

Ichthyology, scope and major carps

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Introduction:

- **Fishes form a highly successful group of animals comprising more than 40,000 species inhabiting all seas, rivers, lakes, canals, dams, muddy water, brackish water, estuaries and all places where water is available.**
- **From nutritional point of view, fish are valuable food due to presence of high quality proteins, in addition to vitamins and minerals like calcium, phosphorous, iron and sodium contents. All the essential amino acids and many poly unsaturated fatty acids (PUFAs) available in fish products are generally not found in land based food products and are absent in vegetables as well.**
- **With the change in life style in urban population, the consumption of processed fish and shell fish products has increased considerably all over the world. Therefore, products belonging to this class are in great demand in domestic as well as in global market.**
- **Thus, increasing demand of fish for delicious food products and for other household products and ornamental items opens great opportunity for its trade and entrepreneurship particularly in rural areas. Sound knowledge on fish production techniques and management may be harnessed not only to set a business for one's own livelihood but also may create employment for others.**

What is Ichthyology?

Ichthyology is the branch of science which deals with the study of fish, including bony fish (Osteichthyes), cartilaginous fish (Chondrichthyes) and jawless fish (Agnatha) with all related aspects like ecology, morphology, anatomy, physiology, behavior, etc.

What is fishery science?

Fishery Science is a multidisciplinary science which deals with the biological study of life, habit and breeding of various species of fish. This discipline manages and understands fisheries involving aspects like farming and husbandry of fishes and aquatic organisms in various water forms, i.e. fresh water, marine and brackish water. As fish export has a considerable share in the economy growth, this field is of importance from the traditional times. With increasing development of fishery sector, not only the traditional fishermen are dependent on these resources, but also the skilled personnel are required on regular basis.

Scope of career in Fishery Science in today's global context:

With an increase in the taste buds of the people and in the urge to relish quality and to discover cuisines across the boundaries, there comes an increase in demand of fresh and quality seafood and fishes. Not only this, as the end customer now wants a detailed and cost worthy products for which they are ready to spend anything that the product demands, there comes an increase in not only the employment opportunities for the aspirants who are skilled and dynamic, but also the demand of quality fishery products for those who have their own business enterprises.

The Indian coastline is vast and country also has huge inland water bodies. So, the subject area to study and to work in this field is also large in our country. Thus, the aspirants who have dynamic entrepreneurial skills can excel in this expansive sector.

General Characters of Fish:

- Fish exhibit following common characters, most of which are related to their permanently aquatic mode of life.
- Fish are cold blooded vertebrates, usually have a streamlined body; however, some are snake like and few are dorso-ventrally flattened.
- Exoskeleton: body is covered with scales but some are naked without any exoskeleton. Integument with mucous glands and chromatophores -Endoskeleton: is bony or cartilaginous and less massive in comparison to land vertebrate.
- Respiration by gills, accessory respiratory organs may also be present, gills open outside by gill slits and covered by operculum in osteichthyes (4 pairs) but absent in chondrichthyes (usually 5 pairs but never more than 7 pairs)
- Lateral line system is present that contains neuromast organs (Rheoceptors), sensitive to water current and changes in pressure and vibrations (Echo-location).
- Only internal ear is present
- Eye lids and tear glands and fleshy muscular tongue is absent
- Visceral skeleton is well developed (skeleton of pharyngeal wall associated with the gills)
- Locomotion by muscular contraction assisted by paired and unpaired fins which are supported by fin rays of dermal origin
- Paired visceral arches are present, first pair forms the upper and lower jaws, the second pair forms the suspensorium and remaining support the gills
- Kidney is mesonephric in adults
- There are 20 pairs of cranial nerves
- Gonads possess true gonoducts
- Development direct, unisexual, amnion and allantoise are absent in the embryonic stage
- Cerebrum is primarily an olfactory centre
- Heart is venous, one pair nostrils, not for respiration only for olfaction.

Major Carps

Definition: *Cultivable species of the fish are called the major carps.*

Cultivable species of fish may be of three types:

(1) Indigenous fishes: *Native fresh water fish, e.g. Labeo, Catla, Cirrhinus.*

(2) Exotic fishes: *Imported fishes. e.g. Cyprinus (Common or mirror carp), Ctenopharyngodon (Grass carp), Hypophthalmichthyes (Chinese carp), Osphronemus, Tilapia and Crucian carp.*

(3) Salt water fish: *Acclimatized to fresh water e.g. Chanos (Milk fish), Mulletts.*

Qualities of major carps:

- They should have a fast growth rate.
- Ability to feed on natural and comparatively cheaper artificial food.
- Should be able to tolerate adverse climatic conditions.
- Should be hardy and resistant to common fish diseases.
- Should be palatable.
- Should be of high nutritive value.
- Should be prolific breeder.
- Should consume small quantity of food for development and growth.
- Should live in ponds with other species of fishes without any disturbance.
- Should preferably be herbivorous in diet.
- Should be gentle and non-poisonous.
- Should be easily harvested.
- Should reproduce under confined conditions.
- Should have low bone to flesh ratio.
- Should support high fish density in ponds.
- Should be transportable from one place to other.

Other qualities of major carps:

- **Major carps feed on phytoplankton and zooplankton, decaying weeds and debris and other available aquatic plants.**
- **Resistant to relatively high temperature and turbidity.**
- **They can tolerate certain oxygen variation in water.**
- **Growth rate is fast and may attain a reasonably large size in short in short duration.**
- **They breed profusely.**
- **Fecundity is high. Flesh is palatable and much nutritive. They can be handled and netted easily.**

(1) *Catla catla*. Hemilton:

Common names- *It is also known by other names like Catla, Bhakur, Thail, Tambra, Tay lee, Bau, Botchee, Dhekeru, etc.*

Distribution: Widely distributed from north and south India, Pakistan, Bangladesh, Burma, Sri Lanka.



(2) *Labeo rohita*. Hamilton:

Common name: *It is also known by other names like Rohu, Ruee, Ruhu, Rohee, Rohit, Roe, Tenbda, Massa, Tapra, Dhambra, Dumbra, etc.*

Distribution: It is widely distributed in north India, Pakistan, Burma, Chennai, Andaman & Nikobar islands, Sri Lanka.



(3) *Cirrhinus mrigala*. Hamilton:

Common name: Mrigala, Mirka, Naini, Mirkali, Mirrga, Mori, Naraini, Morkha, etc.

Distribution: North India, Madras, Assam, East Pakistan, Bangladesh and Burma.



(4) *Cyprinus carpio*. Linnaeus:

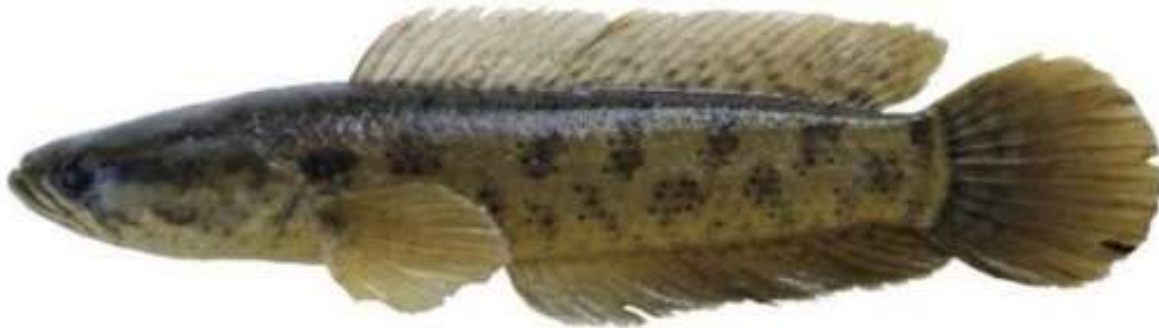
Common name: Common carp or European carp or German carp, Koi (Japan) and Li Yu (China).

Distribution: India, China, Japan, Ceylon, Australia, cultivated in all parts of the world.



5. *Channa punctatus* (Bl.) : Ophiocephaliformes, Family : Ophiocephalidae

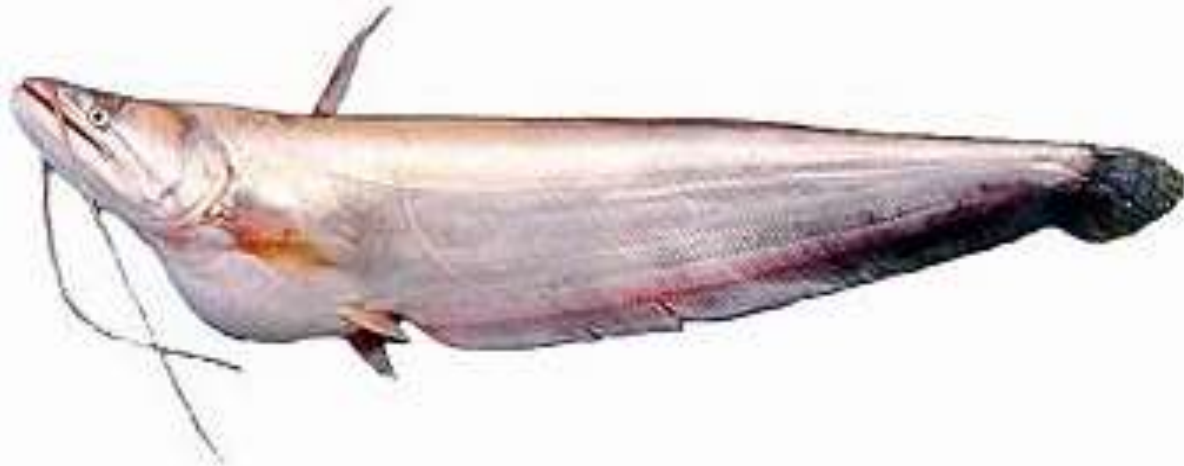
Commonly known as Saur, body covered with scales, 55-60 cm in length, dark black on dorsal and white or yellowish with brown or black spots or striations on the ventral side, slow moving fish, feeds upon manure, mud and rotten substances present in the bottom of the pond, reservoir or even in the well also, lateral line is well marked, head dorso-ventrally flattened, mouth wide, lips of unequal size, head covered with skin, eyes small, operculum short, barbules absent, pectoral and ventral fins small, dorsal fin along with entire length of the body separated from the caudal by a notch, anal fin long and free, caudal fin is not forked, teeth present.



6. *Wallago attu* (Schn.) : Cypriniformes, Family : Siluridae

Supposed to be freshwater shark as it feeds upon young fingerlings, small fishes, frogs, insects and others.

Develops faster, laterally compressed body, eyes are rounded and bigger, mouth wide and armed with teeth, lower jaw slightly longer than upper jaw, barbels 2 pairs and very big, pectoral fin small, dorsal fin rays strong, anal fin long and congruent, caudal fin forked, upper lobe pointed and big, color yellow to yellowish green.



(7) *Ctenopharyngodon idella* (Grass carp):

It is herbivorous fresh water fish. It is a native of Asia (China) and is commonly cultivated in China for food but was introduced in Europe and US for aquatic weed control and now it has been introduced in various countries, including India. It has wide degree of temperature tolerance and spawn at temperature of 20-30°C.



(8) *Hypophthalmichthys* (Silver carp):

It is herbivorous fresh water fish and filter and plankton feeder. It is native of Asia (China). It is widely used in aquaculture. It enhances fisheries and control water quality. It attains a maximum length of about 140 cm and weight of about 45 kg. It is also known as the flying carp. It has olive green coloration above lateral line and on back and silver below lateral line. Body is laterally compressed. Gill rakers are thin and numerous for filter feeding. Smooth keel on abdomen. Dorsal fin originates from posterior to pelvic fin base.

