

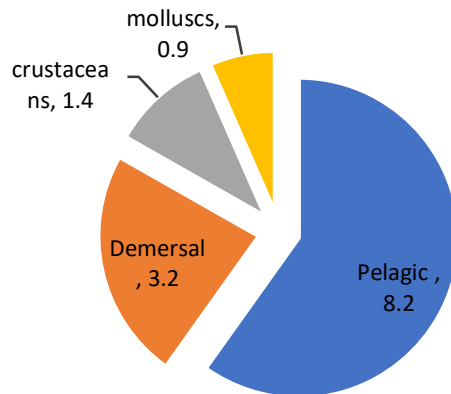
CHAPTER 14

Anchovies



INTRODUCTION

- Fisheries is an important sector in India. It provides employment to millions of people among the Asian countries, India ranks the third position in fisheries. World fish production reached 179 million tonnes in 2018(FAO).
- India has 8,118 km long coastline along 9 coastal states and 4 union territories producing 38,20,207 tonnes of fish catch from marine fisheries sector. The major catches come from the coast of Gujarat. Tamil Nadu. Kerala, West Bengal and Maharashtra.
- As per the data of CMFRI Annual report compared to 2018, marine fish landings during 2019 increased by 2.1% from 3.49 million tonnes to 3.56 million tonnes. In terms 12% is molluscs.



- *Clupeiformes* is the order of ray-finned fishes, with 5 families that includes the herrings family Clupeidae and anchovy family Engraulidae.
- Anchovies are small, thin silvery fishes that resemble miniature herrings. They feed planktonic organisms, travel in large shoals, near the shores and rarely found in depth greater than 60 meters.
- This group includes most of the world's numerous and commercially important fishes.
- This groups have silvery body with streamlined and spindle-shaped and they generally lack lateral lines.

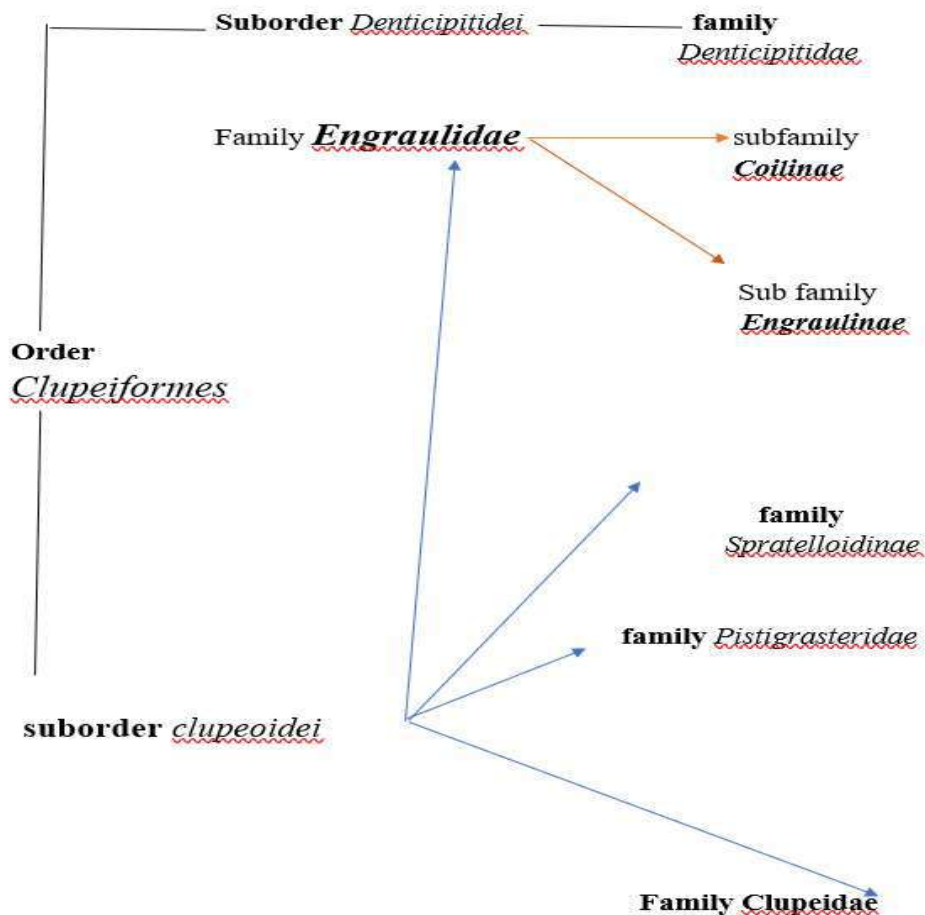
- They filter food from water with their gill rakers.

SCIENTIFIC CLASSIFICATION

Kingdom : Animalia
 Phylum : Chordata
 Class : Clupeiformes
 Sub order : Clupeodei
 Family : Engraulidae

FAMILY-ENGRAULIDAE

- This family comprises of anchovies.
- Small silvery fishes, mostly 10 to 15 cm, usually with fusiform. Sub- cylindrical bodies but sometimes quite strongly compressed, body tapers to very slender tail in the rat-tailed anchovies (*Coilia*)
- Scutes are present along the belly, either needle-like or strongly keeled.
- Snout usually pig-like, strongly projecting, lower jaw characteristically unders lung.
- No spiny rays in fins.
- A single dorsal fin, usually short and midpoint of the body
- Pectoral fins set low on body, sometimes with (*setipinna*) or 4 to 19 (*coilia*) filamentous rays.
- Pelvic fins usually about midway between pectoral fin base and anal fin origin.
- Anal fin short, moderate or very long, caudal fin forked except in *coilia*.
- Scales always cycloid but often shed rather easily.
- No lateral line
- Color: Usually blue or green or brown or black, flanks wholly silver or with bright silver lateral stripe, darker marking include dark venulose area on shoulder (*Thryssa*) and dark pigmentation on all part of dorsal, pectoral, pelvic, anal and caudal fin.
- Anchovies are small fish having greenish-blue reflections due to a silver-colored longitudinal stripe that runs from the head to base of caudal tail.
- They are found in scattered areas throughout the world's oceans, but are concentrated in temperate waters and rare or absent in very cold warm seas.
- There are more than 28 species of anchovies reported in India.
- There are two fishing seasons, January to May and September to November, the latter period being the peak season for anchovy catches. Major contribution to the fishery is by the genera are *Stolephorus*, *Engraulis*, *Thryssa*, *Setipinna* and *Coilia*.



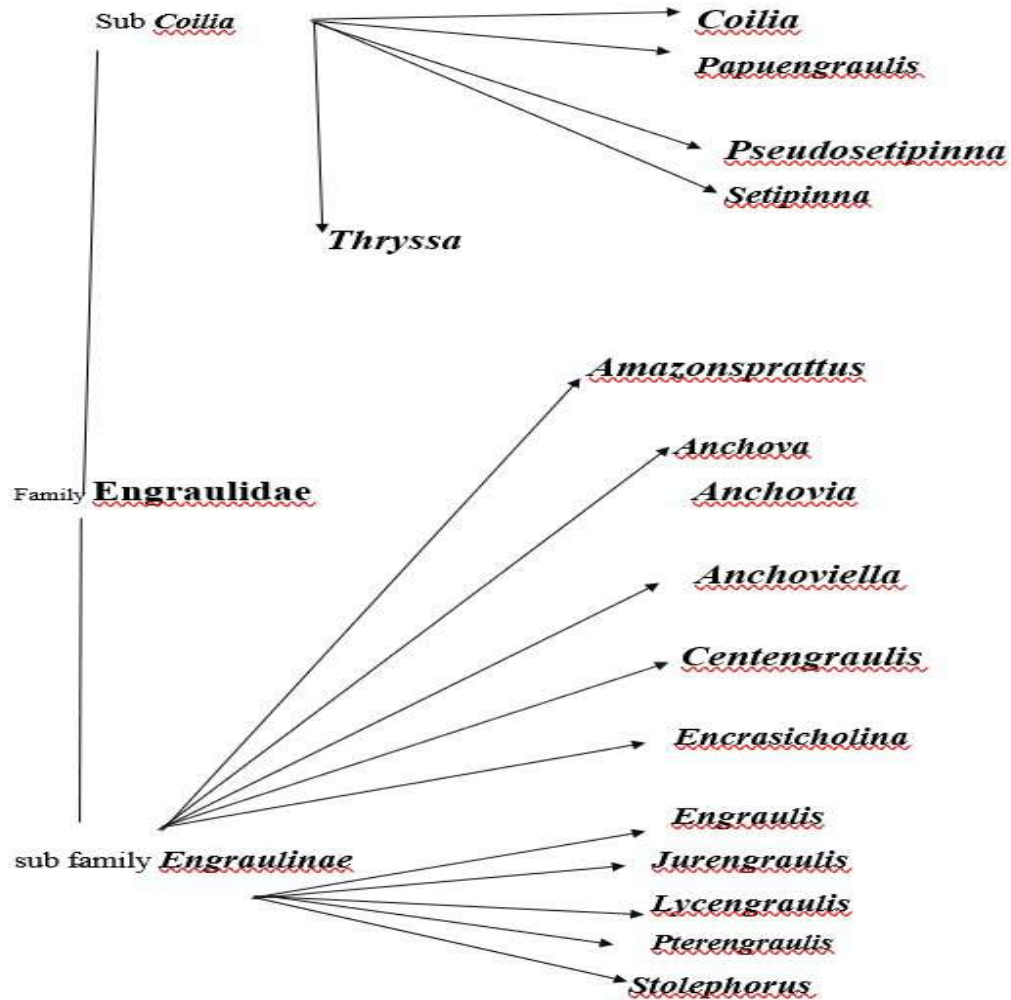
CRAFT AND GEARS

- Kerala and Karnataka coast: Ring seines (mesh size of 8mm).
- Maharashtra, Goa, Karnataka, Kerala coast: Purse seines (mesh size of 4-18mm).
- Andra Pradesh, Tamil Nadu and Kerala coast: Boat seines (10-20mm)
- Orissa and West Bengal: Bag net
- Kerala: Gill net.
- Maharashtra and Gujarat: Dol net (mesh size 5-25mm).

ECONOMIC IMPORTANCE OF ANCHOVIES

- Healthy heart
- Tissue and cell repair
- Eye health
- Skin health
- Weight loss
- Anchovies are rich in proteins, vitamins and minerals that help in maintaining good health.
- It contains Calcium, Magnesium, Iron, Potassium, Sodium, Zinc and phosphorus.

- Anchovies are a good source of vitamins such as Thiamin, Riboflavin, Niacin, Folate, Vitamin C, B-12, B-6, A, E, K.
- It contains fatty acid and cholesterol.



Subfamily: *Coilia*

- Body greatly elongates. Tail long and tapering. Caudal little or not forked. Lower portion continuous with long tail. Upper pectoral rays prolonged as slender filaments.
- There are 11 species were reported in the world, from those 5 species only found in India.

Coilia dussumieri (Valenciennes, 1848)

Common name: Gold spotted grenadier anchovy

- **Geographical distribution:** Thailand, Myanmar, Indian ocean.
- **Features:** Body elongated, compressed, snout prominent, conical, shorter than eye. Dorsal about twice nearer to snout than caudal. Six upper pectoral rays filiform and produced to about the middle of the length of the fish golden, with 2 or 3 rows of round golden spots along the lower half of the body.



C.grayii

Common name: gray's grenadier anchovy

- **Distribution:** Indo-pacific, East and south China seas also Indian ocean (Kerala).
- **Features:** Body tapering belly rounded before pelvic fins with 12 to 15 plus 22 to 29 =36 to 44 keeled scutes from isthmus to anus. Maxilla long reaching to or beyond base of the first pectoral fin ray.



C.neglecta (Whitehead, 1968)



- **Common name:** Neglected grenadier anchovy.
- **Features:** Maxilla almost or just reaching to edge of gill cover. Lower gill rakers 23 to 27.

C.regnaldi

- **Common name:** Reynald's grenadier anchovy
- **Features:** Maxilla short, not reaching to the edge of gill cover. Lower gill rakers 28 to 36. Pectoral fin with 10 to 13 long filaments and 6 or 7 branched fin rays, much shorter than those of pelvic fin later with 6 fin rays.



C.ramcarati

- **Diagnostic features:** Body tapering, belly rounded before pelvic fins with 6 plus 10 or 11=15 or 16 keeled scutes from just behind the pectoral fin base. Maxilla short, not

reaching to edge of gill cover. Lower gill rakers 29 or 30. Pectoral fin with long filaments and or branched rays.

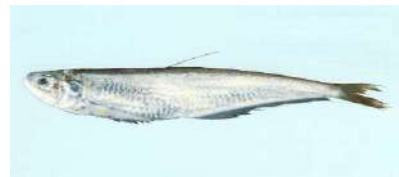
Genus *Lycothrissa* -*Lycothrissa crocodilus*

- **Common name:** Sabretoothed *Thryssa*
- **Distribution:** Asia, Thailand, Cambodia
- **Diagnostic features:** Rather elongated, not strongly compressed. Belly without scutes before the pectoral fin base, 7 or 8 (rarely 9) plus 9 or 10 (rarely 8 or 11) = 16 to 19 keeled scutes from pectoral fin base to anus. Maxilla short, tip reached to the edge of operculum. Enlarged canine like teeth. Lower gill rakers 8 to 19. It resembles to *T. baelama* and *T. encrasicholoides*.



Genus *Papuengraulis* -*P. micropinna*

- **Distribution:** Gulf of Papua and Arafura Sea
- **Characters:** belly with or needle like structure of scutes in front of pectoral fin base. Lower gill rakers 25 to 27. Pre pelvic scutes are reduced to 5 or 6 needle like scutes. Post pelvic scutes reduced to thin plates hidden by scales.



Genus *Pseudosetipinna*

- Only one species is reported in this genus.
- *P. haizhouensis* and it is not reported in India.

Genus *Setipinna*

- Medium sized compressed anchovies
- Belly sharply keeled, 8 species found in world wide.
- Maxilla short, pectoral fin with first ray produced as a filament.

S. breviceps

- Pectoral fin with first ray produced as a filament that usually exceeds or well exceeds head length.
- Belly with 17 to 23 plus 9 to 11 = 27 to 32 keeled scutes from isthmus to anus.
- Jaws slender.
- Lower gill raker 11 to 12, serrae enlarged.
- Pectoral filament long and reaching to base of 35th to 41st anal fin rays.

- Anal fin with 56 to 61 in number.

S.brevifilis

- Belly with 15 to 17 plus or 6 or 7 = 22 or 23 keeled scutes.
- Lower gill rakers 17
- Pectoral filament short
- Anal fin 65 to 72
- Very closed with *S.phasa*

S.phasa

- Belly with 15 plus or 7 = 21 or 22 keeled scutes from isthmus to anus.
- Pectoral filament long reaching to base of 15th to 39th anal fin ray
- 66 to 78 anal fin rays present in this species.



S.tali

- Body strongly compressed, belly with 20 to 29 plus 4 to 14 = 32 to 40.
- Lower gill rakers 17 to 29.
- Anal fins 45 to 55.



Genus *Thryssa*

- Oblong or elongate, compressed
- Scales more or less deciduous
- Abdominal scutes well developed
- Origin of dorsal before that of anal which is long.
- Maxilla may be short, moderate, long or very long
- There are 24 species reported in worldwide, from those 15 species found in India



Subfamily *Engraulinae*

Genus *Amazonsprattus* (Robert 1984)

- **Habitat:** Fresh water
- Only One species was reported in the world.
- Maxilla short, reaching just to front of eye
- Gill rakers few in number 18 or 19

A.scintilla (Roberts, 1984)

- **Distribution:** Amazon
- Dwarf species with small mouth, toothless containing two supramaxilla.
- Dorsal fin origin well behind midpoint of body with 12 to 14 fin rays.

Genus *Anchoa*

- **Habitat:** Marine, Estuarine
- Small, snout fairly pointed, maxilla long reaching the margin of preoperculum, tip pointed.
- Gill rakers slender.
- Maxilla tip pointed, dorsal fin origin at about midpoint of the body.
- There are 35 species were reported in the world

Genus: *Anchoviella*

- **Habitat:** Marine, Estuarine
- **Distribution:** Atlantic and Pacific coast
- Teeth on lower jaw small and evenly spaced or absent
- Lower gill rakers on first arch less than 45.
- Maxilla short, tip blunt, not reaching or just reaching anterior margin of preoperculum.

A.blackburni

- Anal fin origin slightly in advance of body midpoint.

A.brevirostris

- Anal fin origin posterior to body midpoint
- Snout very short, projecting only slightly beyond lower jaw, lower jaw symphysis almost at tip of snout.

A.gulanensis

- Snout longer, projecting beyond lower jaw, lower symphysis more posterior, not at tip of snout.
- Axillary scale of pectoral fin reaching only to about midpoint of fin.

A.cayennensis

- Axillary scale of pectoral fin reaching beyond midpoint but failing to reach tip of fin.
- Snout $\frac{1}{2}$ eye diameter, lower gill rakers 29 to 35.

A.perfasciata

- Snout $\frac{3}{4}$ eye diameter
- Lower gill rakers 24 to 30.

A.elongata

- Axillary scale of pectoral fin about half as long as fin, body more moderately compressed, silver stripe, narrow, less than eye diameter through entire length.

A.lepidentostole

- Axillary scale of pectoral fin reaching beyond midpoint but failing to reaching tip of fin, body deeper, silver stripe wide, greater than eye diameter below about middle of dorsal fin.

Genus *Engraulis*

- **Habitat:** Marine
- **Distribution:** Western Atlantic
- There are 9 species found in world wide.
- Anal fin origin equal with or posterior to vertical at dorsal fin origin, pectoral fin short, not reaching posteriorly beyond pelvic fin base.
- Teeth or lower jaw small and evenly spaced or absent.
- Lower gill rakers on first arch less than 45.
- Maxilla short, tip blunt, not reaching or just reaching anterior margin of preoperculum
- These are the species coming under this genus.

1. *E.albidus*
2. *E.anchoita*
3. *E.australis*
4. *E.capensis*
5. *E.encrasicolus*
6. *E.eurystole*
7. *E.mordax*
8. *E.japonicus*
9. *E.ringes*

Genus *Cetengraulis*

- Two species were reported in this genus, *C.edentulus* and *C.mysticetus*
- Branchiostegal membrane broadly joined across isthmus.
- Lower gill rakers on first arch greater than or equal to 45.

Genus *Encrasicolina* (Fowler, 1938)

- **Distribution:** Indo-west pacific
- **Habitat:** marine
- They are 8 species found in the world, from those 4 species reported in India. These are *E.punctifer*, *E.devisi*, *E.intermedia*, *E.heteroloba*.
- Scales extremely deciduous, seldom with scales on body after catch, body semi-translucent with a silver mid lateral band.

- Body tinged grey after death with clear scale pattern on upper part of body, nodule-like expansion present on anterior part of isthmus, anal fin originating behind the dorsal fin base.

E.punctifer (fowler, 1938)



- Maxilla short not reaching to preopercle margin, its posterior end rounded

E.devisi (Whitely, 1940)

- Maxilla long extending to preopercle margin, its posterior end pointed.



Genus *Pterengraulis*

- Only one species reported in the world.

P.atherinoides

- Anal fin origin anterior to vertical at dorsal fin origin, pectoral fin reaching posteriorly beyond pelvic fin base.

Genus *Lycengraulis*

- Teeth on lower jaw enlarged and canine like
- Anal fin origin equal with or posterior to vertical at dorsal fin origin, pectoral fins short, not reaching posteriorly beyond pelvic fin base.

L.batesil

- Lower gill rakers 12 to 15.

L.grossidens

- Body depth 23 to 24.5% of SL, maxilla reaching margin of operculum, pelvic fin base, occasionally equidistant between these points, total gill rakers on first arch 30 to 36.

L.limnichthys

- Depth of body 21 to 23 % of SL (in specimen greater than 100m total length) maxilla not reaching margin of preoperculum, pelvic fin inserted nearer to pectoral fin base than to anal fin origin, total gill rakers on first arch 37 to 42.

Genus *Stolephorus*

- **Distribution:** Indo-Pacific
- **Habitat:** Marine, pelagic and schooling.
- Body milky white after death without clear scale pattern on upper part of body, anal fin originating below the dorsal fin base
- Small and moderately compressed with 15cm SL.
- One to eight sharp needle-like pre pelvic scutes, no post pelvic scutes.
- Maxilla tip pointed and projecting beyond 2nd supramaxilla
- There are 18 species reported in the world from that 6 reported in India.

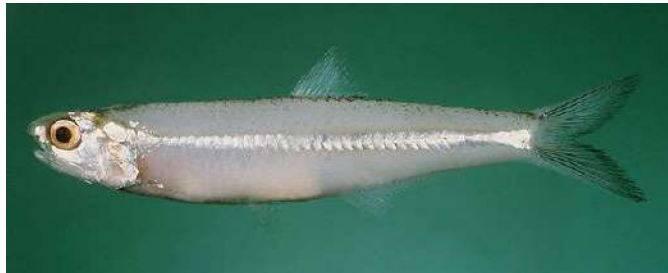
S.insularis

- Cross section of the body is round, caudal fin slightly dark.
- Body with 4 to 8 (usually 3 to 5, mostly 4) small needle-like prepelvic scutes, anal fin 14-17.
- Maxilla tip pointed, reaching to or only just beyond front border of preoperculum



S.commersonii

- Usually to and mostly or small needle like pre pelvic scutes.
- Maxilla tip pointed reaching to or a little beyond hind border of preoperculum
- 18 to 19 anal fin rays.



S.dubiosus

- Belly with 4 to 7 small needle like pre pelvic scutes.
- Maxilla tip pointed, reaching beyond the border of preoperculum.
- Gill rakers 25 to 31, anal fin rays 18 to 19.

S.andhraensis

- Caudal fin margins black, dorsal edge of body with indistinct black, scale pattern not arranged in a line.

Photos for the compilation have been adapted from Fishbase online

