UN environment
United Nations Environment Programme

Mediterranean Action Plan
Barcelona Convention

The Mediterranean Biodiversity Centre
SPA / RAC

TYRE COAST NATURE RESERVE
محمية شاطئ صور الطبيعية

Republic of Lebanon
Ministry of Environment

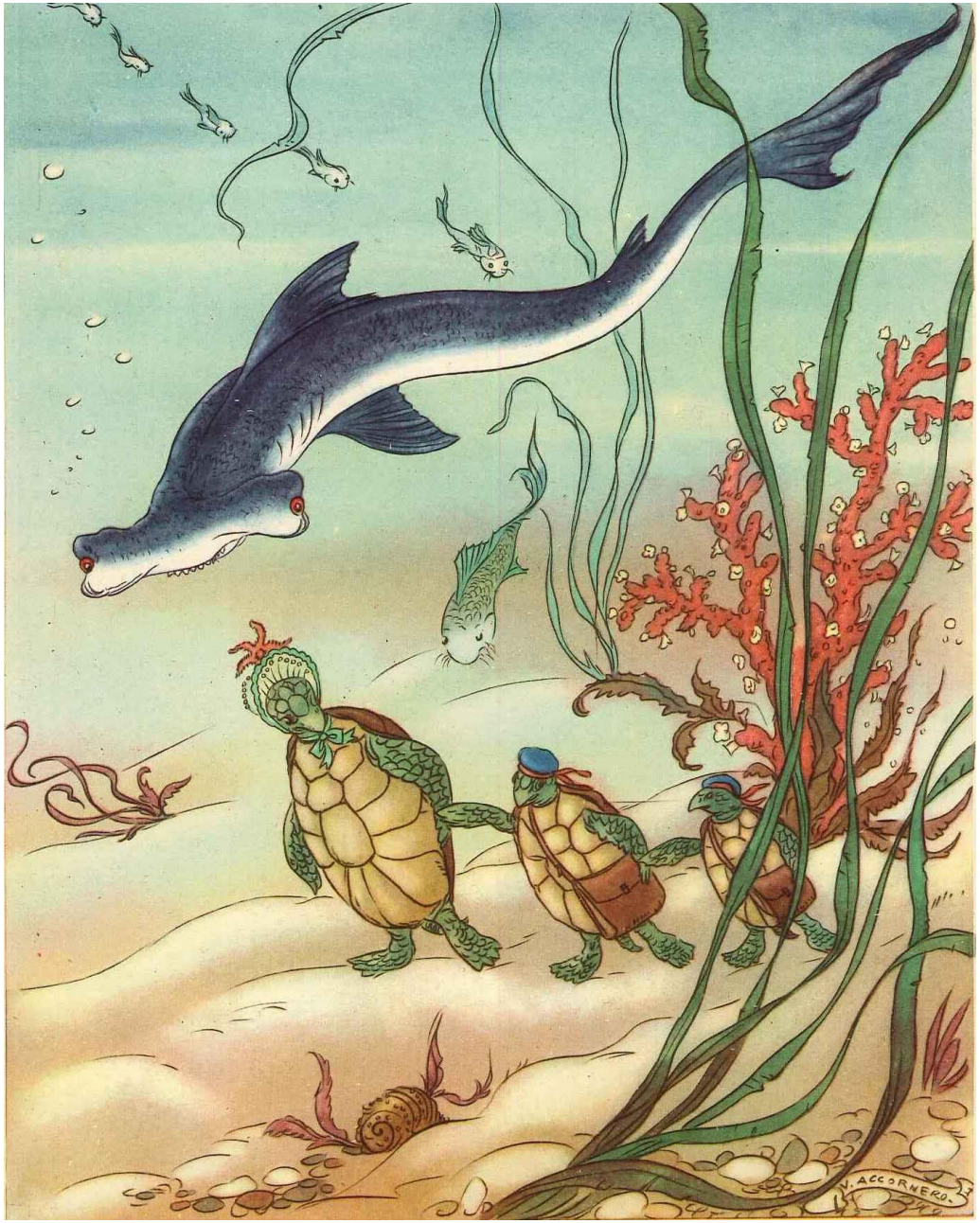
National Training Session on monitoring techniques of marine turtles

Tyre Nature Coast reserve (Lebanon) , 3-7 July 2018

Reproduction and nest biology

National training workshop on monitoring techniques of marine turtles

Tyr (Lebanon),3-7 July 2018



Sexual maturity

The age at which turtles mature varies from place to place, probably as a result of growth rate

Estimate maturity for Green :
27-33 years (70 cm CCL)

Estimate maturity for Loggerhead :
13-30 years (60 cm CCL)

Turtles are solitary animals except in the mating season…

Mating

Mating takes place in shallow waters, often in areas not adjacent to the nesting beaches, but few Kilometers away

Mating can be tranquil or violent. The male may bit the female to submit her as he attempts to climb on top of her

Time of nesting

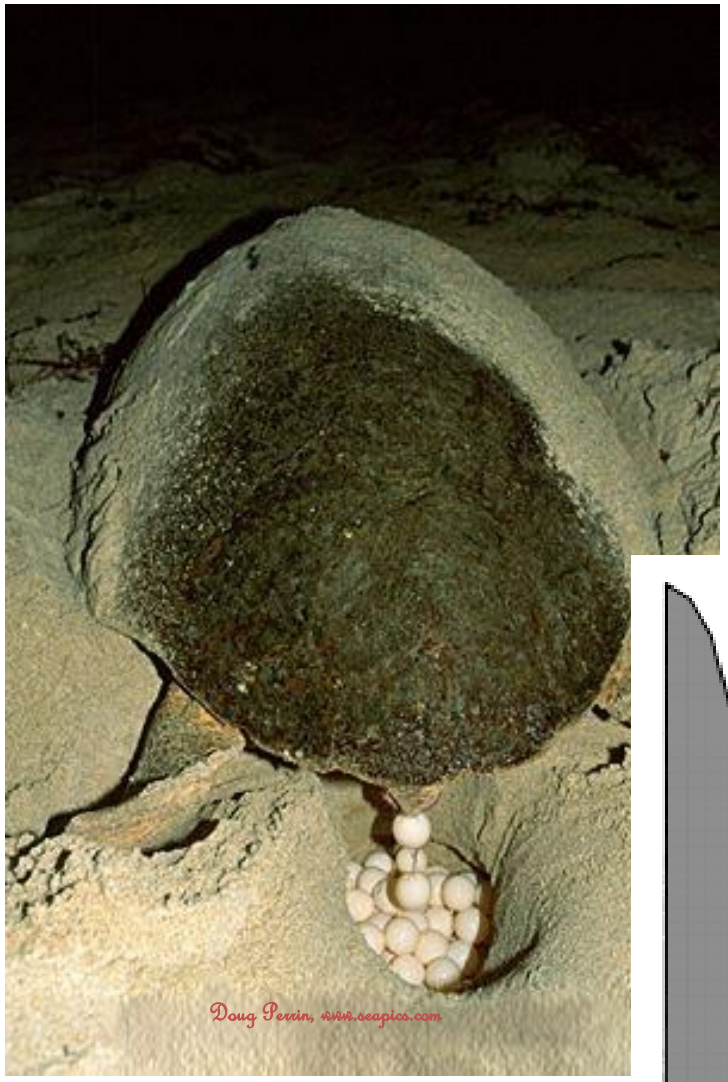
Most sea turtles nest at night usually after 10 p.m.

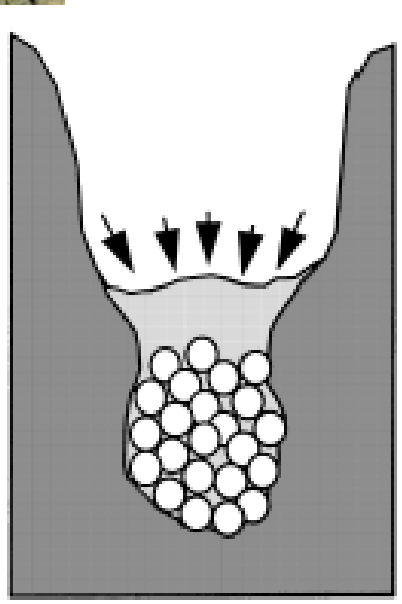
Nest at night reduce the possibility of lethal overheating and the risk of daytime predators

Nesting periodicity and nesting season

- Nesting usually takes place every 14 days (half lunar cycle) but variations are frequent and turtle may lay in period varying from 10-18 days.
- Loggerheads start laying at the end of May or at beginning of June and usually finish laying by the end of August. Occasional nesting in early September has been noted.
- Green Turtles usually start about two weeks later and finish by the end of August, though sparse nesting has again been noted even in early September.
- The beginning of nesting season may be affected by weather conditions and may vary widely from year to year. Prolonged winter conditions can delay nesting.

Eggs and Clutch Size



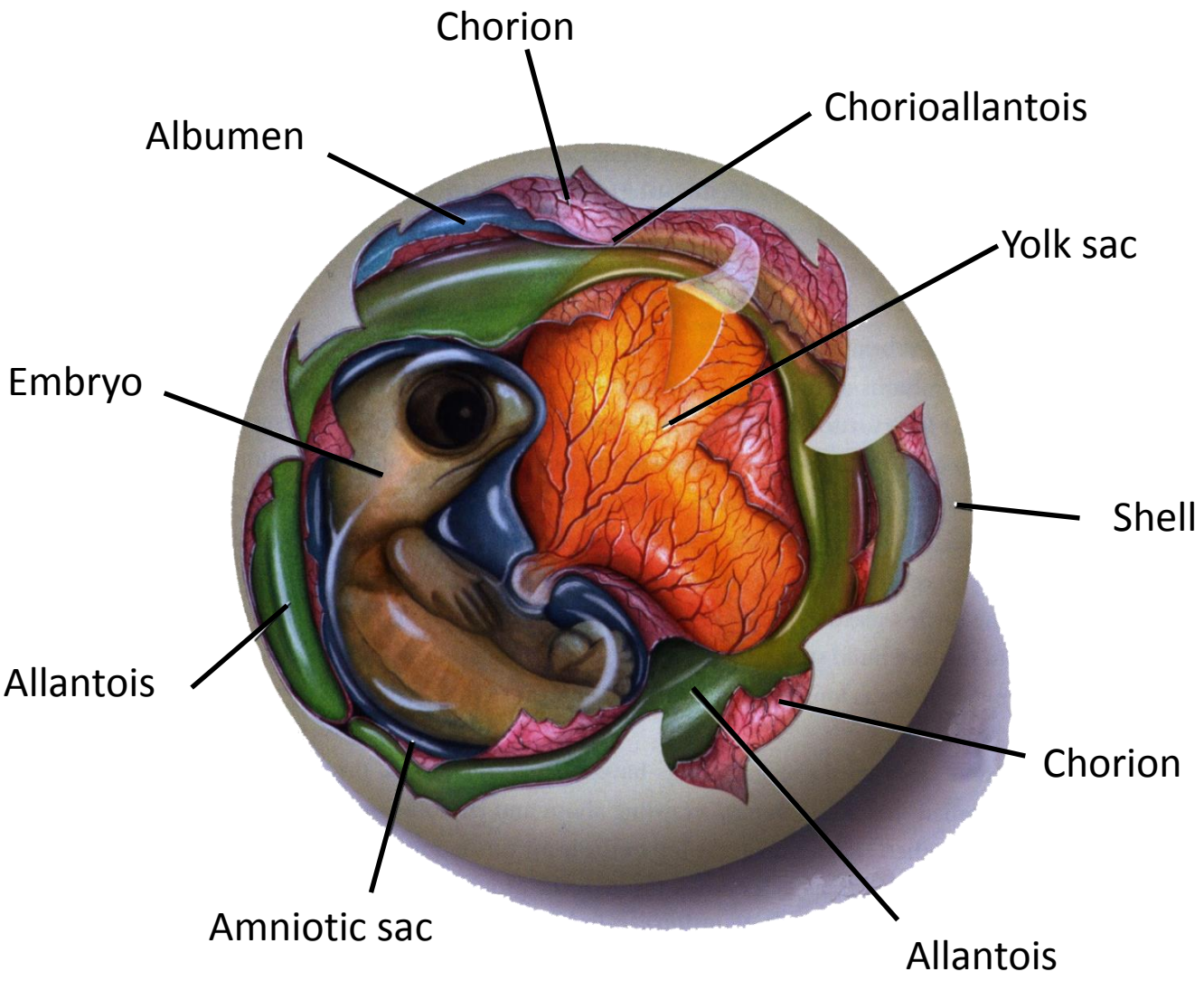


The eggs are white, spherical and soft-shelled.
In general are about the size of ping-pong balls

Odd-shaped eggs may be extra- large multi yolked or very small compared to the other eggs in the clutch.
Very small eggs are commonly termed “yolkness” eggs.

Yolkness or deformated eggs are found regularly in small number

Sea Turtle embryo



The sea turtle egg includes 1) pliable shell 2) capsule of albumen 3) yolk. The vitelline membrane that supports the embryonic disc encases the yolk

Eggs

Yolkness eggs

Eggs

Yolkness or deformates eggs

Eggs

Two to three-day old egg

Freshly –lay eggs have a «translucent» Soft shell.
The eggshell of fertilised eggs start turning white on top

Loggerhead eggs average 38,4 mm and 30 gm in weight

Green turtle eggs average 41.5 mm and 38 gm in weight

Eggs

One week old egg.

The white patch grows and its size is a good Indicator of the age of the egg during the first few days

In about ten to twelve days, the whole egg is white

Infertile eggs remain transucent

Eggs

Denting of eggs often occurs, even in undisturbed nest and is the result of Water losses due to evaporation

Usually it is the top eggs that get dented especially in shallow Loggerheads nests.

Such denting is apparently normal and it has little effect on the embryos.

Egg nearing hatchling, the shell is «crumbly» and is dented

Clutch size

A clutch is definited as the number of eggs laid into the nest excluding yolkness eggs
The yolkness eggs should be counted separately
Multi yolked eggs should be counted as part of clutch

Eggs and Clutch Size

TABLE 3.3
Reproductive Characteristics of Marine Turtles: Nesting Period and Sizes of Eggs and Hatchlings

Species	Clutch count (# of eggs)	Egg weight (g)	Egg diameter (mm)	Egg volume (cc)	Hatchling weight (g)
Dermochelys coriacea	81.5 (3.6) 12	75.9 (4.2) 4	53.4 (0.5) 9	79.7 (2.4) 9	44.4 (4.16) 5
Chelonia mydas	112.8 (3.7) 24	46.1 (1.6) 10	44.9 (0.7) 17	45.8 (1.2) 17	24.6 (0.91) 11
Natator depressus	52.8 (0.9) 6	51.4 (0.4) 3	51.5 (0.3) 6	70.8 (1.1) 6	39.3 (2.42) 3
Lepidochelys kempi	110.0 (—) 1	30.0 (—) 1	38.9 (—) 1	30.8 (—) 1	17.3 (—) 1
Lepidochelys olivacea	109.9 (1.8) 11	35.7 (—) 1	39.3 (0.4) 6	31.8 (1.1) 6	17 (—) 1
Eretmochelys imbricata	130.0 (6.8) 17	26.6 (0.9) 5	37.8 (0.5) 1	28.7 (1.3) 11	14.8 (0.61) 5
Caretta caretta	112.4 (2.2) 19	32.7 (2.8) 7	40.9 (0.4) 14	36.2 (1.1) 14	19.9 (0.68) 7

Values are means of means of populations (standard deviation), number of populations included.

Based on data from Hirth,[2] Miller,[29] and Van Buskirk and Crowder.[5]

Miller J.D., 1997

In the Mediterranean the average is :

Loggerhead 80-100 eggs

Green Turtle 120 eggs

Incubation takes about seven weeks but may vary from 44-60 days or more, varying with the incubation temperature (which varies with latitude, date of laying, the nature of beach, etc)

Incubation temperature determines the sex of the embryo

The sex of the embryo is determined at about the third week of incubation

High temperatures of about 31°-32°C or more result in the production of females

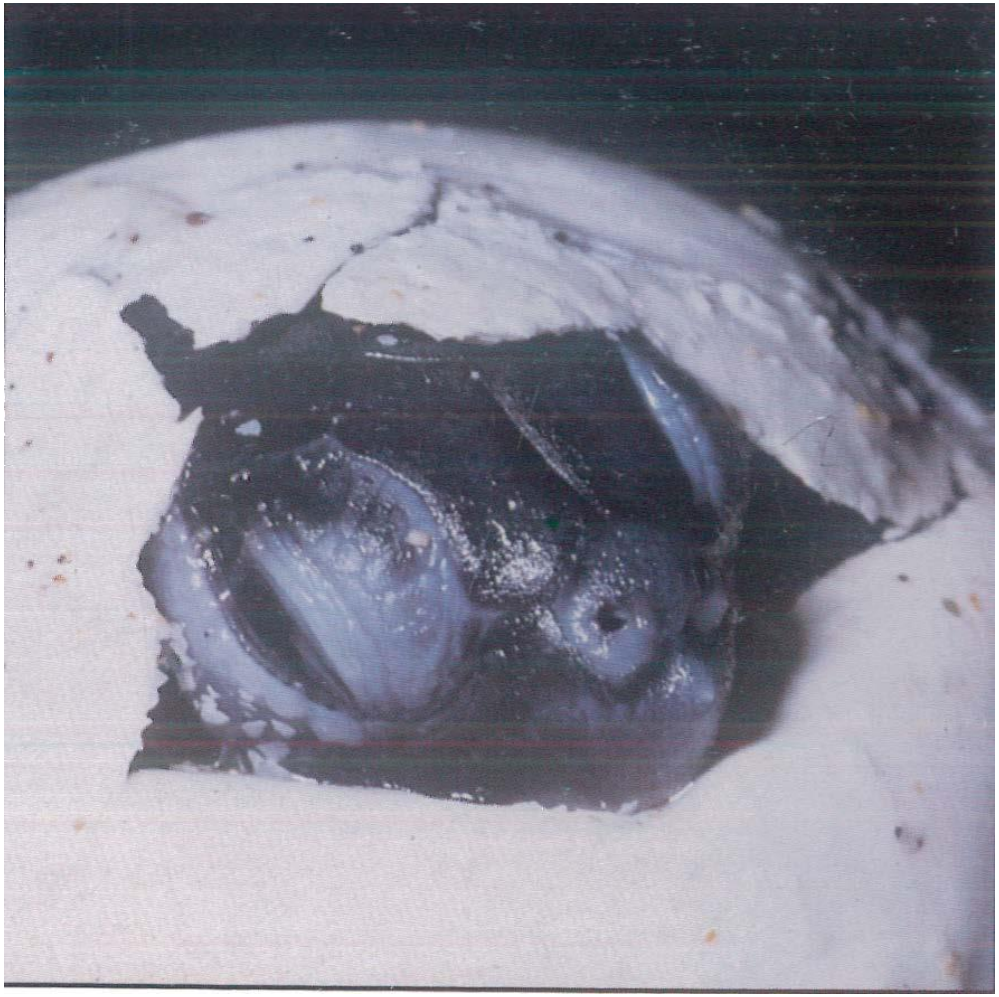
Low temperatures of less than 28°C result in the production of males

For Green turtles the «pivotal» temperature is between 28.75°C and 29,75°C

For Loggerheads 30°C

The «pivotal» temperature apparently varies somewhat on a global scale

Hatchilings Emerging



A few days before hatching the Eggshell becomes brittle

The hatchling breaks through the shell with a protuberance On its snout; this is lost soon After hatching

Green turtle hatchling Pipping stage

Hatchling Emerging

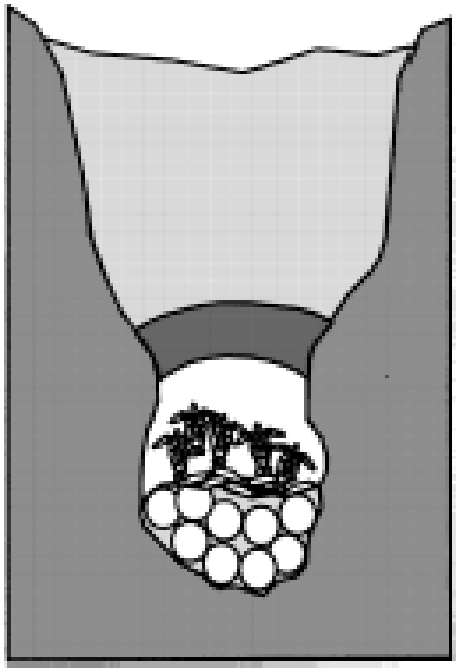
The hatchlings emerge from the nest 2-4 days after hatching

Not all the eggs hatch at the same time and hatching time can vary by one to two days

It takes the hatchling about one to three days to get out of the egg from the moment of breaking the eggshell (pipping)

The hatchlings usually emerge in batches (usually one or two batches per day) over 2-3 days

Emerging takes place usually in the night



Hatchlings Emerging

The hatchlings rise from the chamber in a Batch forming a cone , their bodies nearly vertical helping each other to rise the surface

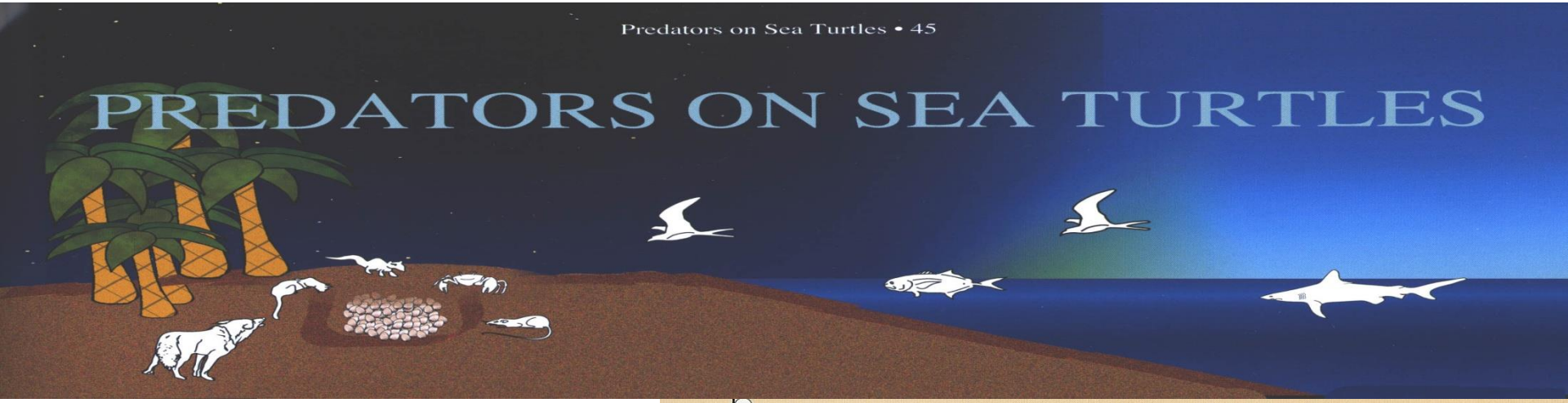
The breaking of the shells releases the internal liquids, this creates more space for hatchlings

If on the second night, after the first emergence, no sizeable batch of Hatchling emerges, then the nests should be dug up

Straggiers or hatchlings trapped in eggsshells are frequent

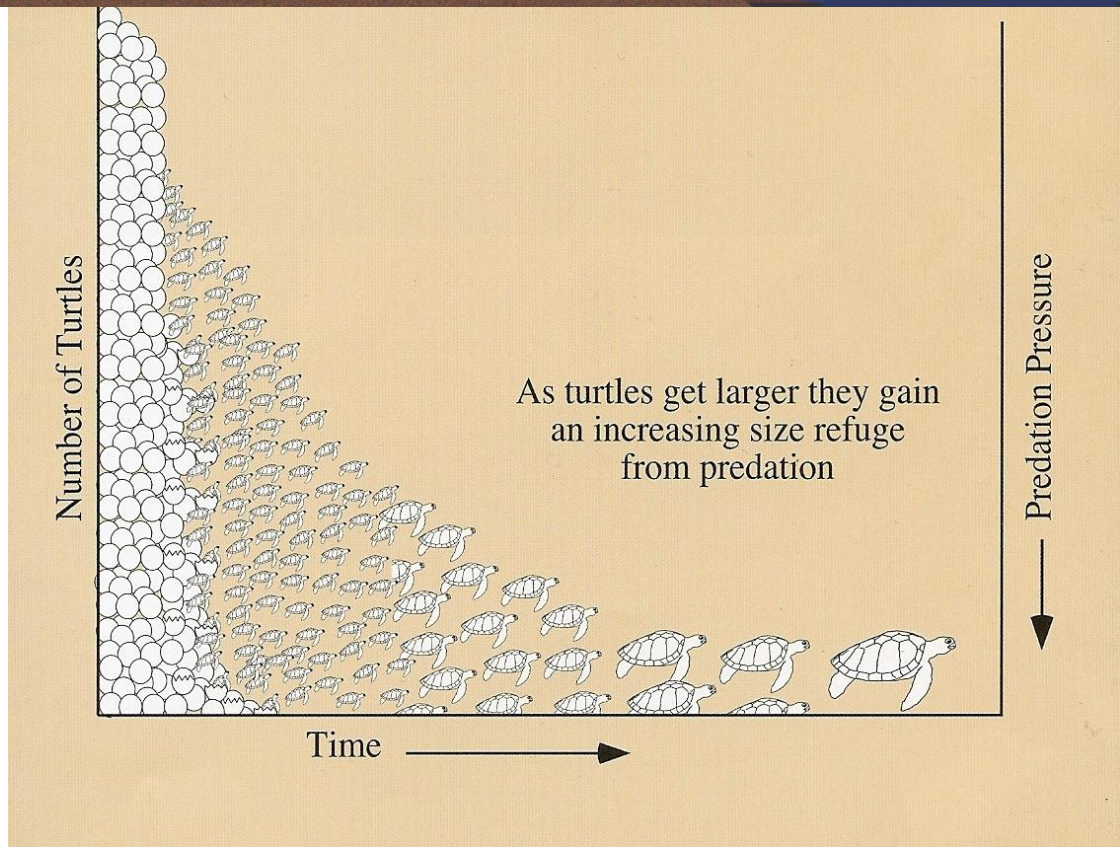
Hatchlings emerge usually at night after 10.pm though earlier night-emergences have been recorded. Hatchlings may sometimes emerge during the day, though this is probably a sign of humane disturbance

PREDATION



In areas where there is not human interference predation on turtle eggs and hatchlings is usually the main factor limiting the number of hatchlings that reache the sea

The Predation Pressure is very high for the eggs and the hatchlings



Predation on eggs and hatchlings

in the Mediterranean the main predator is the fox

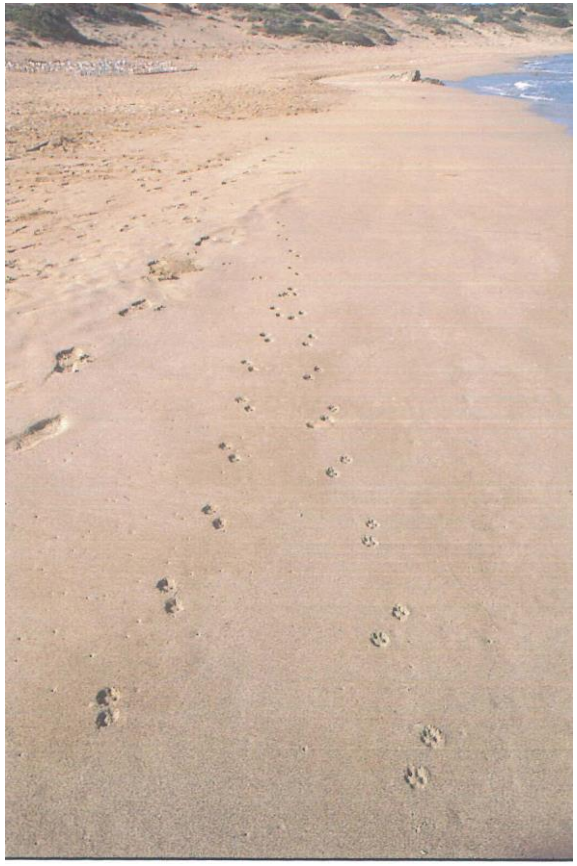
Predation on Eggs and Hatchlings

Fox predation on nest

Shallow nests are more easily detected by animals with a keen sense of smell

The main danger period are soon after laying , when smells are fresh and when the hatchlings emerge from the nest

Predation on eggs and Hatchlings



Foxes frequently patrol nesting beaches during The nesting and hatching season and will follow the tracks of hatchilings back to nest

Foxes are territorial and one fox can be to cover at least1 km of beach each

Predation on Eggs and Hatchlings

Predation on Eggs and Hatchlings

Ocypode cursor

Ghost crabs can catch hatchlings both on the beach and in surf zone

Occasionally ghost crab will burrow into a nest causing damage to the eggs

Night Patrol

«*arribadas*» of *Lepidochelys olivacea*

In walking It is recommended to follow the surf-line while looking for tracks . Emerging turtles leave tracks that start from the shoreline of that night.

A single fresh track means that the turtle is on the beach, two tracks may mean that the turtle has left the beach, or that there are two turtles on the beach ,etc.

Night Patrol

If turtles are disturbed before they start nesting they will quickly return to the sea

Movements on the beach will also disturb turtles that can look for another place

Night Patrol

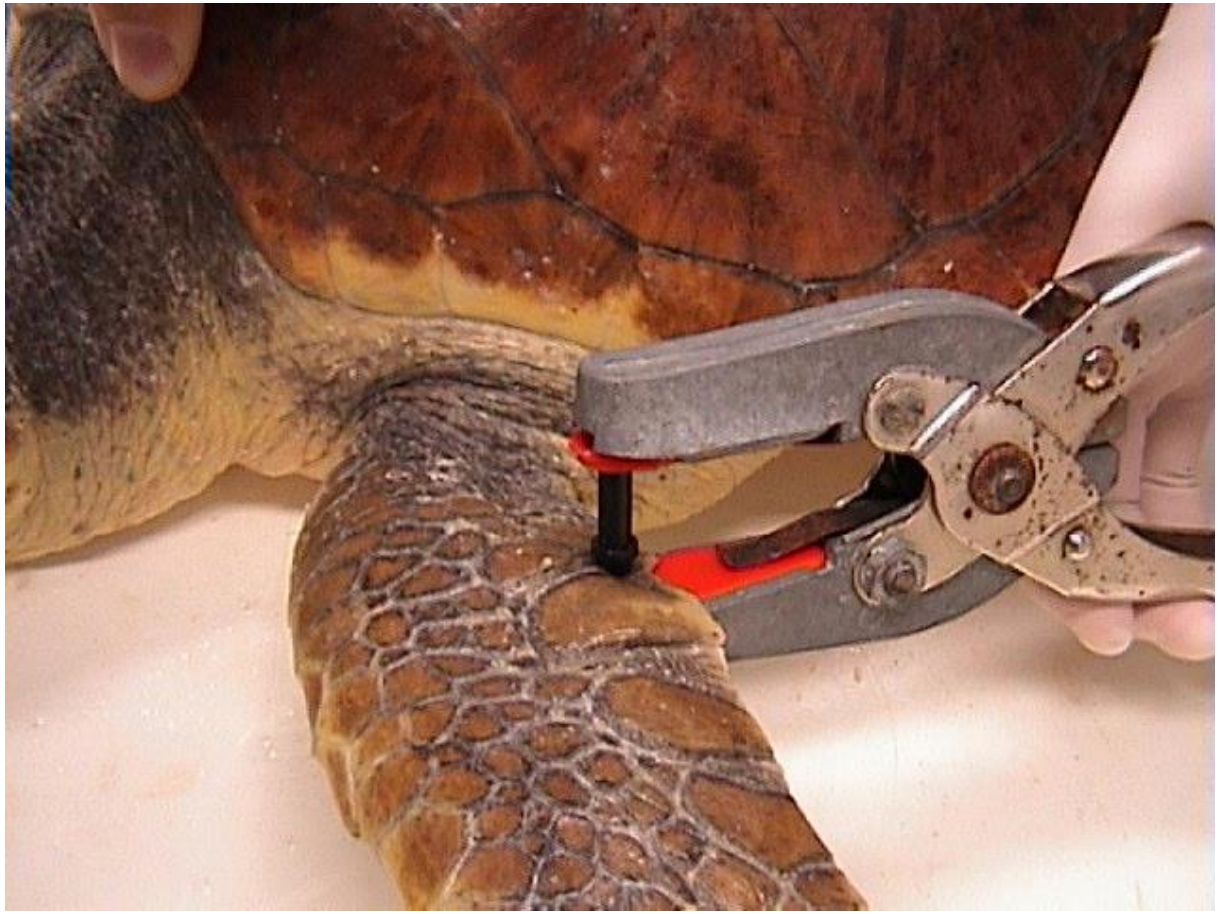
Dermochelys liuto

Following the track to find a Turtle you Must stay behind her

To avoid disturbing the Turtle it is safer To crawl on all fours

Avoid wearing black or white clothes that can be detected by the turtle

Night Patrol



Tagging should be undertaken just after the turtle has finished layed and has covered the eggs

Night Patrol

Equipment needed: wallet, tape measure, pen, notebook a narrow-beam torch (red filter)
Tagging –guns, tags

Night Patrol

A large torch may be used

Large torch may be used near the ground to detect tracks .
But large torch should be used only when necessary.

Appendix I
[SAMPLE] Nesting Beach Ground Survey

Daily Report Form

Date of Survey _____ Beach Name _____

Observer(s) _____

Time Start _____ AM PM Time End _____ AM PM

Beach Zone or LAT/LONG	Species 1 (e.g., *Caretta)*		Species 2 (e.g., *Chelonia)*		Species 3 (e.g., *Dermochelys)*	
	#Nests	#False Crawls	# Nests	#False Crawls	#Nests	#False Crawls
A						
B						
C						
D						
E						
F						
G						
etc/						
Total						

Comments