

First record of the common carp *Cyprinus carpio* var. *communis* (Linnaeus, 1758) and the mirror carp *Cyprinus carpio* var. *specularis* (Lacepède, 1803) in Tabasco, Southern Gulf of Mexico

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Abstract

Cyprinus carpio is known to be established in most of Mexico. Only the Mexican Gulf states were free of this species until recently. This paper reports the first record of the common carp in Tabasco, Mexico. Seven specimens of *Cyprinus carpio* var. *communis* and one specimen of *Cyprinus carpio* var. *specularis* were detected in a small scale fishing landing site near Frontera, Tabasco on January 24, 2011. Further sampling and monitoring is required to assess the ecological impacts of this exotic species on the native fauna.

Key words: *Cyprinus carpio*, carp, invasive species, Tabasco, Mexico

Introduction

The common carp originated in European rivers around the Black Sea and the Aegean basin, especially the Danube (Berra 2007; Freyhof and Kottelat 2008). Prior to human influence the common carp was found in the Black, Caspian and Aral Sea drainages, east into Siberia and China and west as far as the Danube River (Balon 1995).

Common carp has been a popular aquaculture fish for more than 2,000 years (FAO 2010). This condition has resulted in *C. carpio* being the third most frequently introduced species worldwide (Saikia and Das 2009). The production of carp (Cyprinidae) was 20.4 million tons which is equivalent to 71.1% of total freshwater production worldwide (FAO 2010).

The common carp *Cyprinus carpio* var. *communis* was introduced in Mexico in 1889 and the mirror carp *Cyprinus carpio* var. *specularis* in 1956 from Haiti (Obregón 1961). Nowadays common carp and mirror carp are broadly distributed in Mexico. They are cultured in the states of Aguascalientes, Chiapas, Chihuahua, Coahuila, Durango, Guanajuato, Hidalgo, Jalisco, Michoacán, Oaxaca, Puebla, Querétaro,

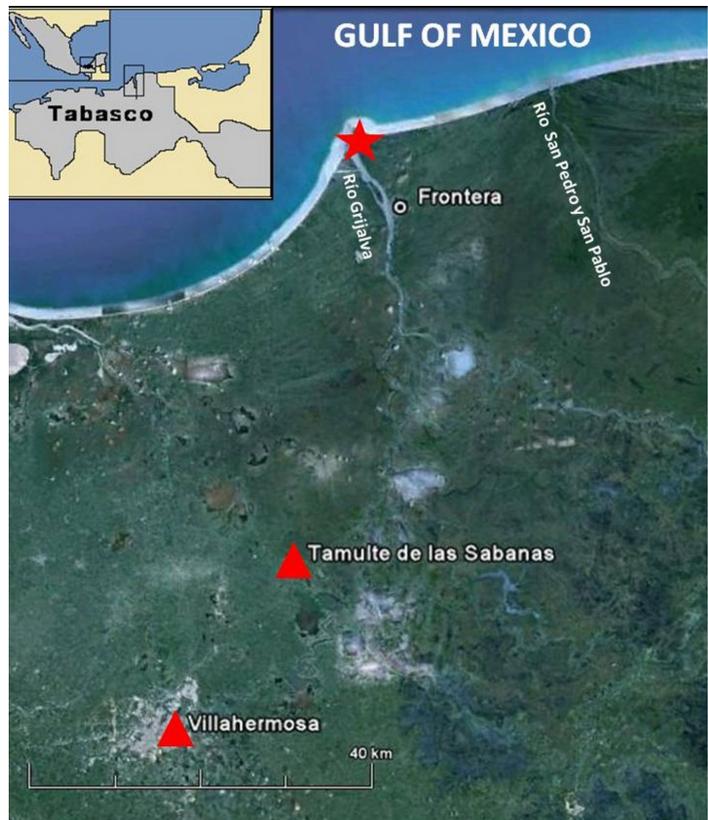
San Luis Potosí, Sonora, State of Mexico, Tlaxcala and Zacatecas (DOF 2011). Many ponds, lagoons and dams have been stocked with these carp species mainly in rural areas in order to increase protein consumption and generate jobs. Carp have played an important role in aquaculture development in Mexico, occupying in 1985 the second place in importance for yield in freshwater fisheries (SAGARPA-CONAPESCA 2008). The capture of carp in 2008 was 27,844 tons. In the present paper we describe first record of these species in the Gulf States of Mexico.

Methods

The sampling was conducted near Frontera, Tabasco (18°36'21.75"N, 92°41'07"W) during an artisanal fisheries monitoring program survey in January 2011. Cast nets with a mesh size of 76.2 mm were used during the survey. Sampling sites are shown in Figure 1.

Shoreline vegetation in the sampling site was primarily red mangrove *Rhizophora mangle*, white mangrove, *Laguncularia racemosa*; black mangrove *Avicennia germinans* and button

Figure 1. Map of Tabasco, Mexico showing the Grijalva River. Star indicates the site where common carp were caught and triangles indicate the sites where they were observed.



mangrove *Conocarpus erectus*, with a few overhanging trees bordering an area of urban development. Aquatic vegetation consisted of water hyacinth, *Eichhornia crassipes*. The substrate was mud. Water surface temperature was 21°C and salinity 4 PSU.

Specimens of both varieties of carp are housed in the Ichthyology Collection of the Centro de Investigación de Ciencias Ambientales of the Universidad Autónoma del Carmen under catalog numbers CI-CICA-UNACAR 0230 and 0231. The criteria used to identify the specimens were described by Schofield et al. (2005).

Results and discussion

Seven specimens of common carp and one specimen of mirror carp were recorded during the survey on January 24, 2011. Common carp measured from 268 to 340 mm in total length; total weights were 251 to 650 g. Mirror carp measured 330 mm and weighed 600 g. Sex could not be determined in these fish.

Common carp caught in the Grijalva river had an elongated body and somewhat compressed, thick lips, two barbels on each side of the upper jaw, with the posterior pair more conspicuous; relatively small, toothless mouth, with the upper jaw slightly protruding; lateral line complete, with 35 scales; one long dorsal fin with 21 soft rays, and a stout saw-toothed spine in front of the dorsal and anal fins; pectoral fins with 14 rays; pelvic fins thoracic, originating beneath origin of dorsal fin, 8 rays; one anal fin with 5 branched rays; large and thick cycloid scales with yellowish-white color below; fins dusky. Mirror carp are very similar to common carp, with a robust body with flakes in the dorsal and lateral part, and large scales resembling mirrors (Figure 2).

The differences between common and mirror carp are genetic and visual. Common carp have an even, regular scale pattern whereas mirrors have irregular, patchy scaling. The two species can be distinguished by visual inspection. Reports from fishermen about the capture of common carp in rivers and lagoons near Tamulte

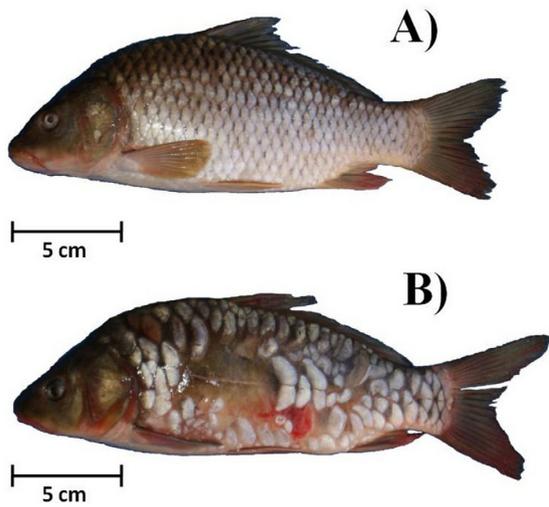


Figure 2. Lateral view of common carp *Cyprinus carpio* variety: A) *communis*, B) *specularis* caught in Tabasco, Mexico 24th of January 2011 (Photo by L.E.Amador-del Ángel).

de las Sabanas and Villahermosa, Tabasco, suggest that *C. carpio* is spreading in the lower Grijalva-Usumacinta River Basin (Laureano Chocoteco pers. comm.).

Although carp are mostly found in fresh water, the common carp specimens in this report were caught near coastal waters with low salinities. This characteristic of the carp had been reported in areas of its native geographical range (Kuliyev and Agayarova 1984) and North America in several states bordering the Atlantic and Pacific Oceans and Gulf of Mexico (Moyle 2002) as well as the Atlantic and Pacific coasts of Canada (McCrimmon 1972). Carp have been captured in U.S. waters with salinities as high as 17.6 PSU (Schwartz 1964), and it has been suggested that *C. carpio* invades new freshwater drainages by moving through coastal estuaries (Swift et al. 1977).

Common carp expansion in Tabasco could have potentially undesirable effects in river and lagoon ecosystems. Documented ecological effects of *C. carpio* include i) a tendency to destroy vegetation and increase water turbidity by dislodging plants and rooting around in the substrate, causing a deterioration of habitat for species requiring vegetation and clean water (Bellrichard 1996; Laird and Page 1996, Zambrano and Hinojosa 1999; Zambrano et al.

1999); ii) preying on the eggs of other fish species (Taylor et al. 1984; Miller and Beckman 1996), iii) the gradual disappearance of native fish by destroying their spawning grounds or uprooting aquatic plants that provide habitats (McCarragher and Gregory 1970). Additional sampling and monitoring is required to assess the impacts of this new exotic species on the native fauna of freshwater ecosystems in Tabasco.

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