

THE PROSPECT OF EEL CULTURE IN THE PHILIPPINES

by

P. C. Gutierrez
Bureau of Fisheries and Aquatic Resources
Manila, Philippines

Abstract

The eel culture industry in the Philippines is still in its infancy, having started in 1972 when commercial quantities of elvers were first discovered in the estuarine delta of the Cagayan river system, Cagayan Province, Philippines. Eel farming in the Philippines promises a bright future in view of the favourable climatic conditions. The Philippines has rich elver grounds, specially those that are found in Cagayan river system, the coastal rivers of Cagayan Province, the Buayan river in South Cotabato Province, and other coastal rivers in Mindanao region.

A good number of eel traders and culturists are now established in the country. There are three important species of eel present in the Philippines, *Anguilla pacifica*, *A. celebesensis*, and *A. marmorata*. Elvers from the *Leptocephalus* stage enter the mouth of rivers and migrate upstream where they are caught as glass fish (transparent elvers) through the use of fyke nets fixed along the banks of rivers. Scoop nets and fine meshed seines are also used.

CONTENTS

	<i>Page</i>
1. INTRODUCTION	311
2. PRESENT STATUS OF THE EEL INDUSTRY	311
3. EEL CULTURE IN THE PHILIPPINES	311
3.1 Nursery ponds	311
3.2 Transition ponds	312
3.3 Rearing ponds	312
4. FISH DISEASES	312
5. PROBLEMS	312

1. INTRODUCTION

Eels belong to the family Anguillidae and species of the genus *Anguilla* are most important in fresh waters. Elvers at the Leptocephalus stage enter the mouth of rivers and migrate upstream where they are caught as glass eels (transparent elver) through the use of fyke or bag nets fixed along the banks of rivers. Push nets and dip nets are also used. Elvers are usually caught at night during high tides and after heavy rains. So far, the Cagayan river system (estuarine delta) in Cagayan, Buayan river in South Cotabato, and the coastal rivers of Cagayan and Davao del Sur province, yield commercial quantities of elvers of three species: *Anguilla pacifica*; *A. marmorata*; and *A. celebesensis*.

Elvers weigh about 0.2 g and measure 5-6 cm in length. There are about 5 000 to 6 000 elvers per kg.

The elver season in the Philippines is from July to February, with its peak from August to November.

2. PRESENT STATUS OF THE EEL INDUSTRY

With the ban on the exportation of elvers (FAO, 1973) most investors in eel culture have benefitted greatly, although some eel traders in Cagayan province have ceased to operate. FAO (1973) prohibits the exportation of elvers, thereby giving the local eel culturists enough for their use, while keeping the price of elvers low.

Today there are five private eel traders and eel holding pond operators in Cagayan province. They are mostly engaged in eel trading and hold the elvers in ponds ready for their shipment to Manila. Strictly speaking, there are no commercial eel culture projects in Cagayan province. The only eel pond to culture elvers to larger stages is at a small experimental eel project of the Bureau of Fisheries and Aquatic Resources at the Freshwater Demonstration Fish Farm, Bantay, Camalaniugan, Cagayan. The eel traders, dealers or holding pond operators buy elvers from collectors in the area. The elvers are kept for a period of three weeks to one month before they are shipped to Manila by aircraft. Holding the elvers temporarily in the holding ponds will allow them to acclimatize and become stronger for transport. At least three of these holding pond operators are themselves owners of eel culture projects in Central Luzon and nearby. Some eel traders buy the "Curoco" size or pental size eels which are caught in small streams and rice paddies in the contiguous areas of the Cagayan river system. These wild curoco size eels are trained to eat in the transition ponds. It has been reported that using these eels for stocking the ponds has shortened the rearing period by 3 to 4 months.

There are 4 eel culture projects in operation in the country, three of them found in Luzon namely: the Showa-United Food, Inc., Lucanin, Mariveles, Bataan; ESS Marine Resources, Cansinala, Apalit, Pampanga and Taki Fish Industry (Phil.), Inc., Bagbaguin, Valenzuela, Bulacan. The only eel project in Mindanao is the Sun Foods, Inc., Dumoy.

Of the three species cultured, *Anguilla celebesensis* has shown the fastest growth. However, this accounts for only 7-8 percent of the total. *Anguilla pacifica* is next in order of growth rates, with about 70 percent and *Anguilla marmorata* 20-25 percent. *A. marmorata* is the species least preferred for pond culture in view of their slow growth and high food conversion ratio.

3. EEL CULTURE IN THE PHILIPPINES

Eel rearing is done in relatively small ponds which are usually made of concrete and constructed to provide adequate inlet and outlet for the maintenance of a continuous flow of fresh water. Dissolved oxygen must be kept high and satisfactory water quality should be maintained throughout the culture period.

3.1 Nursery ponds

Nursery ponds are intended for rearing elvers. Elvers, each weighing 0.2 g are grown to a few grams weight before they are transferred to the transition ponds. Here they are made to adapt themselves to the new kind of food and environment. Nursery ponds range from 10 to 100 m² in size. The nursery ponds are usually shaded, with a depth of 80-100 cm. Water from elevated tanks or a reservoir is sprinkled over the pond by a perforated pipe to supply oxygen and to keep the water temperature low. Another method of augmenting the supply of oxygen is the use of an air blower compressor through rubber tubing, with outlets

located at the bottom of the pond. Elvers are fed with finely ground fish flesh and liver given at about 10 percent of their body weight. Overflow of excess water is drained through a properly screened outlet pipe. The stocking rate is 400-500 g m⁻².

3.2 Transition ponds

After three weeks to one month in the nursery ponds, the young eels are transferred to transition ponds. Shaded feeding houses are provided and a continuous flow of water is provided. Additional oxygen is supplied either by an elevated pipe which drops water to a mounted board or by the use of paddle wheels driven by an electric motor. The pond walls are provided with protruding lips at the top and may either have a concrete or a sandy bottom. The pond bottom should be concrete if the soil is not capable of retaining water, whereas areas with a hard shifting bottom can be spread with a layer of sand (about eight inches thick) to maintain good water quality. The pond bottom slopes towards the drain pipe. Overflow pipes are also provided to get rid of excess water. Culling is carried out in the transition pond. The rearing of young eels (curoco size) may take three months in this pond. Floating scum, "labelab" and filamentous algae are removed from the pond. Most eel ponds are now constructed above ground level to facilitate drainage and save costs of excavation. Stocking rate in the transition pond is 400 to 500 g m⁻² with a water depth of from 60 to 70 cm. The size of the transition ponds ranges from 100 to 500 m². The food consists of ground trash fish given at about 15 percent of the body weight. Other eel culture projects use synthetic feeds imported from Japan.

3.3 Rearing ponds

The rearing pond is a large pond with a construction similar to that of the transition pond. The food is coarser and blanched fish and minced flesh can now be given. Young eels are grown to marketable size in this pond. The aim is to produce 150-200 g eels for the table. The stocking rate is about 400-500 g m⁻² with a depth of 60 cm. Production of an average 5-6 kg m⁻² can be attained in the rearing pond. A larger feeding place which is sheltered or darkened is provided at one side of the pond. The food is placed in a feeding tray or basket suspended to prevent contamination of the water. The quantity of food (either fresh or frozen fish flesh, or synthetic diet) supplied is about 15 percent of the body weight. The feed coefficient if flesh is used is 8-10 and about 2.5 for synthetic diet. Eels are harvested when they are about 150 to 200 g in weight, or 5 to 6 per kg. The pond bottom slopes towards the centrally located drain pipe at a depth of about 1.30 m. The depth at the side is usually shallow from 60-70 cm. The size of rearing ponds ranges from 500 to 2 000 m². Lately smaller rearing ponds below 1 000 m² have proven to be more practical.

4. FISH DISEASES

Eels are subject to diseases in intense culture. One method used to combat disease is to disinfect the water with formalin solution. Treating infected eels with 30 ppm for 24 hours has been effective. Salt solution applied at 6 kg m⁻² for 24 hours is also recommended.

5. PROBLEMS

The main problem of the eel culture industry today is the high cost of feeds. The price of trash fish has gone up and the cost of imported synthetic feeds has become very exorbitant. The other problem is lack of technology on the culture of local species of eel.