The biology of the Cascadu, *Hoplosternum littorale* (Hancock)

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Introduction

Hoplosternum littorale (Hancock) is an armoured catfish belonging to the family Callichthyidae. It is locally known as the cascadu, cascadura or cascadoo (Regan, 1906; Price, 1955; Boeseman, 1960). The cascadu is the most important freshwater food-fish in Trinidad. It is a local delicacy and is part of our folklore (Selvon, 1972). The fish is heavily exploited especially during the dry season when water levels are low making it is easier to catch. Fishing gear includes cast nets, hook and line and bamboo traps called garapachas.

Description

The fish is fairly small, with males attaining a maximum length of 19 cm and females 16 cm in the wild (Singh, 1978). There are two longitudinal rows of dremal plates which form the "armour". The head is flattened and at the base of the small protrusible mouth there are two pairs of sensory barbels. The eyes are comparatively small (Plate 1). The jaws are toothless but pharyngeal teeth are present which may be involved in food selection.

The fish has underdeveloped gills and a highly vascularized gut which enables it to breathe air (Carter and Beadle, 1931). It therefore respires bimodally.

Distribution

In Trinidad, *Hoplosternum littorale* is found in the Nariva Swamp and freshwater section of the Caroni Swamp. It also inhabits slowly flowing rivers south of the Northern Range.

The cascadu is primarily a South American fish and is found in the following countries: Guyana, Venezuela, Surinam, French Guiana, Paraguy, Argentina and probably Brazil.

Life History

The cascadu is a seasonal spawner. Spawning occurrs at the beginning of the rainy season and is a response to rising water level (Singh, 1978). The spawning season extends from June to October with major spawning activity be in July.

The male cascadu builds a dome-shape nest in fairly shallow water using available material such as dead grass, dead leaves, twigs, paper and even green vegetable matter (Plate 2). The nest ranges from 15 to 50 cm in diameter and is usually 6 cm in height (Singh, 1978). It is supported by a thick layer of froth which is produced by the male. Nest building usually occurs during the night.

One or more females contribute to the "cake" of adhesive eggs which is deposited in the dark underside of the nest within the foamy layer (Plate 3). The eggs are golden in colour when newly laid. Spawning tends to occur around midday. Each nest contains from 2 000 to 22 000 eggs with a mean of 10 200. After spawning the females are driven away by the male. The fishes are multiple spawners (Singh, 1978).

The male grows forwardly-pointing pectorial spines during the spawning season (Plate 4) and these help it in protecting the nest from predators. The male does not always guard the nest as reported by Singh (1978) and Lowe-McConnell (1987). However, he repairs the nest if it is damaged. Incidence of fungal infection is minimized by the male periodcally removing dead eggs from the egg mass.

The layer of foam serves several functions. It supports the nest and also protects the eggs from extremes of temperature and, possibly, physical shock. The foam provides an oxygen-rich environment for development of the eggs. It may also serve as an anti-predator device.

As development occurs the eggs darken in colour. Hatching occurs in 3 to 4 days. The sac fry cling to the nest for 2 to 3 days (Ramnarine, 1989) during which time the yolk sac is absorbed. Afterwards, they begin active foraging. The male helps in distribution of the fry by sometimes destroying the nest.

The fry feed on periphyton which consists of filamentous algae, cladocerans, desmids, rotifers, copepods and the minute eggs of some invertebrates.

Larval development is fairly rapid and in about 2 weeks the fry switch from branchial respiration to bimodal respiration (Ramnarine, unpub. data). In the wild, growth is fairly rapid and sexual maturity is achieved within one year, males maturing at a minimum length of 12 cm and females at a minimum length of 9.5 cm. The life span is normally 4 years (Singh, 1978). The cascadu is a demersal fish and feeds primarily on detritus. It also takes copepods and other aquatic invertebrates. (Singh, 1978).

Potential For Culture

The cascadu has been suggested as a potential culture species by Kenny (1959) and Bruce (1981). The fish has several characteristics which makes it a suitable culture species. There is an existing local market for the fish with a high price of TT$2 to $3 each, or even higher, being commanded during the rainy season when the fish is not very abundant. In the dry season, when the main fishery exists, prices are between $1.50 and $2.00 for medium-sized fish. Demand exceeds supply, with the result that National Fisheries imports wild-caught fish from Venezuela. There is also the possibility of an export market to cities where large West Indian and Surinamese populations live: New York, Toronto, London and Amsterdam.

Biologically, the fish has several features which favour intensive culture. Its air-breathing habits and schooling behavior enable it to tolerate high stocking densities. Schooling behavior is also an aid to supplementary feeding. The bony armour makes it easy to package, reducing possible damage by crushing. Its ability to survive out of water for 10 to 14 hours is another favourable feature which makes live marketing possible. No major diseases or cases of parasitism have as yet been recorded.

The fish has a fast growth rate and in culture marketable size can be achieved in 6 months. The detritivorous nature of the fish (Singh, 1978) favours it for culture because organisms which occupy low trophic levels are preferred (Kinne, 1980). The technology for fingerling production has been developed and research is in progress on nutritional requirements of the animal at the Department of Zoology, U.W.I.

The fish has been cultured at a subsistance level for several years. A commercial hatchery has been established in Gran Couva and the first attempt at commercial culture is being carried out on the periphery of the Nariva Swamp.

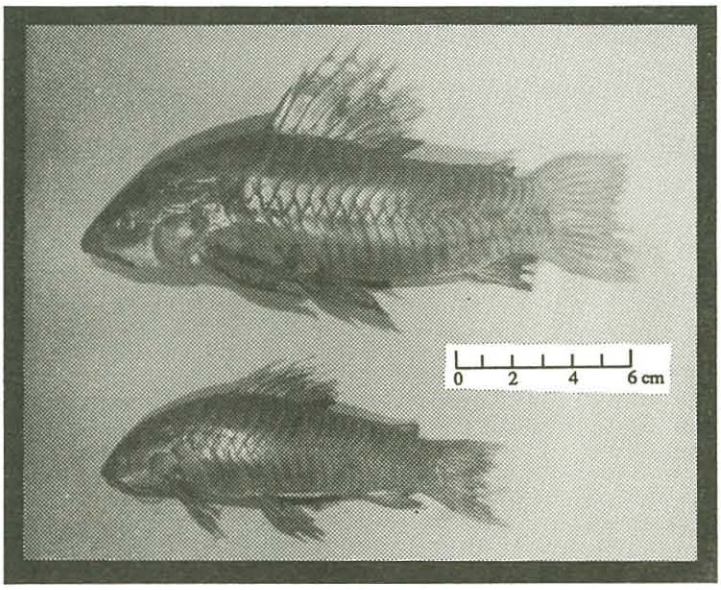

Plate 1 :
Adult male (above) and female (below) "Cascadu"

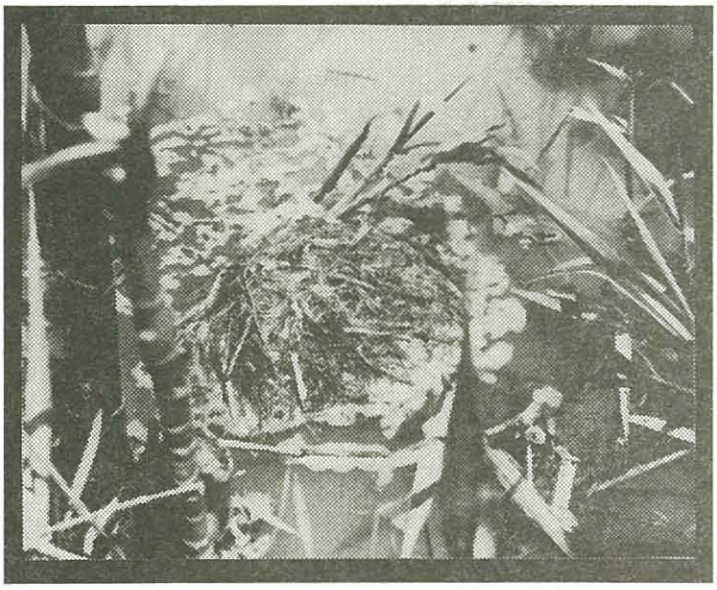

Plate 2 :
Cascadu nest

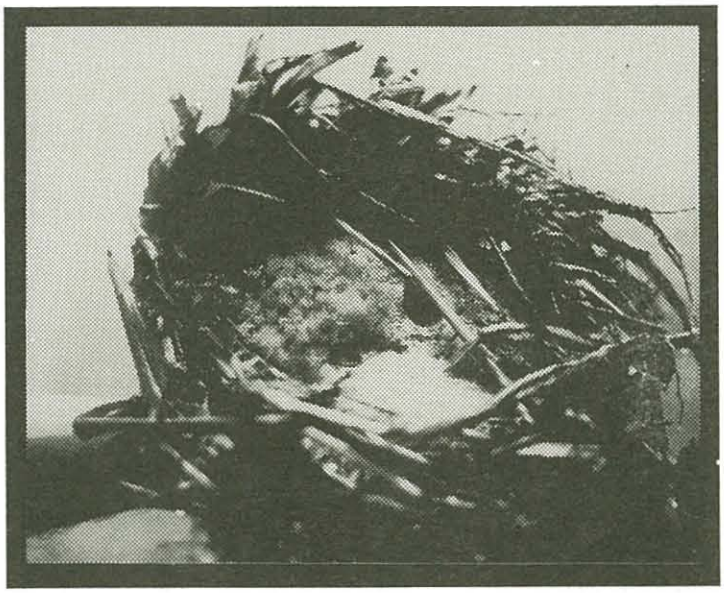

Plate 3 :
Cascadu nest showing egg mass

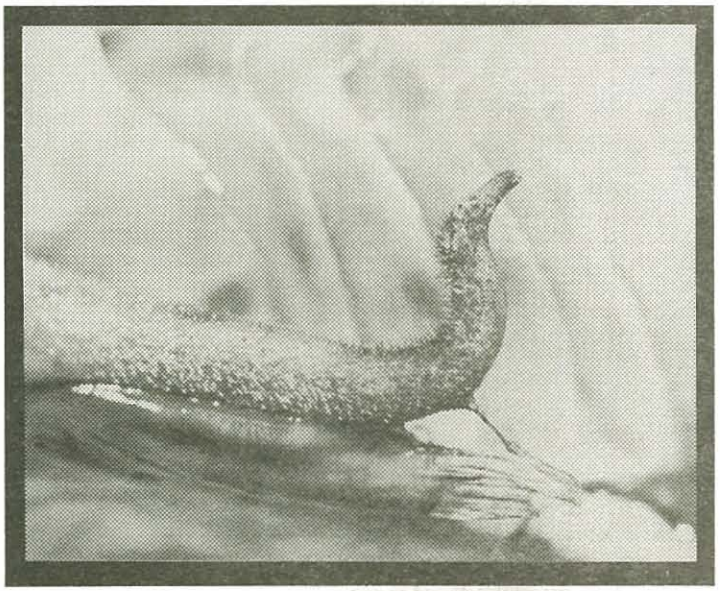

Plate 4 :
Pectorial spine of male Cascadu

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