Huayaipe fry at 28 days.

Huayaipe juveniles at 40 days.

Huayaipe at 82 days.

Experimental Culture of Ecuadorean Huayaipe

Enrique Blacio, M.Sc.
Marine Fish Culture Laboratory
Fundacion CENAIM ESPOL
Guayaquil, Ecuador
eblacio@cenaim.espol.edu.ec

Jodie Darquea
Universidad de Guayaquil, Escuela de Biologia, Guayaquil, Ecuador

Sandra Rodriguez
Fish Culture Consultant

Marine fish culture is an alternative for aquaculture development in Ecuador. The Pacific yellowtail (*Seriola mazatlana*), locally known as huayaipe, is considered a good candidate for production because other related species from this genus, especially the Japanese yellowtail (*Seriola quinqueradiata*), yellowtail kingfish (*Seriola lalandi*), and European amberjack (*Seriola dumerili*) sell for attractive prices in international markets. However, limited information on its biology is currently available, and research efforts are under way.

Past Research

During the last decade, several hatcheries and private aquaculture companies have conducted some trials with huayaipe in Ecuador. These experiments have provided data on some of the parameters needed by this species to mature and spawn in captivity. In addition, results of larviculture and growout trials have been published, especially by University of Miami Professor Daniel Benetti and coworkers. However, larval survival is still highly variable, and due to heavy mortalities at first feeding and swim bladder inflation stages, a very low percentage (0.5-2.0%) of the animals survive to the juvenile stage.

CENAIM Activities

In 2001, CENAIM began collaborating with a private company on several aspects of huayaipe culture research. Included in this joint effort are studies on larval survival improvement – based on larval feed enhancement and feeding management – that are currently being carried out, with the assistance of undergraduate students from local universities with ties to CENAIM.

Broodstock

Some huayaipe broodstock have been maintained at CENAIM's facilities since April 2002. Fish are kept (at less than 5 kg/ton water) in two, 18-ton, indoor fiberglass tanks in the maturation laboratory at ambient water temperature and natural photoperiod, 34-35 psu, with daily water exchange of 150%. Feeding includes a varied diet of fresh and frozen fish (mostly clupeids and small tunids), squid, and fish gonads, with the addition of vitamins. Fish are fed once a day during the morning.

Spawning

The fish have adapted very well to the rearing conditions begun to spawn. No water temperature control is provided for the tanks, so spawns followed the natural cycle of sea temperatures. No hormone treatment has been necessary. A total of 87 viable and nonviable egg batches were obtained before December 2002. Collected eggs were stocked in conical, polycarbonate, 500-l tanks for hatching. Temperature controls in these tanks keep the water at 27° C.

Hatching and Development

Samples have been collected from several egg batches for observation and photographic records using microscopy equipment with a 350-mm camera. Photos taken every hour record the egg and embryo development process, and a photographic sequence from the 16-cell stage up to hatching shows the main features of development. Results showed that viable eggs hatch after 24.5 hours at a water temperature of 27.4° C.

Swim Bladder Development

In addition, a series of histological plates of the huayaipe larvae in several stages has been produced, which allows study of the development of the swim bladder. This is a crucial stage for this fish, and photographic records obtained during the studies showed that a pneumatic duct forms early (day 5-7 of life), a characteristic of physostome fish. After the larvae inflates its bladder, however, this duct is lost, turning the fish entirely physoclistous. This physiological feature is common

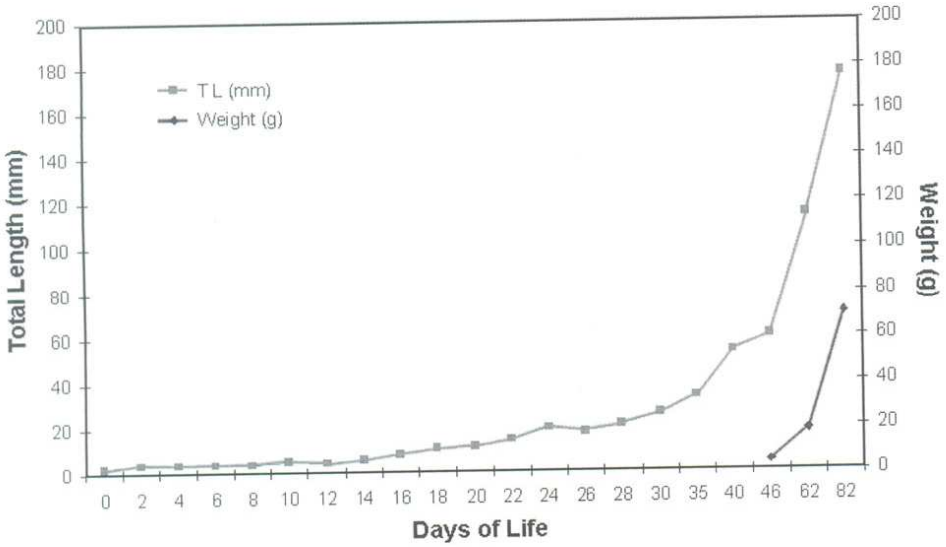

Figure 1. *Growth curve of Pacific yellowtail (huayaipe) cultured in outdoor tanks.*

among advanced teleosts.

Larviculture

Using culture strategies based on managing water temperature, salinity, and light intensity in the larval-rearing tanks, a batch of juvenile huayaipe was produced. These fish are currently being reared in outdoor tanks.

The larviculture stage was carried out in 500-l plastic tanks with controlled temperature (26.5° C). Salinity was maintained at 25 ups until day 30, then increased gradually to 35 ups over a five-day period. At three weeks of age, cannibalism and aggressive behavior sets in, so fish were transferred to 5-ton outdoor fiberglass tanks. One month later, they were moved to 12-ton outdoor tanks.

All tanks are shaded to provide a light intensity at surface of ca. 1800 lux on sunny days. Feeding started with rotifers, *Artemia* nauplii, a dry microdiet, and 55%-protein dry pelleted feed.

Conclusion

At 82 days old, the surviving juveniles were growing well (Figure 1) and mortality was virtually nonexistent. Animals from this batch will be eventually transferred to an outdoor, plastic-lined, 0.08-ha pond for grow-out. Future larviculture trials are needed and will be critical to fine tune rearing procedures – including feeding strategies – which have so far produced a fish survival of 2.35% at the end of the larval stage.