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

Practical of Sea Turtles necropsy

External and internal examination
definition of mortality causes

External Examen

- Examine the turtle externally from head to tail: Plastron, Carapace, and Skin for any abnormalities or damage.
- Species, size, and sex, (if mature) should be noted. Foreign material, anomalies, and healed or fresh wounds should be described including their locations. Tumors are common in some species, especially green turtles, and should also be described by size, color, texture and location.

Examine the turtle externally from head to tail

head

Plastron

Carapace

Fracture to the head

Body condition

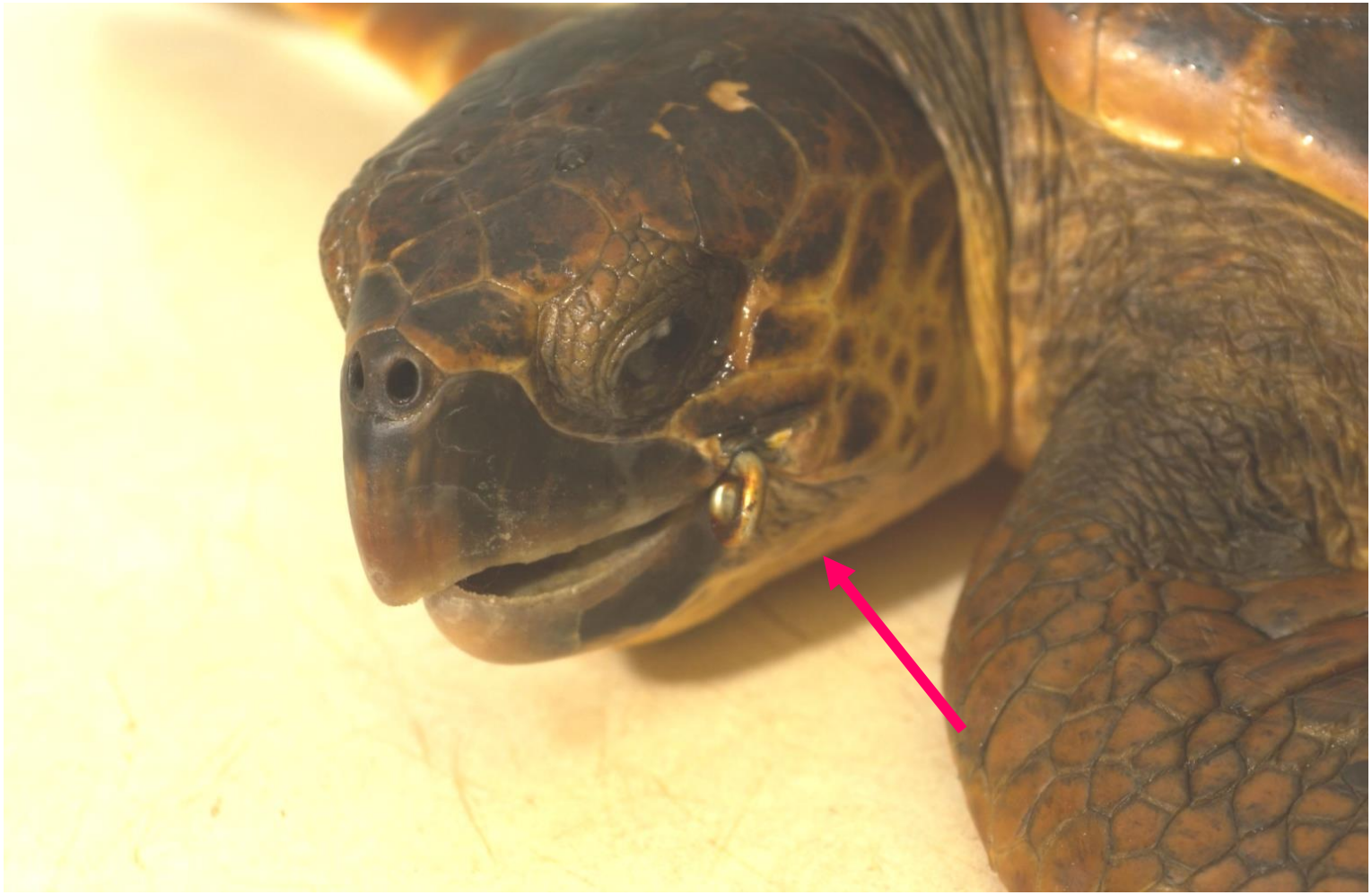
In emaciated turtles the plastron is dished in and concave

The occipital bone is prominent

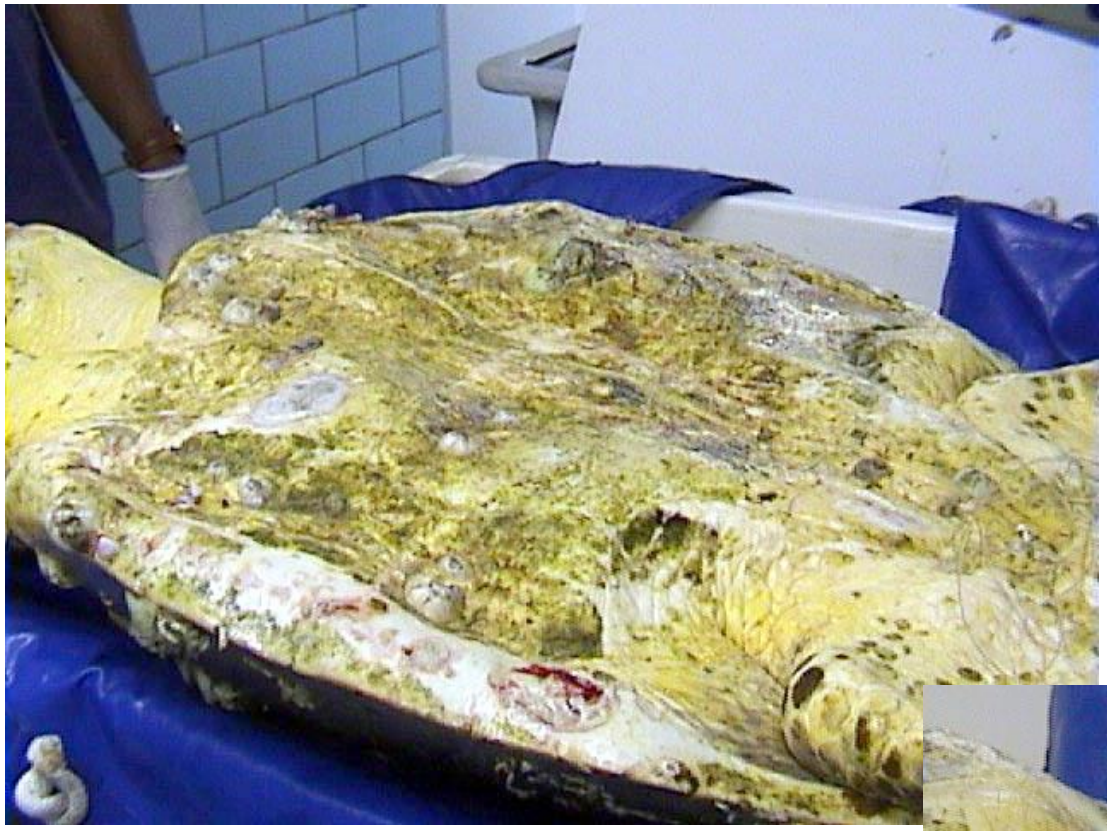
Mouth

The mucous membranes in the mouth should be homogenous.

Fishing hook stuck in the Mouth



Note any ulcers, plaques, hooks, fishing line, blood, spots in the oral cavity
Also note the presence of algae in the mouth and collect samples



Is there anything protruding out of Cloaca?

Fishing line which emerges from the cloaca

The line has crossed the whole body by preventing the turtle to feed

Are the flipper intact?

Damage from fishing line

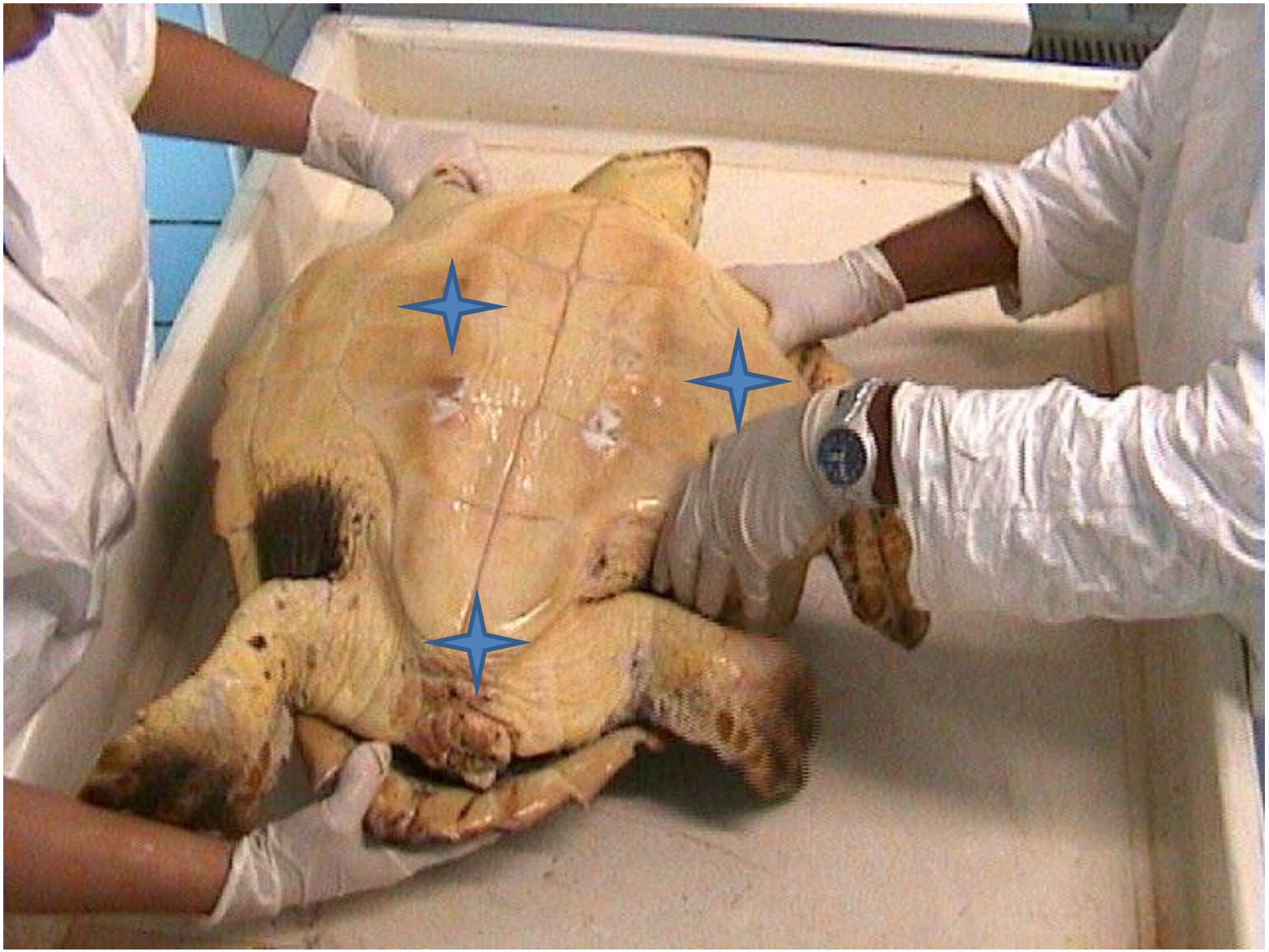
Measurements in centimeters

(CCL) Curved Carapace length

Measurements

(CCW) Curved Carapace width

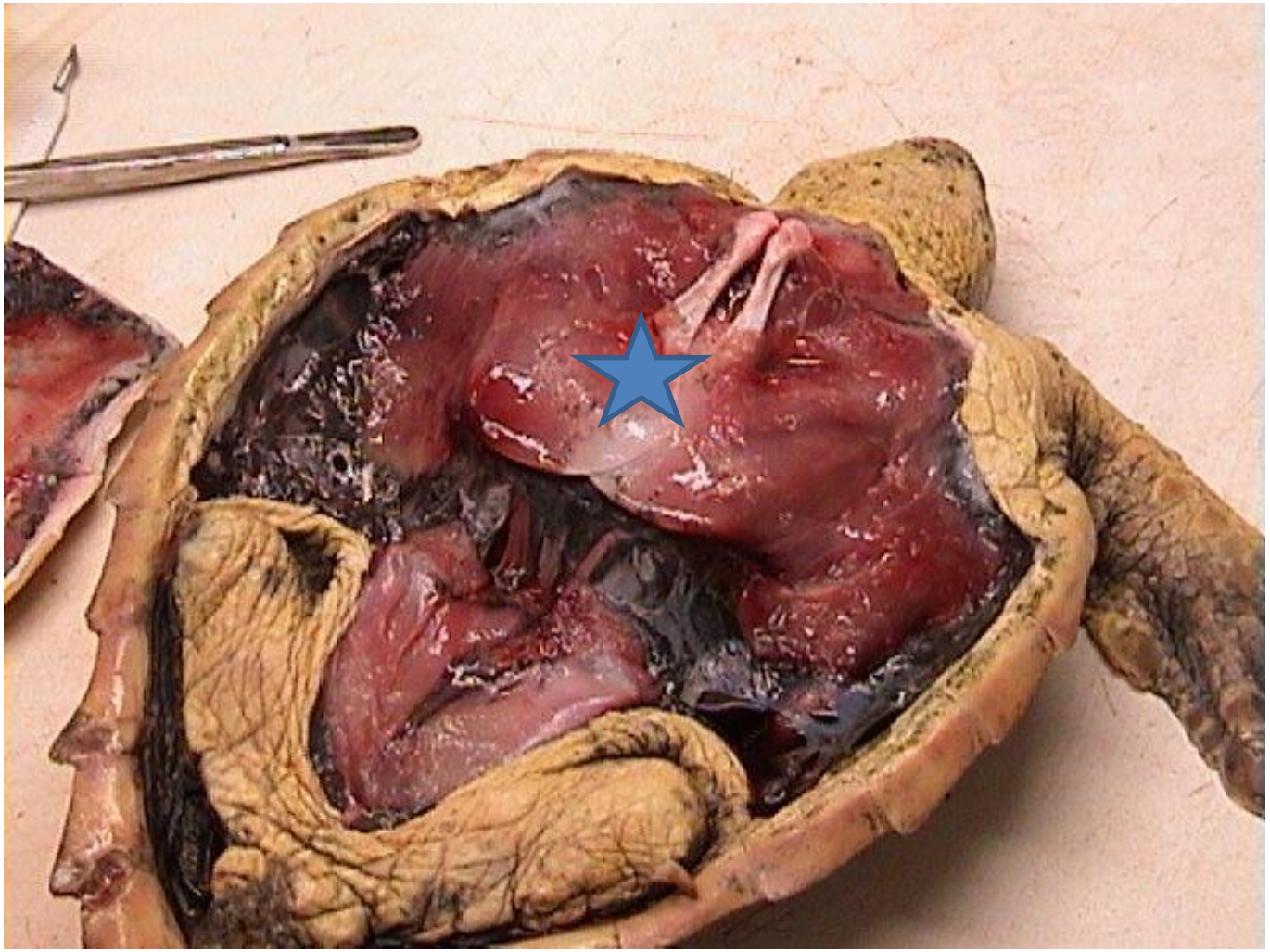
Sea turtle placed on its back to remove plastron



Clavicles and Pelvis areas

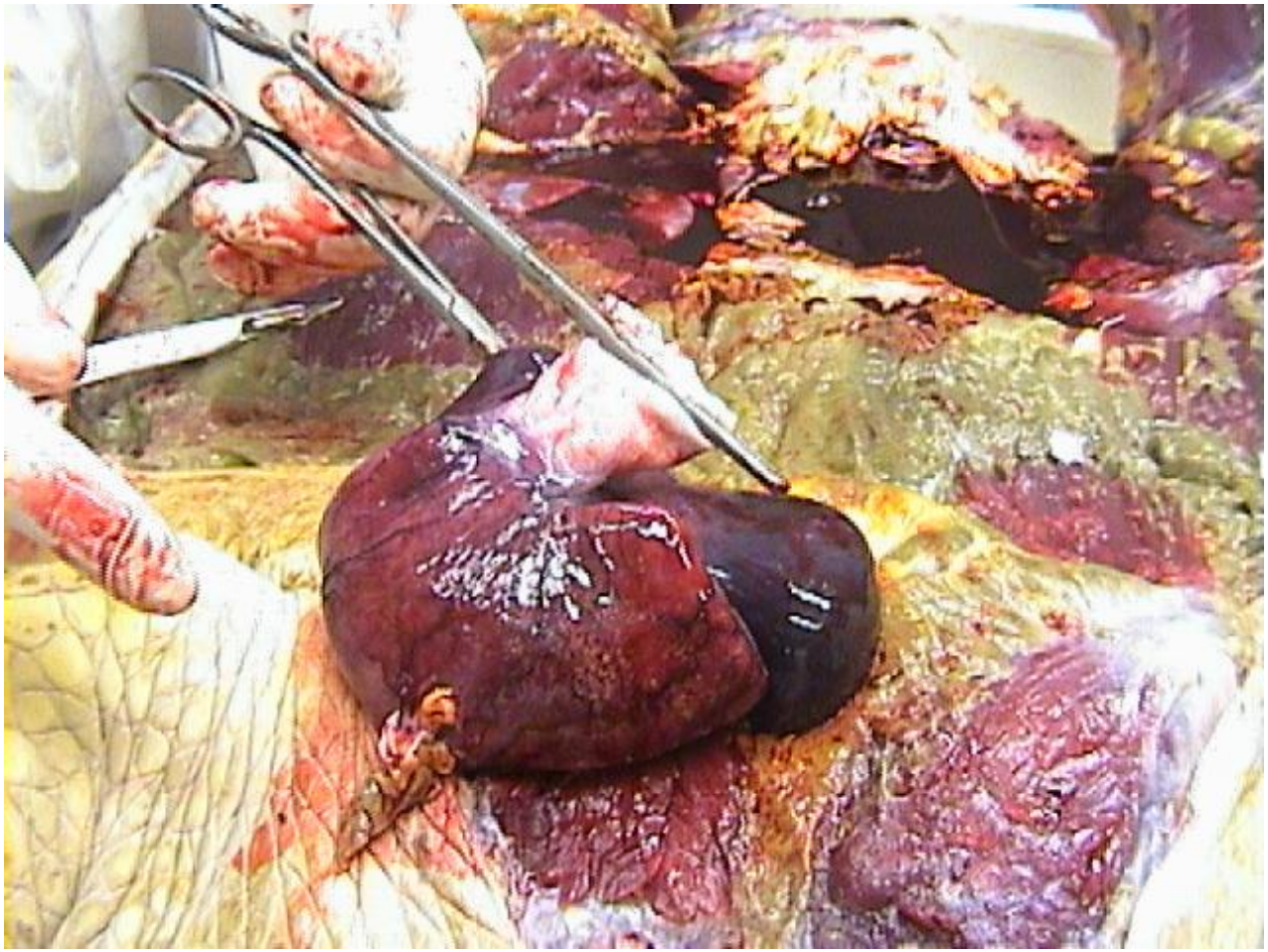
The first step necropsy is to remove the plastron

The plastron removed highlights the pectoral muscles



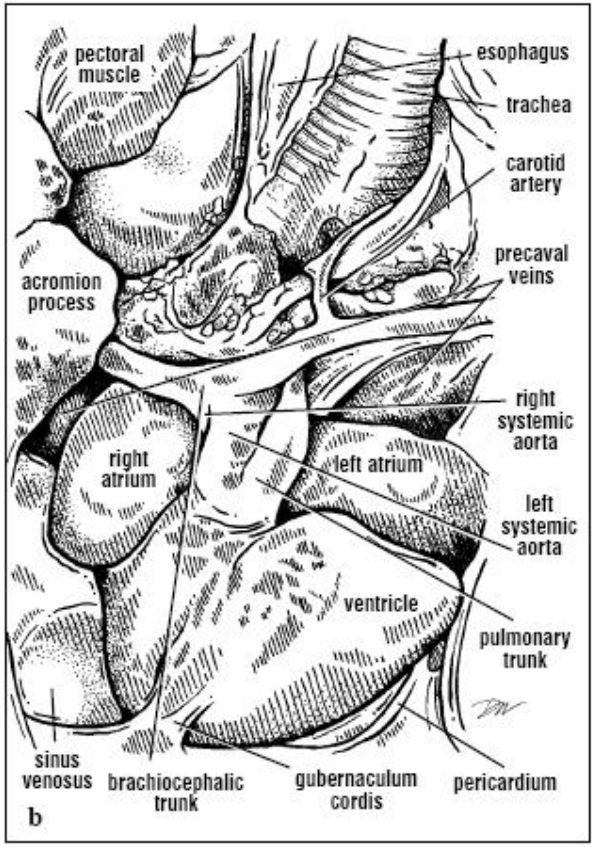
Attachement to clavicles

After removing pectoral muscles and *pericardium* you can see the heart



Heart and its great vessels

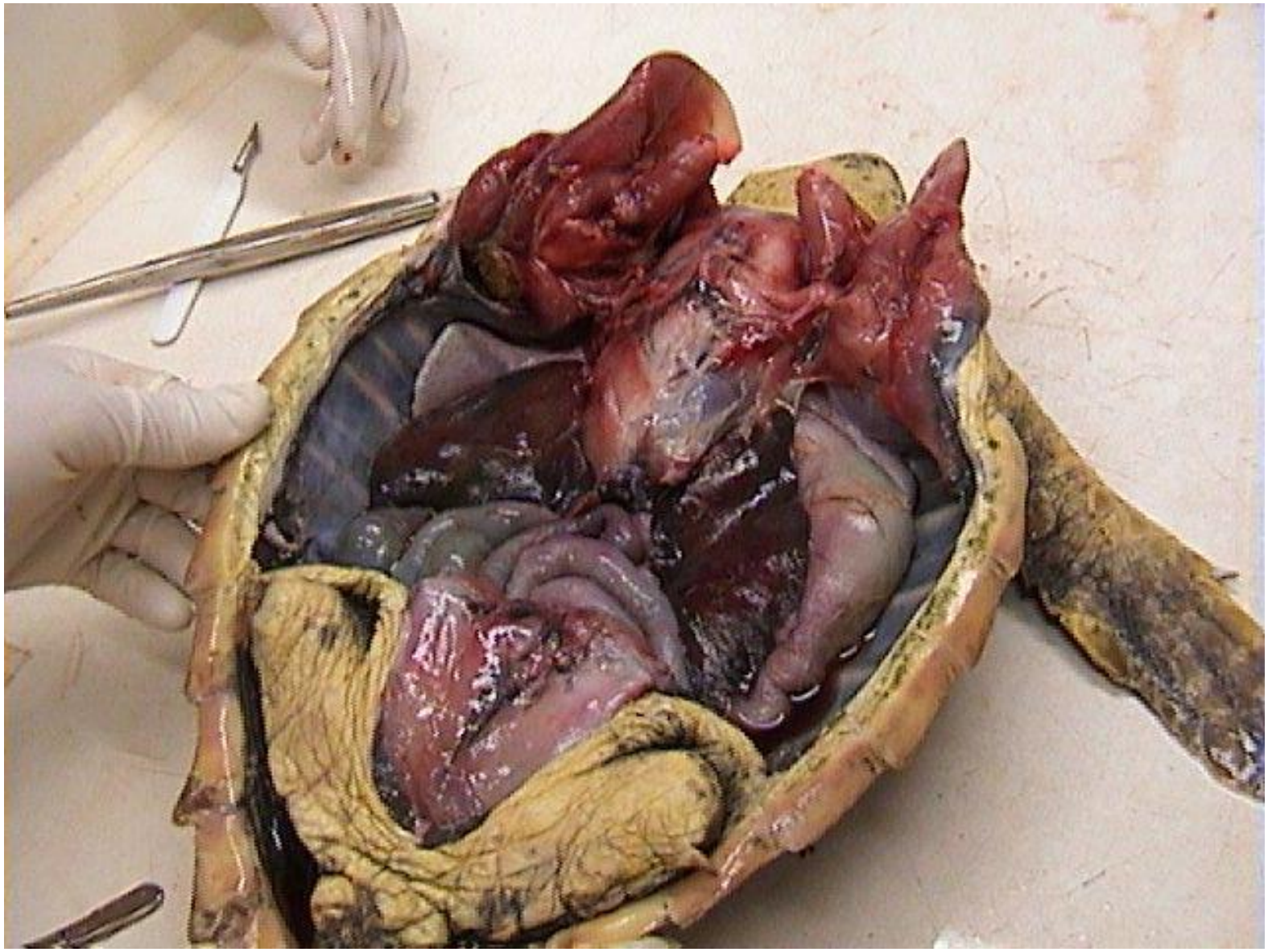
Brachiocefalic trunk,
Pulmonary Trunk,
Right Aorta
Left Aorta
Right Atria,
Left Atria,
Ventricle



Figs. 129a and 129b. *The four chambers of the heart can be identified in this ventral view. The ventral pericardium has been trimmed away to show both the heart and its great vessels. The apex of the ventricle is anchored to the pericardium and peritoneum posteriorly. The venous drainage from the anterior body to the precaval veins can just be seen lateral and anterior to the left atrium.*

Abnormalities: tumors pale spots, rouhg sandpaper like surface , semiliquid fat

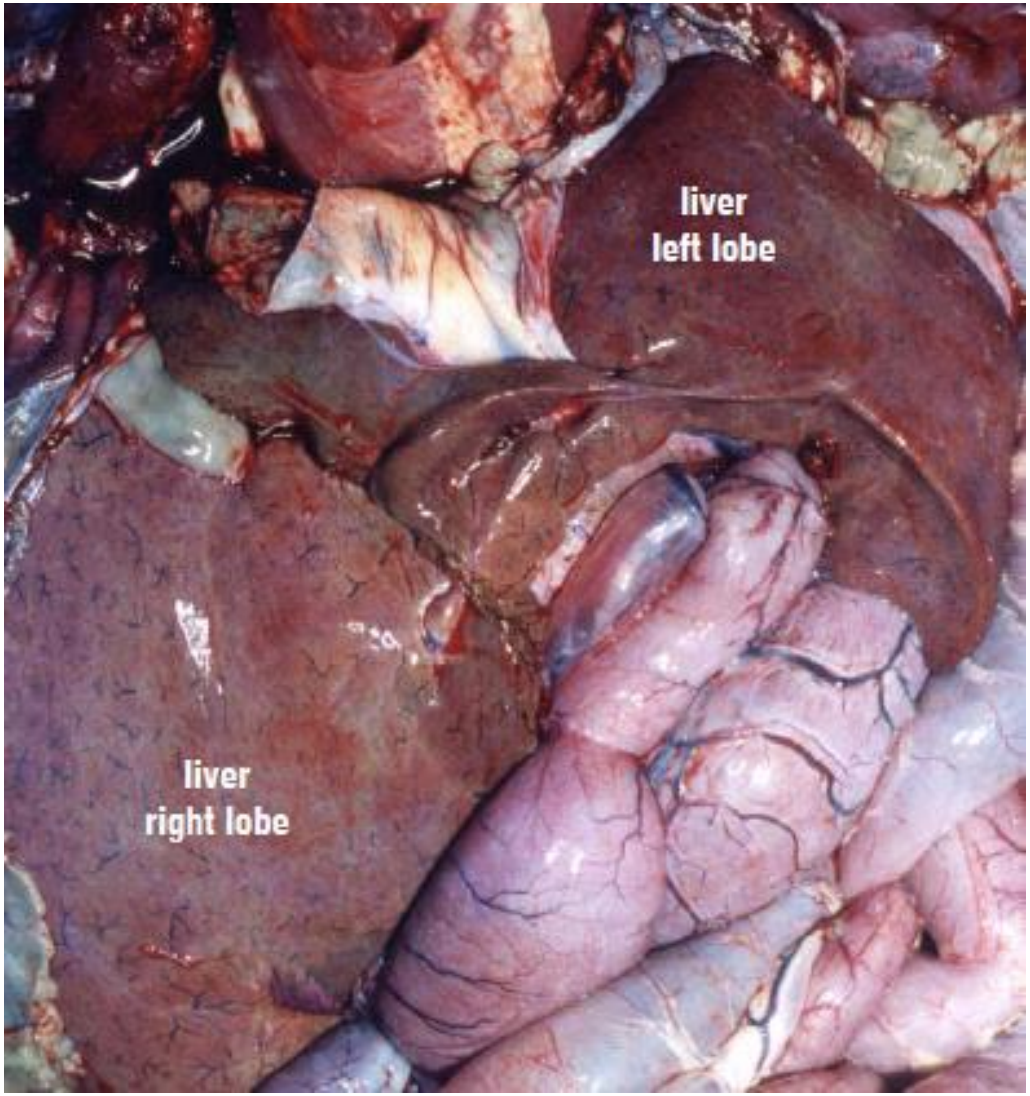
Visceral cavity



Liver

Is the largest visceral organ.
It is dark brown to reddish brown and composed of two lobes joined by one or more connected strips of hepatic tissues.
The liver play a major role in carbohydrate and protein metabolism as well as in removal of toxins from the blood

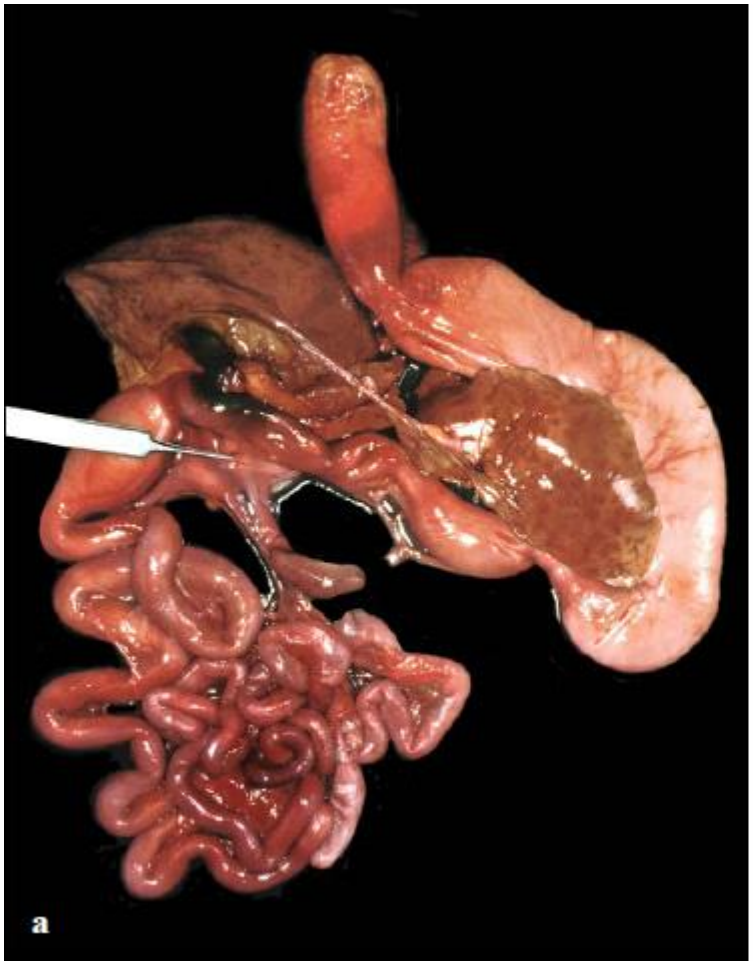
The right lobe houses the Gallbladder on its ventral surface .
The gallbladder stores bile

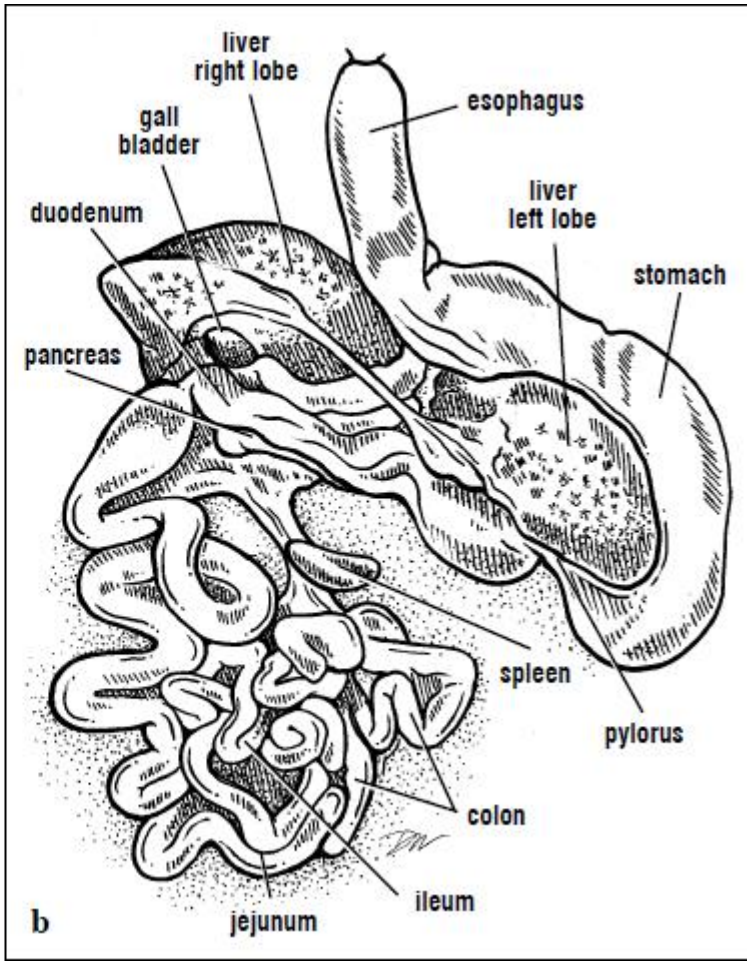


Abnormalities: tumors, nodules, rough exterior,discoloration in the form of spots or pale areas

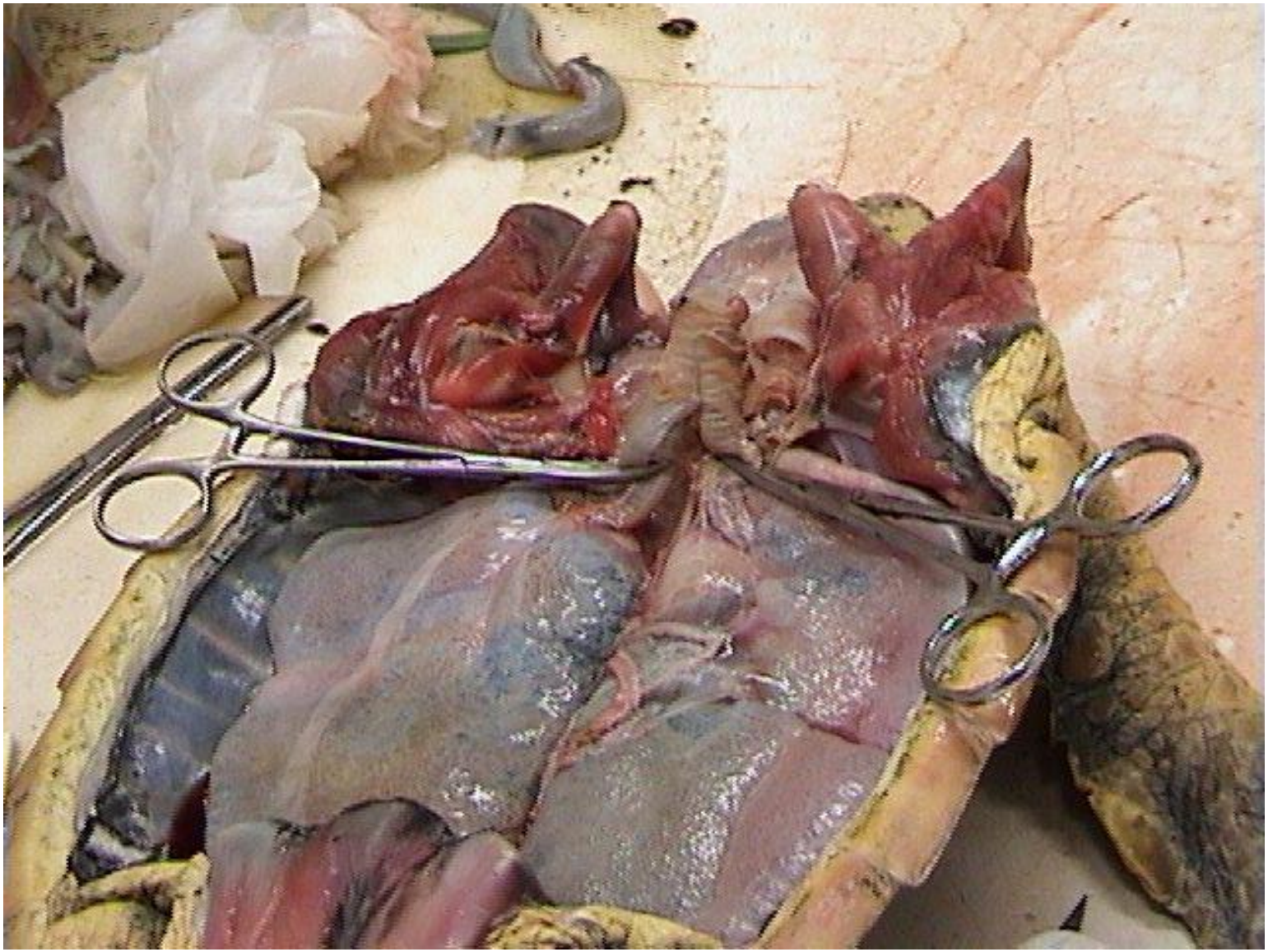
Gastrointestinal tract (GI)

GI tract extends from the mouth to the cloaca





Lungs



Abnormalities: tumors, large areas of discoloration, dense consistency, blood

Urogenital system

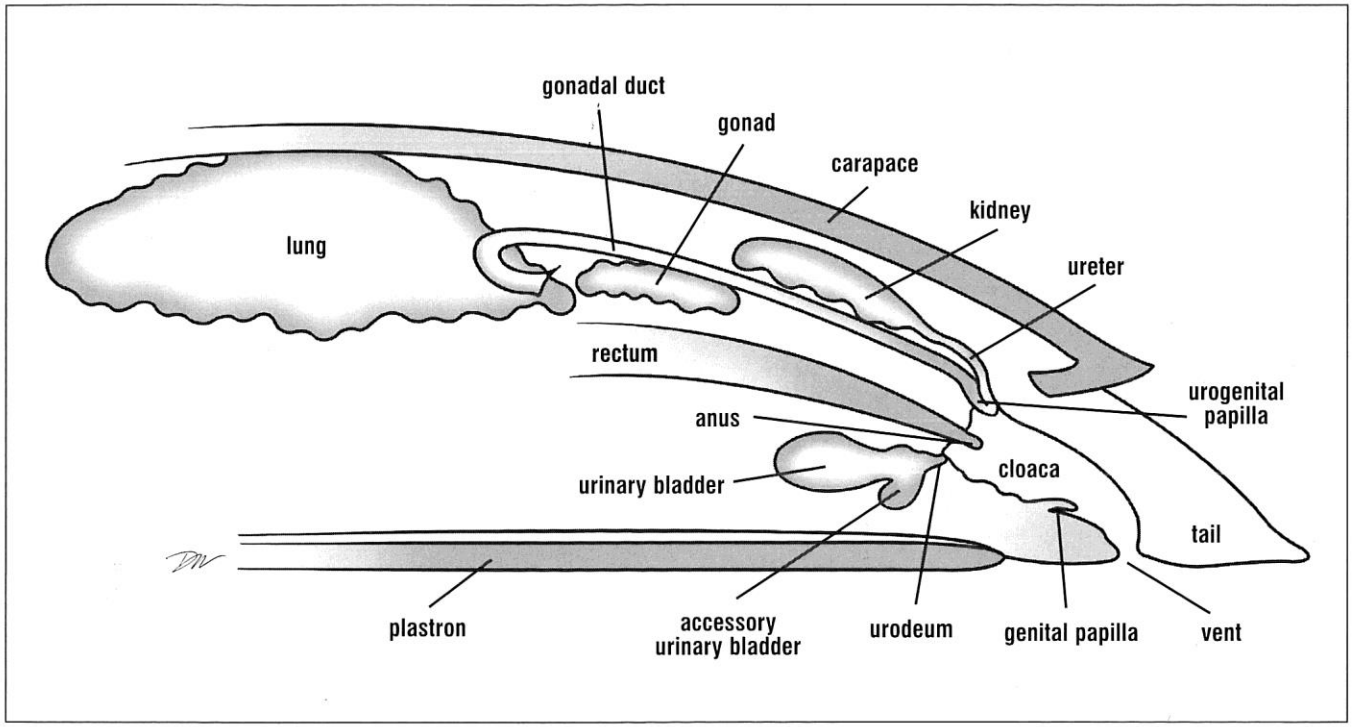
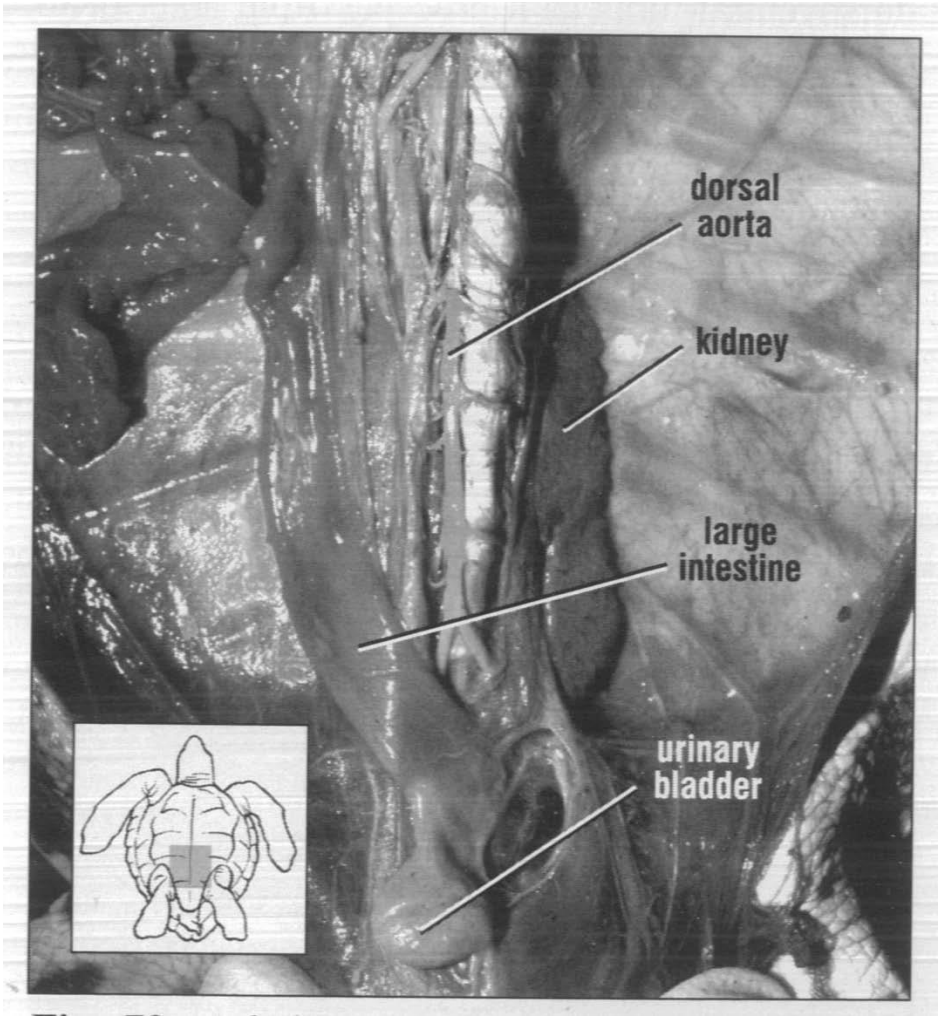


Fig. 219. *Diagram of the Urogenital System. The relative positions of the kidneys, gonads (undifferentieted for diagrammatic purposes), accessory ducts, urinary bladder, rectum and cloaca are shown. Anterior is to the left.*

The relative positions of the kidneys, gonads, accessory ducts , urinary bladder ,rectum and cloaca

The Urinary bladder is seen on the midline, as is collapsed large intestine to one side

Kidneys are hidden under the carapace just behind the lungs and pelvis

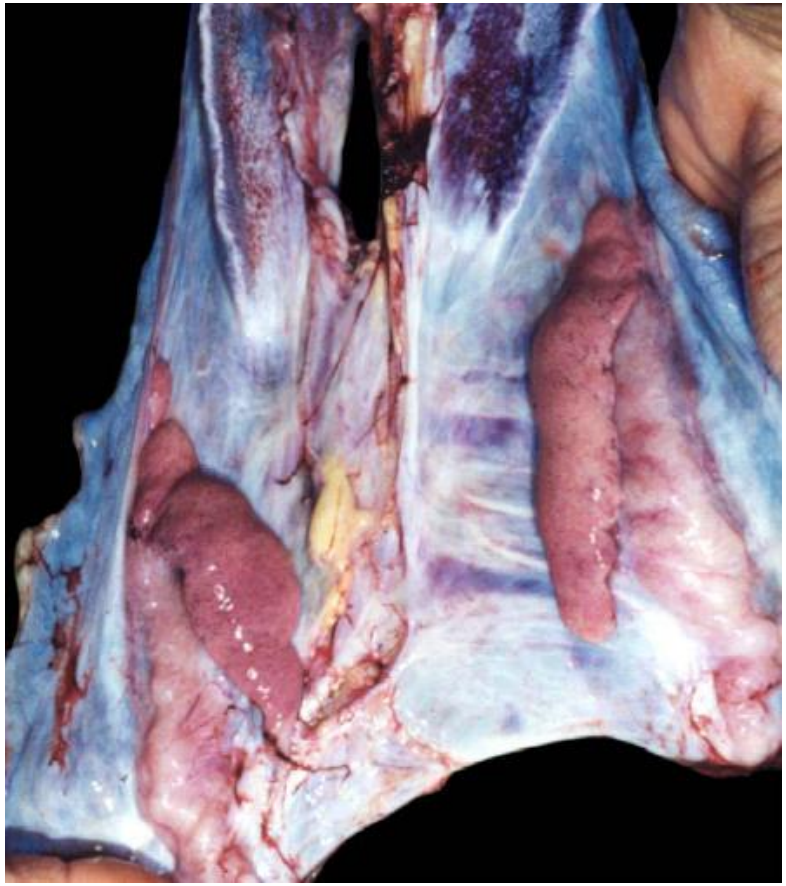


Urogenital System

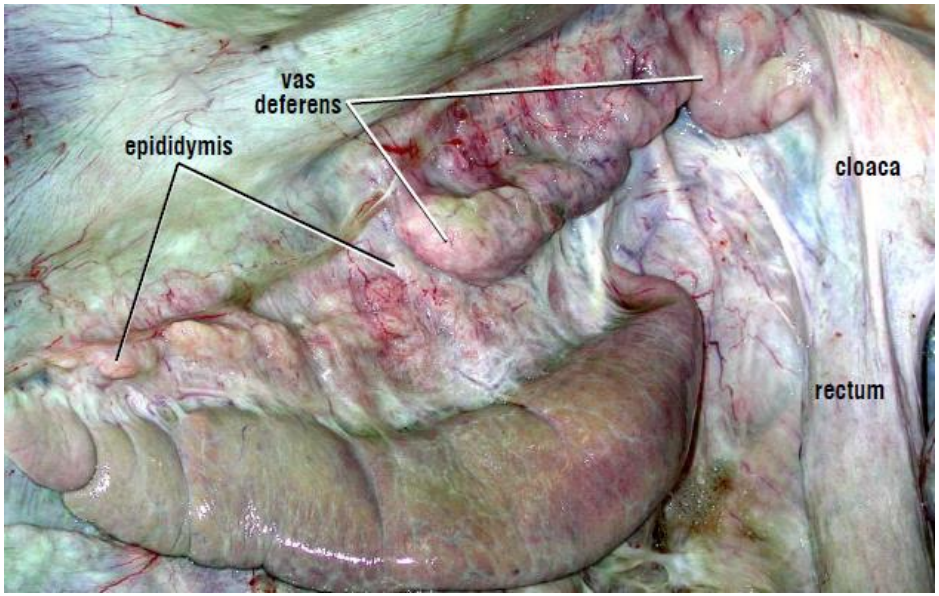
The gonads are located dorsally in the body cavity, posterior to the lungs , and ventral to the kidney

Male gonads

Testes Immature green turtles



Testes mature green turtles

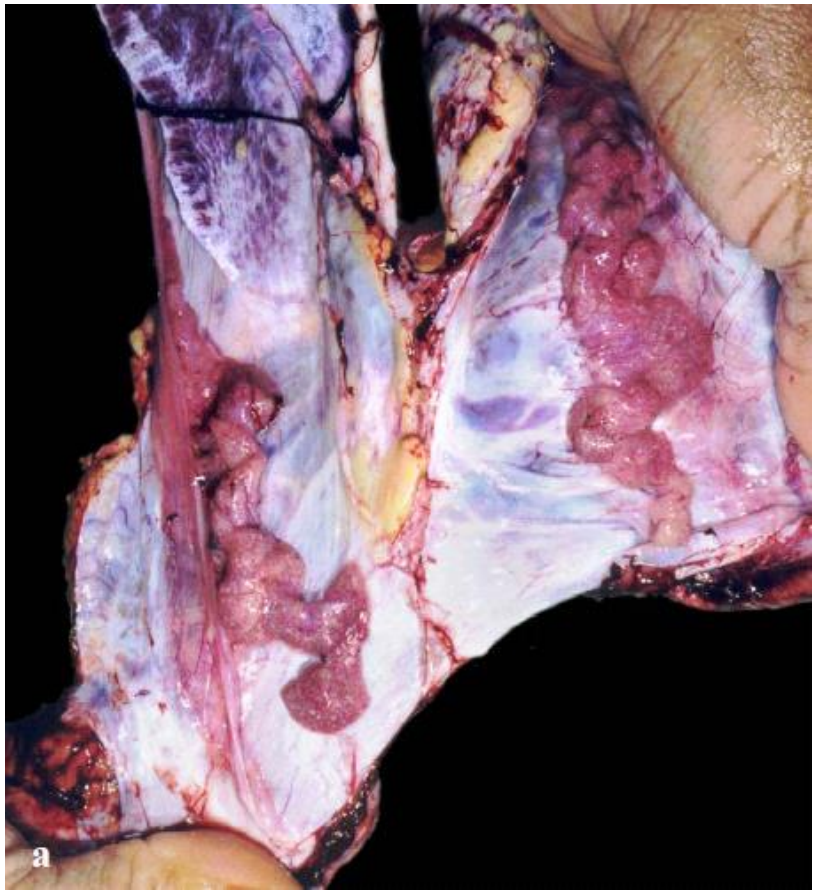


The surface of the testis is smooth

Urogenital System

Female gonads

Ovary Immature green turtle



Ovary mature green turtles

The surface of the ovary is granular

Turtle Necropsy data Sheet

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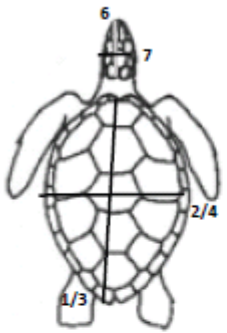
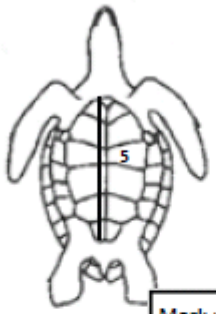
Turtle Necropsy Data Sheet Pag.1

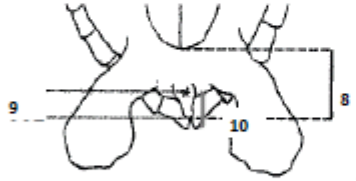
Date necropsied_____ Data Collected_____

Id Turtle_____ Compiler_____





1.CCLst_____	2.CCWst_____	3.SCIst_____
4.SCWst_____	5.SPL_____	6.HL_____
7.HW_____	Mb_____	
8. PTL_____	9.CTL_____	10.CCL_____



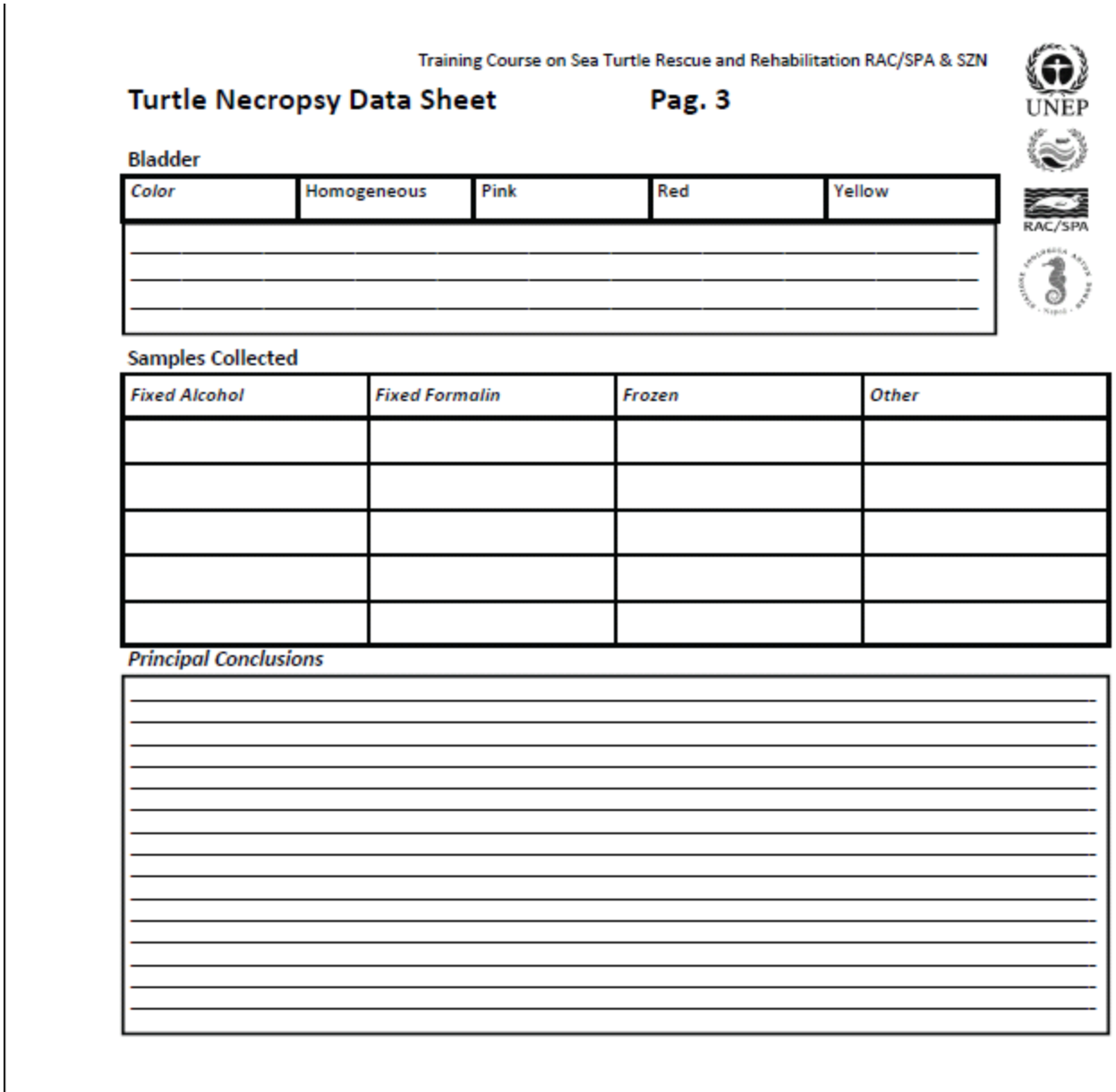
Mark wounds or abnormalities on diagrams on the left and describe below. (Note tar or oil, gear or debris entanglement, propeller damage, etc.)

External Exam (skin, carapace, eyes, nostrils, cloaca)

Musculoskeletal

Pectoral muscle atrophy	None	Moderate	Severe
Fat	Firm	Soft	Jelly-like
Body Cavity	Lots of fluid	Small amount of fluid	No fluid

Turtle necropsy data sheet



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Turtle Necropsy Data Sheet **Pag. 3**

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RAC/SPA

Bladder

Color	Homogeneous	Pink	Red	Yellow

Samples Collected

Fixed Alcohol	*Fixed Formalin*	*Frozen*	*Other*

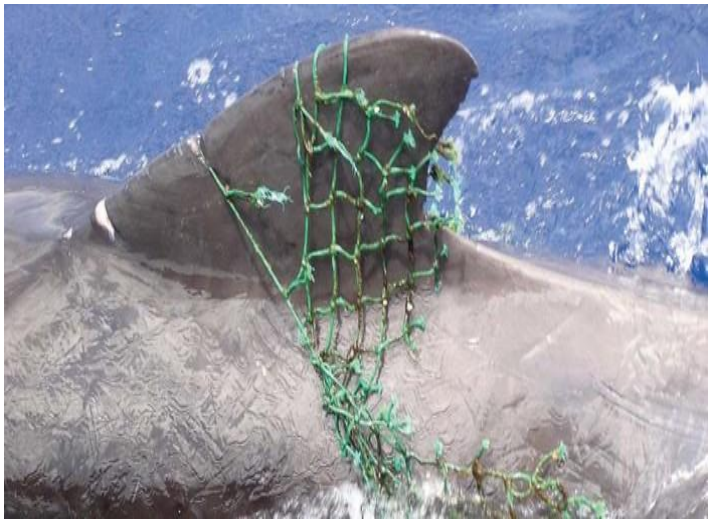
Principal Conclusions

Marine Litter

- Analysis of the GI content to monitor the presence of Marine Litter.

- Presentation of experimental protocol

Marine Litter



Experimental protocol

Marine Litter

- Marine litter is one of the most pervasive pollution problems affecting the marine environment. Hundreds of species of bird, fish, mammals and sea turtles are suffering every year in Europe's waters as a result of this problem.

- Under the Marine Strategy Framework Directive, Europe has specific requirements to meet regarding marine litter under Descriptor 10.

- Amounts of plastics in seabird stomachs are already used as the Ecological Quality Objectives to assess temporal trends, regional differences and compliance with a set target for acceptable ecological quality in the North Sea area

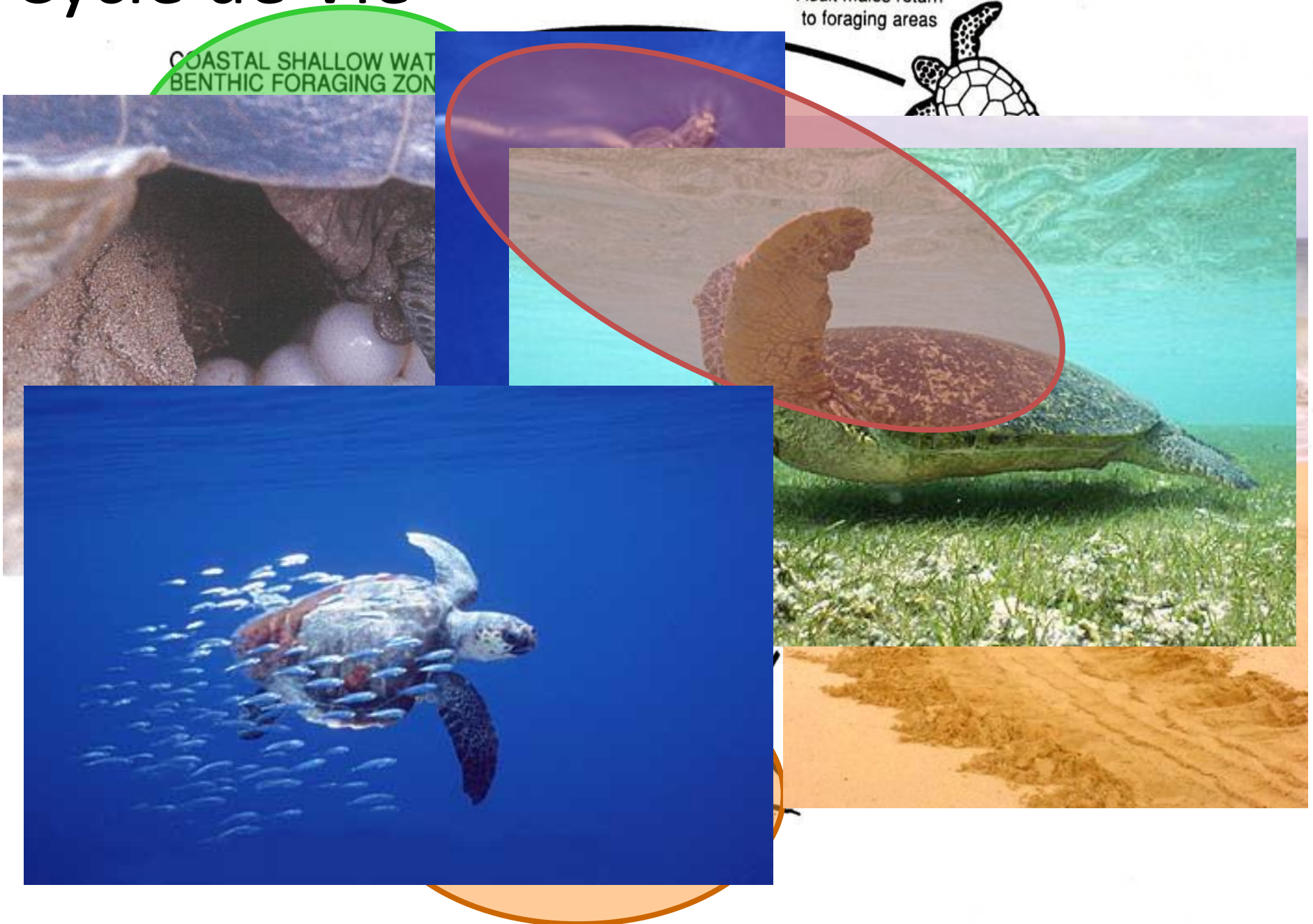
For more than ten years there has been a Marine litter monitoring program thorough the analysis of stomach contents of *Fulmarus glacialis*

Fulmarus glacialis is a deep sea bird common in North Atlantic

Loggerhead turtles are potentially convenient tool to monitor marine litter since:

- Widely distributed and beached turtles are available
- Consume all sort of litter
- Feed exclusively at sea
- Retain litter for a long time in the gastro-intestinal system
- Integrate pollution levels over the oceanic and neritic foraging habitats

Cycle de Vie


Adult males return
to foraging areas
COASTAL SHALLOW WAT
BENTHIC FORAGING ZON

Marine litter Protocol

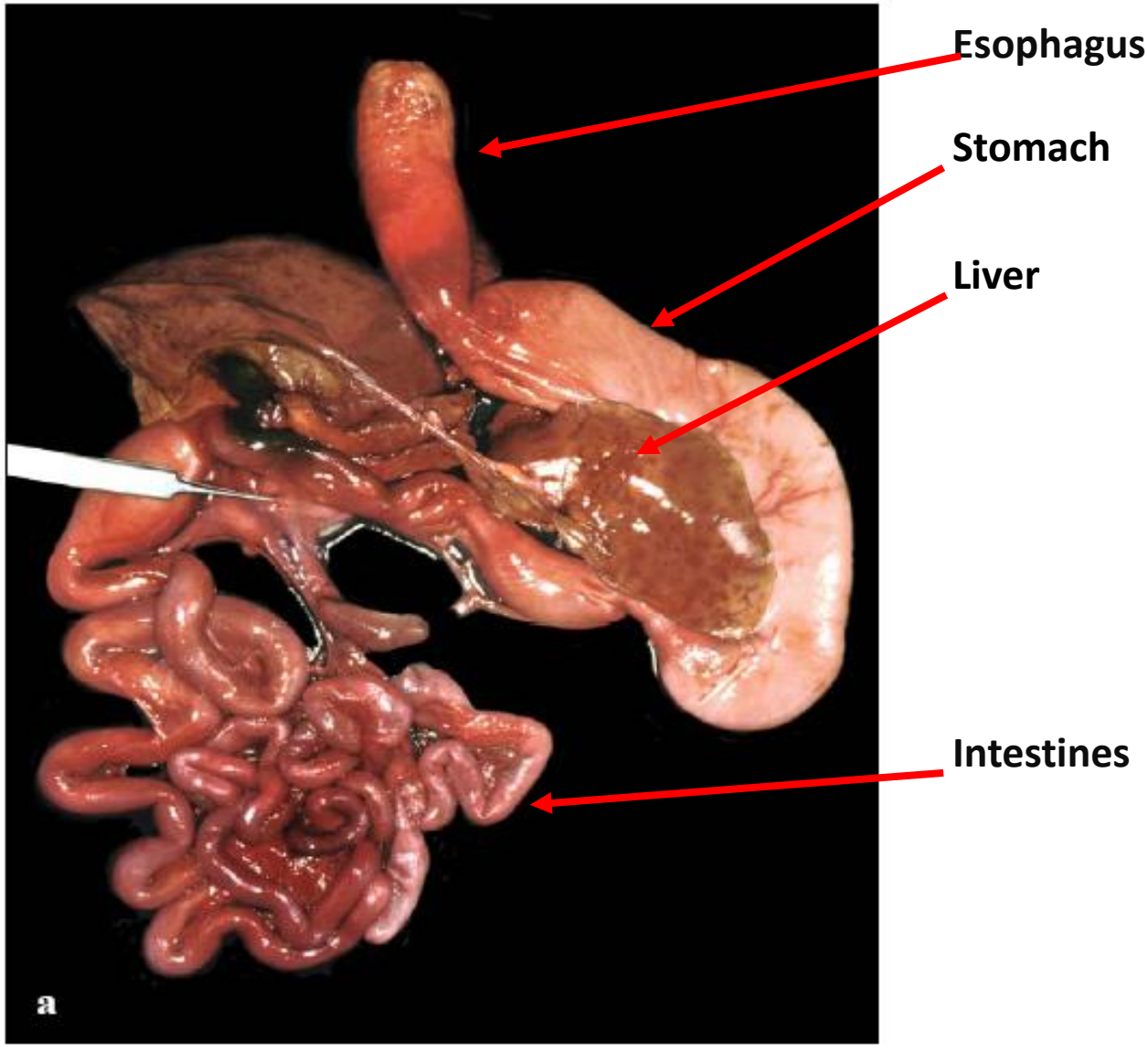
Death animals should be collected once stranded on the beach or collected by fisherman, coast guard, or volunteer, and carcasses should be labeled by Standard measurements, information on location, date, finder's personal details and any possible relevant information. After that first step animal or sample could be frozen in a plastic bag or transported to an authorized laboratory for dissection.

Necropsy to collect the GI content

During dissection the gastrointestinal tract was isolated

Gastrointestinal tract must be divided into esophagus, stomach and intestine using particular attention to do not mix contents

Guts must be opened and the overall drained weight is recorded, (put the gut on the sieve than cut and wait it drains); the remained contents is rinsed with cold water in a sieve 1mm mesh to remove organic material. Once cleaned, all remaining items are put in petri-dishes for identification and sorting under stereo-microscope.



Marine litter Protocol

The contents was rinsed in cold water on 1 mm mesh sieve . Litter sorting from food remains and natural debris was weighed, dried and categorized according to the Protocol used for *Fulmar* (Van Fraeneker et al. ,2005)

Protocol van Freneker et al, 2005

All items are sorted using the following categorization

Industrial plastic pellets (IND): could be pellets, beads or granules, but also disc and rectangular shape occur

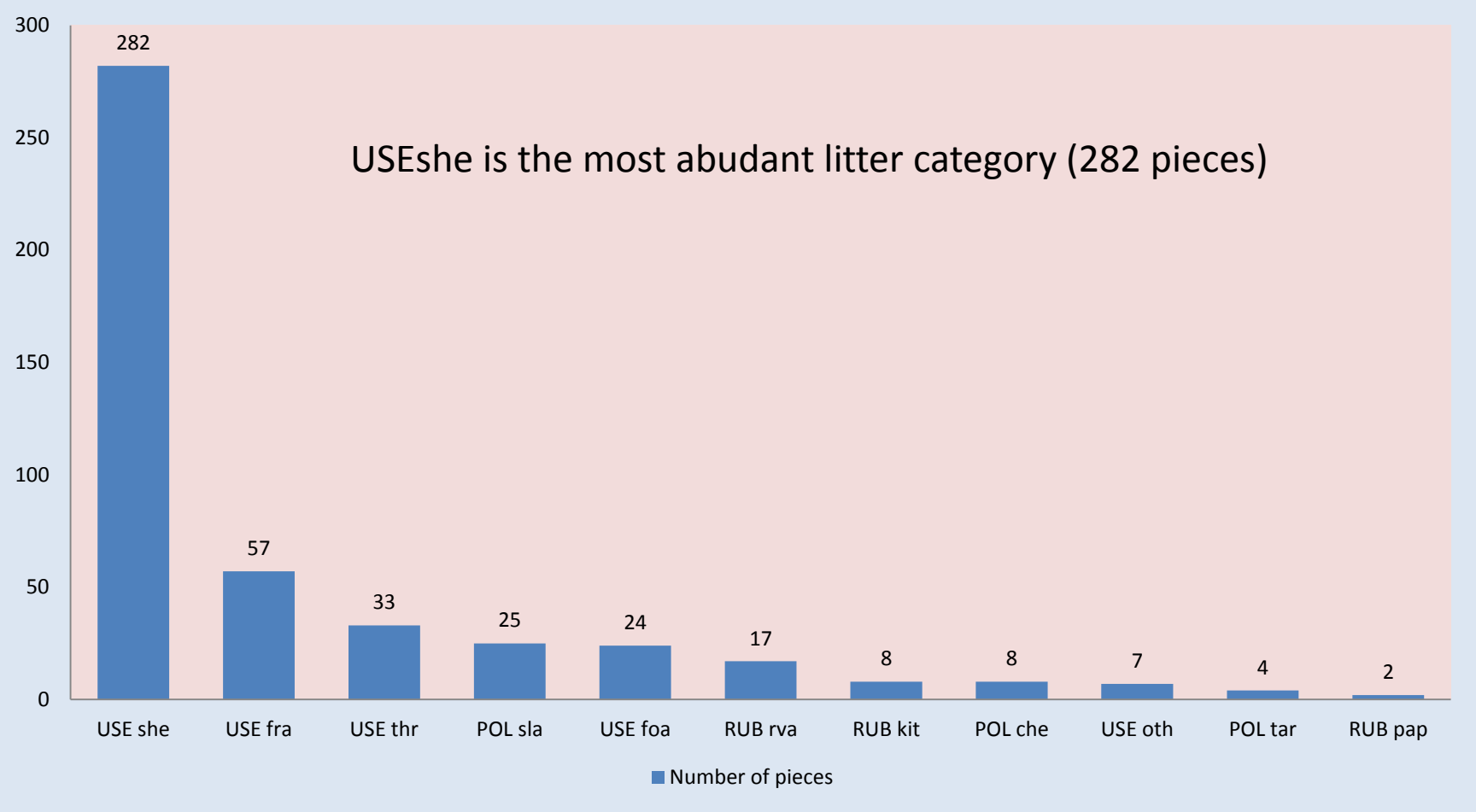
User plastics (USE) : all non-industrial plastic items divided in subcategories
USE sheetlike (**she**) as plastic bags, foils etc.
USE threadlike (**thr**) as rope, nets, nylon line etc.
USE foamed (**foa**) as part of packaging, polyurethane or polystyrene items
USE fragments (**fra**) hard plastics items as part of bottles, boxes, toys lighters etc.
USE other (**oth**) items plastic like but do not clear categorized as elastic, cigarette filter, rubber, etc.

Rubbish (RUB) : other than plastic
RUB paper (**pap**) includes silver paper, aluminium foil and varius types of non plastic packaging material
RUB kitchenfood (**kit**) different human food waste
RUB varius rubbish (**rva**) as manufactured wood, pieces of metal, paint chips etc.
RUB fishook (**hoo**)

Pollutants (POL) : industrial or chemical waste remains
POL slags (**sla**) coal or ore, often resemble as natural pumice
POL tar (**tar**) all tarry substances and fluid heavy mineral oil
POL chemical **(che)** sticky substance of chemical origin as parafine and so on
Natural food remains (FOO): fish otoliths, crustacean remains, jelly-fish, etc.
Natural Non-food remains (NFO): stone, pumice, wood, plant-remains, etc.

For each kind of items, incidence (presence or absence , abundance by number (count of number of items with a size larger than 0,5 cm), and abudance by mass (dry weight in grams) were recorded

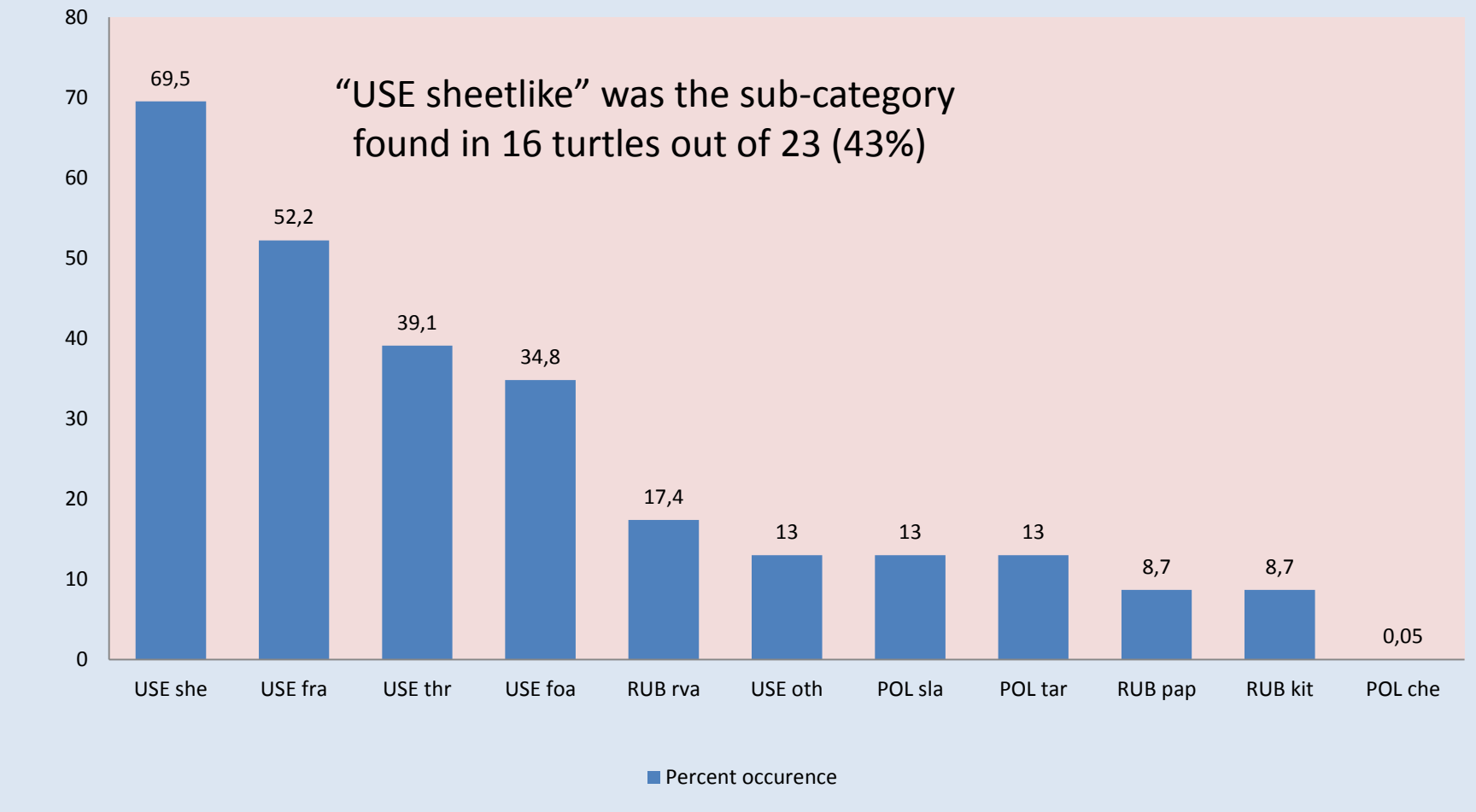
Abundance of the different litter categories in the digestive tract contents of 23 loggerheads



467 pieces of marine litter were ingested by 62% of turtles (n.23)

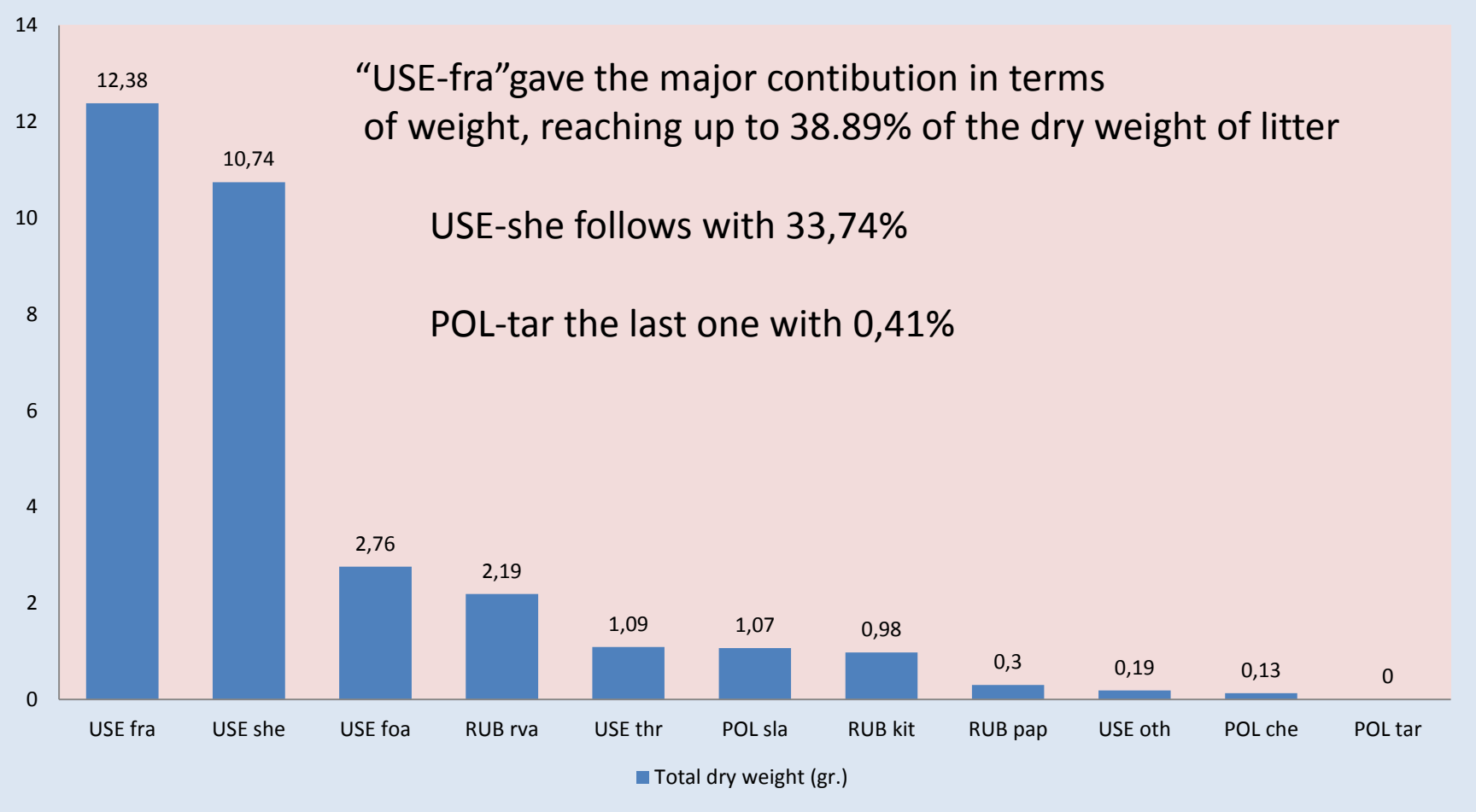
The mean number of pieces per turtle was 2,03

Percent occurrence of the different litter categories in the digestive tract contents of 23 loggerheads



USE-she was the most ingested (69,5%)

Dry weight of the different litter categories in the digestive tract contents of 23 loggerheads



Total dry weight of all anthropogenic items 31,83 gr

The average weight of litter in sea turtle 1,38 gr ranging from non detectable(0,01gr) to 11.1gr

In live turtles kept in the Rescue Center you can analyze the feces