Black Carp - *Mylopharyngodon piceus*

The black carp, a bottom dwelling molluscivore, was purposely imported into the United States in the early 1970's for use as a food fish and also as a biological control agent for snails - an intermediate host for a trematode parasite in fish held captive on fish farms. There is widespread concern, however, that black carp will escape captivity, establish wild populations, and cause major adverse environmental impacts.

Taxonomy

Phylum	▪ Chordata
Class	▪ Actinopterygii
Order	▪ Cypriniformes
Family	▪ Cyprinidae

General Biology

Juvenile Morphology	▪ Resemble adults
Adult Morphology	▪ Bodies are blackish-brown, elongated and laterally compressed ▪ Fins are blackish-gray, scales are very large with dark edges, giving the fish a cross-hatched appearance (Fig. 1) ▪ Terminal mouth ▪ Maximum length of 131 cm, weight of 36 kg, and life span of 15 yr
Behavior	▪ 4 year old juveniles are capable of consuming ca. 1-2 kg of molluscs per day ▪ Commonly feeds by crushing large molluscs with pharyngeal teeth, extracting soft tissue, and spitting out shell fragments

Fig. 1 Black carp.[1]

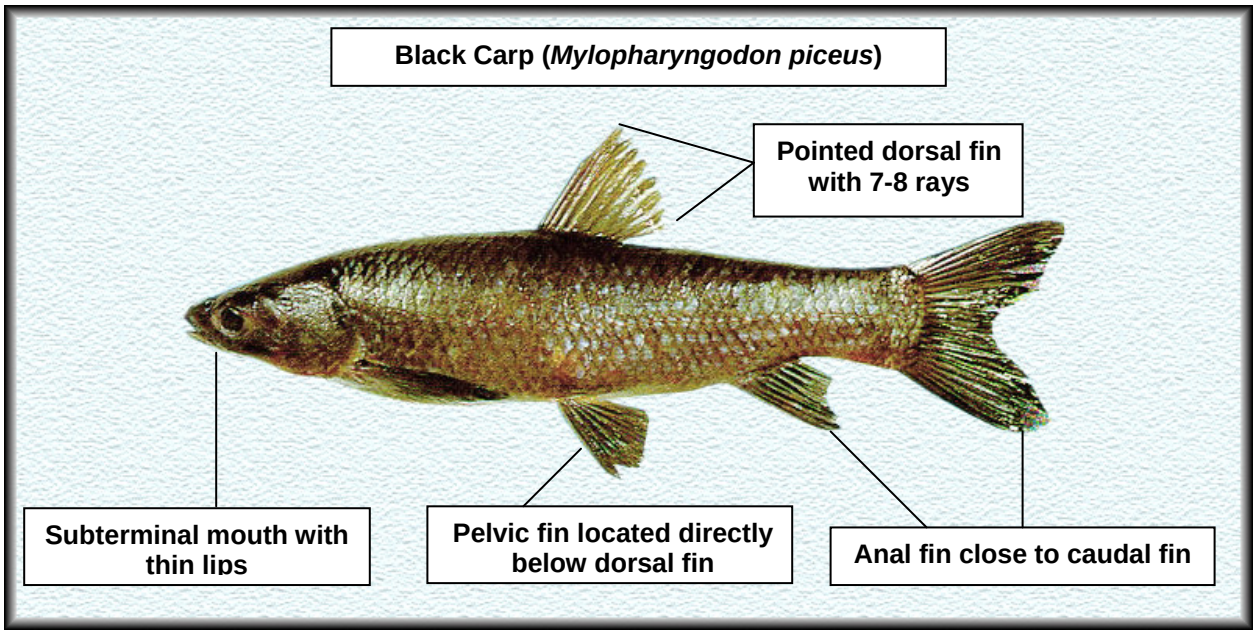
[1] http://www.ittiofauna.org/webmuseum/pesciossei/cypriniformes/cyprinidae/mylopharyngodon/mylopharyngodonpiceus/mylopharyngodonpiceus0.htm

Identification

Distinguishing Characteristics

- Black tipped scales give the appearance of cross-hatching (Fig. 2)
- Dorsal fin is short and pointed, containing 7-8 rays (Fig. 3)
- Dorsal fin is located above the pelvic fins (Fig. 3)
- Anal fin is located closer to the caudal fin than in the native minnow (Fig. 3)
- The black carp closely resembles the grass carp in appearance (body shape and size; coloration; appearance, position, and shape of fins; position and size of eyes) (Fig. 4), but may be most easily distinguished by differences in the formation of the pharyngeal teeth:
  - Pharyngeal teeth of the grass carp possess deep parallel grooves (Fig. 4A)
  - Pharyngeal teeth of the black carp appear molar-like (Fig. 4B)

Fig. 2 Coloration of the black carp. Note the characteristic cross-hatched appearance created by the dark tipped scales.[2]



[2] http://www.studyworksonline.net/cda/content/article/0,,NAV4-43_SAR1222,00.shtml

Fig. 3 Identifying characteristics of the black carp.[3]

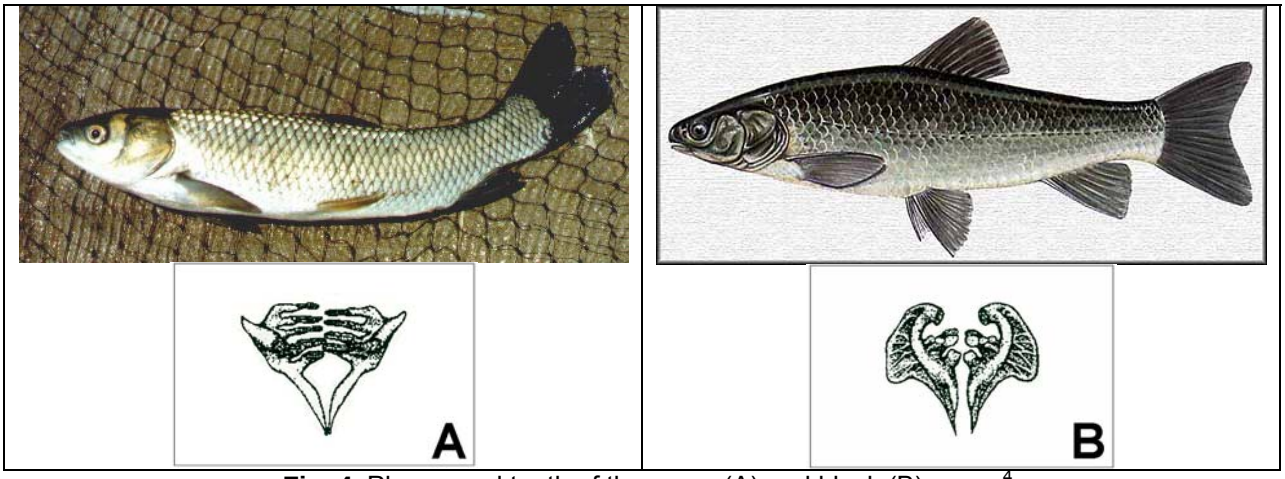


Fig. 4 Pharyngeal teeth of the grass (A) and black (B) carps.[4]

Life Cycle

Eggs

- Bathypelagic and carried by currents
- Eggs swell 4-5 fold during hydration
- Swollen eggs have diameters of 5.6 mm
- Eight embryonic stages

Larvae & Fry

- Four larval stages, followed by two stages as fry
- Growth rate before sexual maturation is determined especially by quality and quantity of food
- Especially sensitive to infection

Maturity

- Reached at 6-11 years of age in native habitat
- Attain relatively large increments in length and weight annually, even following achievement of sexual maturity
- Females are capable of producing between 129,000-1,180,000 eggs per year (depending upon body size)
- Eggs are deposited on the bottom in a single batch

Spawning

- Once maturity has been reached, reproduction is capable of occurring annually
- In native range, spawning begins once water temperatures increase to 26-30°C, water levels begin to rise, and molluscs are readily available
- Occurs upstream and eggs drift downstream with current until reaching areas with little current (e.g., floodplain lakes, smaller streams, and water channels)
- The grass carp (*Ctenopharyngodon idella*), another invasive species possessing similar reproductive requirements, was capable of expanding to inhabit 48 of the 50 contiguous United States since its 1963 introduction and this suggests that black carp might be capable of doing the same

[3] Adapted from http://www.fishbase.org/

4 Adapted from http://wwwaux.cerc.cr.usgs.gov/MICRA/Asian%20Carp%20Brochure%20MICRA.pdf and http://www.aquaticmanagement.com/grasscarp.htm

Habitat Characteristics

Preferred Environment
- 0-10 m depth
- Wide variety of freshwater habitats: rivers, streams, and lakes
- Capable of inhabiting subtropical habitats; 53-15°N latitude

Temperature
- Reproduction of the species is initiated by a temperature increase to 26-30°C
- Little is known regarding temperature preferences of the species

Salinity
- Strictly a freshwater species

Distribution

Native Range
- Pacific drainages of Eastern Asia

North American Distribution
- Black carp have been maintained in hatcheries, fish culture facilities, and fish farm ponds (mainly located in the southeastern United States). Both diploid (fertile) and triploid (sterile) fish have been used in fish farming applications, and some have escaped captivity. A small number were reported escaped from a fish farm near the Lake of the Ozarks, Missouri during a 1994 flooding event (Fig. 5). Additionally, one large (783 mm, 5.8 kg.) four year old black carp was captured by a commercial fisherman from Horseshoe Lake near the confluence of the Mississippi and Ohio rivers on March 26, 2003. Preliminary analyses indicate that this fish was a triploid individual.

Means of Introduction
- Imported for use as biological control agent for the management of a trematode parasite of cultured catfish
- Imported for use as a food fish

Fig. 6 There are no known established populations of black carp in the wild. Some, however, have escaped captivity.[5]

Diet

Immatures
- Zooplankton, fingerlings

Adults
- Molluscs, benthic crustaceans, aquatic insects, and fish eggs

Impacts

Negative
- Establishment of populations in the wild could have serious adverse impacts, due to predation on:
  - native mollusc species, including threatened and endangered species
  - fingernail clam populations, a primary food source of migrating waterfowl and fish
- Black carp are host to parasites, flukes, and bacterial and viral diseases and could possibly transfer these to other fish species

[5] http://wwwaux.cerc.cr.usgs.gov/MICRA/Asian%20Carp%20Key%20MICRA.pdf

Management

Control Measures

- Regulating the use of black carp by placing it on the federal list of injurious wildlife species under the Lacey Act may assist in the containment of managed populations
- Destruction of captive stocks

Literature

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Web Sites

http://nas.er.usgs.gov/fishes/accounts/cyprinid/my_piceu.html
Florida Caribbean Science Center

http://sgnis.org/publicat/96Rothba.htm
Sea Grant Nonindigenous Species site

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