body pit and nest construction of *Ertmochelys imbricata.*

[Sea Turtles Restoration Project. Electronic Publication Accessed 10 November 2011 <http//www.seaturtles.org/article.phpid=1248>]

Fig. 3. Tear-drop shape of nest containing a clutch of 160 eggs.

[http://www.dec.state.ny.us/website/dfwmr/wildlife/endspec/athafs.html, downloaded 10 November 2011]

Fig. 4. Mating of hawksbill turtles. The male climbs atop the female.

[Sea Turtles Restoration Project. Electronic Publication Accessed 10 November 2011 <http//www.seaturtles.org/article.phpid=1248>]

Fig. 5. Hawksbill hatchlings as they make their way to the ocean.
[http://www.dec.state.ny.us/website/dfwmr/wildlife/endspec/athafs.html-Accessed 10th Nov 2011]