Taxonomy of lobsters

Sub-order: Reptantia

- Dorso-ventrally flattened body.
- Rostrum short or absent.
- Abdomen well-developed or reduced with first segment smaller than the posterior ones.
- Antennules do not have stylocerite.
- Antennal scale reduced or absent.
- Thoracic legs strong with first pair usually forming large pincer-like claws or chelipeds.
- Pleopods often reduced and not adapted for swimming.
- The sub-order Reptantia is divided into three sections (infraorder) - Macrura, Anomura and Brachyura.

Subsection (Infraorder): Macrura

- Well-developed abdomen and extended uropods and telson form a broad tail-fan.
- First and third legs similar.
- Gills numerous.
- It includes two sub-sections namely Palinura and Astacura.

Sub-section: Palinura

- Rostrum small or absent.
- Body depressed.
- Legs rarely chelate.
- Eg. Lobster (*Panulirus, Thenus, Scyllarus*)

This sub-section consists of commercially important lobsters.

Systematic position
Phylum : Arthropoda
Sub-phylum : Mandibulata
Class : Crustacea
Sub-class : Malacostraca
Series : Eumalacostraca
Super-order : Eucarida
Order : Decapoda
Sub-order : Reptantia
Section (Infraorder) : Macrura
Sub-section : Palinura
Super-family : Palinuroidea
Family : Palinuridae

General morphology of lobster

1. **Body consists of two main parts**

a) Cephalothorax (formed by the fusion of cephalon or head, with the thorax) with its appendages.
b) Abdomen with its appendages.

2. **The 14 somites (or body-segments) of the cephalothrax (the first 6 forming the cephalon, the last 8 the thorax) are fused** and only in a few places there are visible indications of the lines between the somites.

Each somite carries one pair of appendages. These appendages are the following, Somite 1 (= ophthalmic somite) carries the eyes, that are usually movable and consist of a stalk, formed by one or two segments. Somite 2 (= antennular somite) carries the antennules, somite 3 (antennal somite) carries the antennae (or second antennae). Somites 4 to 9 (i.e., the last 3 cephalon somites and the first 3 of the thorax) carry the mouth parts, appendages which have a function with the dissection and ingestion of food. Somite 4 carries the mandibles. Somites 5 and 6 carry the maxillulae (or first maxillae) and maxillae (or second maxillae) respectively, both are flat leaf-like organs. Somites 7 to 9 (=thoracic somites 1 to 3) carry the first to third maxillipeds, the first is leaf-like the maxillae, the second and third are more leg-like, especially the third. Somites 10 to 14 (= thoracic somites 4 to 8) carry the five pairs of pereopods or true legs. The first pereopod and sometimes also the second and the third, often (but not always) end in a chela or pincer. The first leg usually is the largest of the true legs. The legs that do not have pincers are indicated as walking legs as they are mainly used for locomotion.

3. **Dorsally the cephalothorax is encased by the carapace, a single shield-like cover, which extends all the way from the eyes to the last thoracic somite and sometimes projects beyond the eyes as a narrow median rostrum.** Laterally, the carapace extends to the bases of the legs, enclosing the branchial chamber which is a space between the body and the carapace housing the branchia or gills and situated above the bases of all legs. In the Palinuridae, the number and arrangement of which is of taxonomic importance. In some genera of Palinuridae, the lateral margins of the antennular plate are ridge-like and swollen, forming a stridulating organ with a process on the inner margin of the antennal peduncle, which rubs over this ridge when the animal moves its antennae in a certain way; a rasping sound is produced by this organ.

4. V**entrally, the cephalothorax shows, between the basal parts of the appendages a central plate, the thoracic sternum, on which the lines between the thoracic somites are usually indicated as grooves**. In the females, the sexual openings are visible on the basis (the sixth segment of the leg counting from the tip) of the third pereopods, in the males these openings are on the basis of the fifth pereopods. This difference usually is the character that most easily distinguishes male and female lobsters.

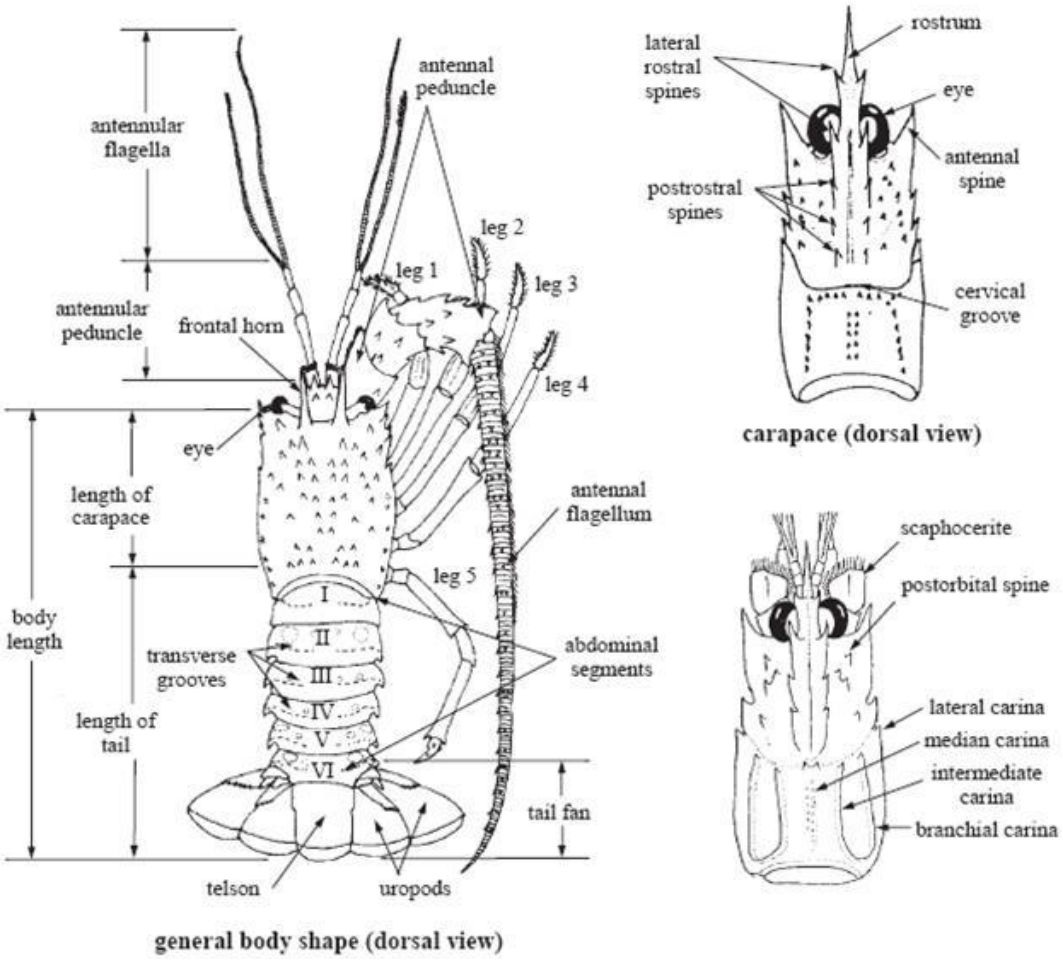
5. **The abdomen consists of six separate somites (number 15 to 20), which are not fused, but movably connected with each other.** Each somite is surrounded by a chitinous armour; the dorsal part is called tergite, the ventral part, sternite and the two lateral parts, pleura (singular pleuron). The combined abdominal sternites form the abdominal sternum, the combined abdominal tergites, the abdominal tergum. The pleura usually are downward directed lateral plates, covering externally the pleopods. The appendages of the first 5 abdominal somites (number 15 to 19) are the pleopods or swimmerets; they are implanted on the borderline between the sternite and the pleuron in the male. In the male, the first and second pair of pleopo may be transformed into copulation organs, the so-called copulatory stylets, which are often stiff and of characteristic shape. The other pleopods usually consist of a single-segmented peduncle carrying two leaf-like appendages at the top. The pleopods may be reduced or even entirely lacking on some somites. The sixth abdominal somite (= somite 20, being the last body segment) bears the tail fan, which consists of a pair of uropods and the unpaired telson. The uropods actually are the sixth pair of pleopods; they are rather wide and well calcified and usually about as long as the telson. The telson is a plate-like median appendage of the sixth abdominal somite and sometimes it is considered to represent the seventh abdominal somite. The tail fan, when spread out, can be used for propulsion.

Chief characters used in the identification of lobsters

The key features of taxonomic value are

- Carapace (shape, surface sculpturation, spination)
- Eyes (absent, reduced or well developed, position of the orbits),
- Antennules (length of flagella),
- Antennae (size, shape, dentition and shape, length and structure of the flagellum)

- Antennular plate (number and arrangement of spines, presence or absence of a stridulating organ),
- Pereopods (whether or not chelate, size and structure of pots and short stripes. chelae),
- Thoracic sternum (general shape, shape of anterior margin, presence or absence of tubercles or spines)
- Abdomen (dorsal sculpturation, shape of the pleura, shape of the tail, number of pleopods).
- Apart from these features the colour and the colour pattern of the species are also helpful in field identification.



Key to the important families of lobsters

Family Palinuridae

- Tubular body.
- Carapace without a rostrum or with a very rudimentary one.
- Legs without true pincers.
- First pair not enlarged (except in Justitia).
- Antennae enlarged, cylindrical, longer than body.
- Carapace rounded in section (subcylindrical) without a distinct median rostrum, ornamented with spines and granules of various sizes.'
- Each eye protected by a strong, spiny frontal projection of the carapace (frontal horns).
- Hairs on carapace, if present few and scattered.
- Antennae long and whip-like.
- Antennules slender, each consisting of a segmented peduncle and 2 long or short flagella.
- Tail powerful with a well-developed fan.
- Abdominal segments either smooth or with one or more transverse grooves.
- Legs without true pincers or chelae (except the 5th pair of legs of the female, which ends in a very small pincers), the 1st pair usually not greatly enlarged.

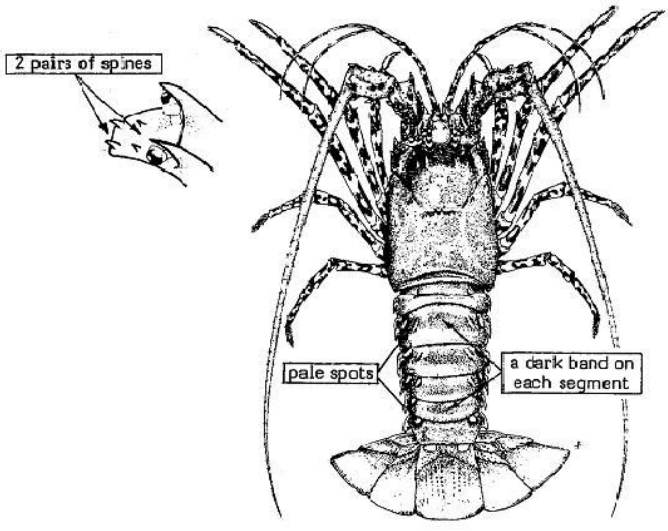
Key to the genus Panulirus

- First pair of legs not enlarged with no trace of a pincer without cross bands.
- Carapace without a scale-like sculpture.
- Tail variously coloured, smooth or with at most 2 transverse grooves.
- Two distinct, widely separated tooth-like frontal horns, between which the anterior margin of the carapace visible.
- Antennal flagella, although large and firm, quite flexible.
- Flagella of an antennule long, whip like, longer than peduncle of antennule.

Panulirus homarus - Scalloped spiny lobster

- Abdominal segments with anterior margin of transverse groove scalloped.
- Antennal plate with 2 pairs of large spines and a few spinules.
- Legs with inconspicuous, irregular spots and short stripes.
- Body with dark greenish to blackish with numerous, very small, white spots without transverse bands.
- White and greenish bands present in antennules.

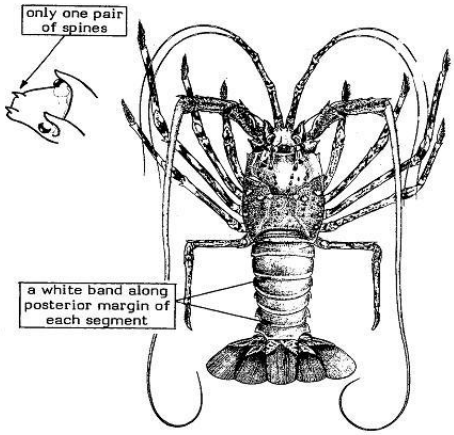
Panulirus ornatus - Ornate spiny lobster



Panulirus ornatus

- Abdominal segments smooth, without a transverse groove with a broad transverse band of a brown colour over the middle and only 2 white blotches on either side.
- Antennular plate with 2 pairs of large spines.
- Legs conspicuously and irregularly spotted.
- Bluish or greenish spines on carapace yellow.
- Anterior part of carapace on and near bases of the o frontal horns and the anterior spines with a vermicular pattern of pale and dark lines.
- No transverse white band along posterior margin of the segments.
- Antennular flagella banded presence of only 2 spots on either side of the second to fourth abdominal segments and vermicular markings seen on and near the bases of frontal horns, distinguish this species from all other Panulirus sp.

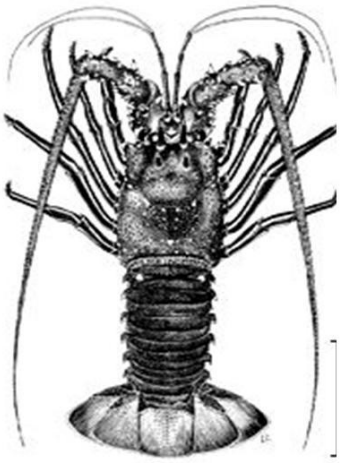
Panulirus polyphagus - **Mud spray lobster**



Panulirus polyphagus

- Abdomen smooth, without a transverse groove, a transverse white band present along posterior margin of segments.
- Antennular plate with 2 large spines, without spinules.
- Legs irregularly and inconspicuously blotched.
- Antennules broad banded.

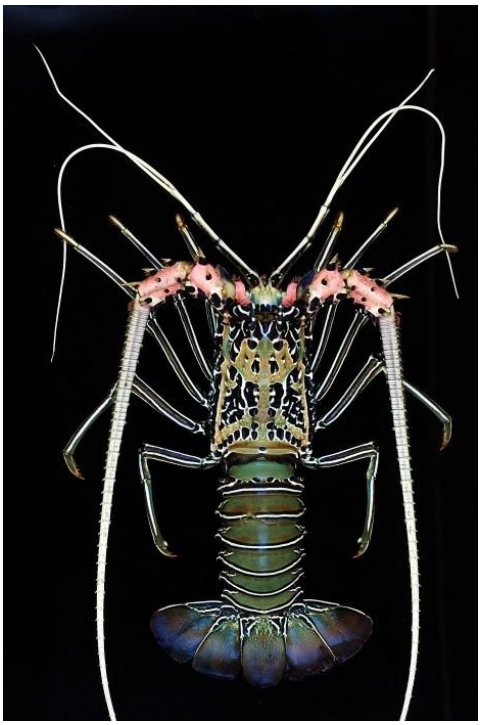
Panulirus penicillatus - **Pronghorn spiny lobster**



Panulirus penicillatus

- Abdominal segments with distinct transverse grooves and numerous, very small white spots, but without a pale band along posterior margin.
- Two pairs of almost equal spines joined at their bases on the antennular plate (No other Panulirus spp. has this character).
- Legs with fine or broader longitudinal white to yellow stripes.
- Ground colour ranging from yellow-green through brown-green to blue black or dark. Reddish brown, with many cream spots on upper surface of carapace and many tiny pale spots on abdomen.
- Antennular flagella uniform green or brown.
- Males usually darker than females.

***Panulirus versicolor*- Painted spiny lobster**



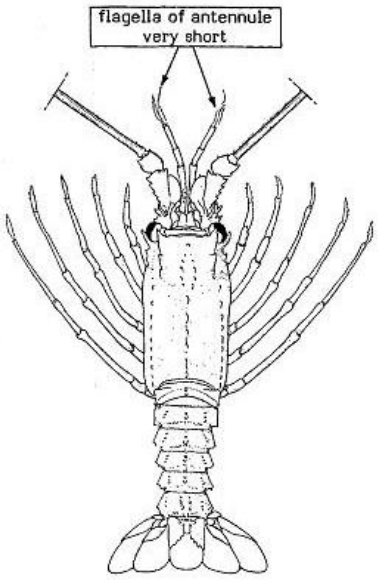
- Abdominal segments without a transverse groove with a white band along posterior margin, flanked at either side by a dark band.
- Antennular plate with 4 large spines.
- Legs and antennules longitudinally striped.
- Carapace with a characteristic pattern of dark blue areas with white lines.
- Bases of antennae bright pink not extending on to antennular plate.
- Bright colour pattern of this species clearly separates from all other lobsters.

Genus Puerulus

- First pair of legs not enlarged with no trace of a pincer without cross bands.
- Carapace without a scale-like sculpture.
- Tail variously coloured, smooth or with at most 2 transverse grooves.
- Two distinct, widely separated tooth-like frontal horns, between which the anterior margin of the carapace is visible.
- Antennal flagella, although large and firm, quite flexible.
- Flagella of antennules short, shorter than last segment of antennular peduncle.

- Abdominal segments with a sometimes interrupted transverse groove, but without squamiform sculptraution;
- A distinct antennular plate between bases of antennae.
- Frontal horns tapering to as sharp point, first segment of antennular peduncle not over-reaching antennal peduncle.
- Anterior margin of carapace between frontal horns without teeth, only a single small tooth in basal part of anterior margin of each frontal horns;
- Pleura of second to fifth abdominal segments ending in two about equally strong teeth.

***Puerulus sewelli* - Whip lobster**



- Carapace angular, with a median and 2 lateral tuberculate longitudinal ridges behind the transverse cervical groove and 3 pairs of ridges in front median postcervical ridge with 8 small teeth frontal horns compressed and sharply pointed, with a single, small, sharp tooth on basal part of anterior margin;
- Surface of carapace covered with scattered granules and larger tubercles or teeth on the ridges.
- Antennules slightly over reaching antennal peduncle, with 2 short flagella, which are about as long as distal segment of antennular peduncle;
- Antennular plate present, without spines, forming stridulating organs with the antennal peduncle;
- Basal part of antennal peduncle with a large, rounded, ciliated lobe on inner margin.
- Tail powerful, segments 1 to 5 with a low, 6th segment with 2 submedian tuberculate ridges.
- Surface of abdominal segments with some sculpturation and with at most 2 transverse grooves;
- Pleura ending in 1 or 2 sharp teeth. Legs 1 to 4 without pincers.

Family Scyllaridae (Slipper lobsters)

- Body strongly flattened dorsoventrally.
- Carapace usually granular with teeth, spines and ridges without a rostrum.
- Eyes movable but recessed into anterior margin of carapace.
- Legs without pincers, none of them enlarged.
- Antennae short and broad, plate-like, lacking flagella.
- Antennules short and slender, with 2 short flagella.
- Tail broad and powerful with a well-developed tail fan.

The most common genus coming under the family Scyllaridae is Thenus.

Genus Thenus

- Orbits on the anterolateral angle of the carapace.
- No teeth on the lateral margin of the carapace, apart from the anterolateral and postcervical.
- Lateral margin of the carapace has only the cervical incision.
- Carapace flat, triangular, narrowing posteriorly.
- Exposed third and first maxilliped without a flagellum.
- The flagellum of the second maxilliped gels transformed as the single laminate segment.
- Body strongly depressed.
- Fifth leg of bundle with a chela.

Thenus orientalis

- Lateral margins of carapace straight, with only 2 teeth, one at the end, the other in the anterior fourth, posterior 3/4th without teeth.
- Upper surface of carapace with numerous small granules and a median carina with 3 sharp teeth and behind the orbit.
- Anterior large segment of antenna has 3 sharp triangular teeth on inner half of distal margin, some small teeth at either side of these.
- Posterior large segment ending in a large, sharply pointed, inward curved tooth, outer margin with 2 smaller teeth.
- Abdomen granular with transverse groove over middle of each segment.
- Fifth segment with a sharp spiniform tooth in the middle of posterior margin.
- Body pale yellowish brown with the granules of a darker brown.
- Tips of the teeth whitish.
- Tail fan with a yellow tinge.