

## **SOCORRO-CLAVERON-VELARDE (SCV) ARTIFICIAL FISH EGGS INCUBATOR FOR INTENSIVE TILAPIA HATCHERY SYSTEM**

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### **Abstract**

The Tilapia Industry in Bicol Region is one of the sources of livelihood and cheaper protein foods of the Bicolanos. For many years the industry depended on fingerlings produced through daily scooping of fry in the breeding pond. The undeniable problems caused by this method ensued like poor growth and deformities due to inbreeding, the poor production of fry caused by cannibalism in the breeding pond and irregular sizes due to uncontrolled breeding regime and other minor ones. This besets the industry. Thus, the SCV Artificial Fish Egg Incubator was developed to support thriving and expanding tilapia industry. It aimed to help hatchery operators produce healthy fry of desired size, strains and quantity. This could support either backyard type or commercial scale hatchery. Due to increasing demand of tilapia fingerlings the SCV artificial incubator was introduced at the phase 2 of the RFFC in June 2003. It was composed of twenty (20) hatching troughs or boxes measuring 75cm x 50cm x 20cm made of concrete materials and PVC water supply system. The stocking density in every trough was 30,000-50,000 eggs. This system sped up the hatching of eggs and shortened the breeding cycle of tilapia in captivity. The adoption of this system by the RFFC proved that it was a worthy investment. It has now attained a higher fry to fingerling production at a better quality than the traditional practice. This new system had been shared to many interested fishers in the region for fry production. With the advent of the new tilapia strain called GET EXCEL Tilapia under the GET EXCEL TILAPIA PROJECT, the SCV incubator system once again proved the worthiness in effective production of quality GET EXCEL tilapia fingerlings. This SCV system can be used in incubating eggs of either brackish or marine origin fish whether it is induced or naturally spawned. Because of flexibility in material components and design of this system, this is adoptable for massive fry production, like commercial or in mass dispersal operation of fisheries agencies or non-government organizations. Likewise, this is a tool for promoting a sustainable aquaculture system.

### **Rationale**

The Tilapia Industry in Bicol Region is one of the sources of livelihood and cheaper protein foods of the Bicolanos. For many years the industry depended in fingerlings produced through daily scooping of fry in the breeding pond. Though there were limitations and problems in the operation, this method sustained the fingerling requirements of the

industry. Through the years this method continued. The undeniable problems caused by this method ensued poor growth and deformities due to inbreeding, the poor production of fry caused by cannibalism in the breeding pond and irregular sizes due to uncontrolled breeding regime and others. This besets the industry due to bad quality of tilapia produced here and consequently gave a bad reputation to the fingerling producers. This condition drastically affected the industry. A corrective measure is important that above mentioned problem could be diminished gradually towards total change in the breeding system. The attainment of a good system in producing fry at its best quality was considered to bring back the trust and confidence of the fish producers to tilapia hatchery operators. Thus the SCV Artificial Fish Egg Incubator was born to support thriving and expanding tilapia industry.

The introduction of this incubator would facilitate the continuous production of good quality fry. One could be able to determine the fry as to its definite sizes, batches, strains, quantity, state of health and prevent mass mortality of egg or fry. This could support either backyard type or commercial scale fry production. This system would provide a new front in the tilapia hatchery operation of various fisheries facilities in keeping the availability of substantial flow of fingerlings for the need of fishers and the replenishment of the lost population in natural waters.

### **History of SCV artificial fish egg incubator development**

The development of this incubator is a manifestation of the need to improve the tilapia industry in the region. The recognized problems in the industry had caught the attention of the above authors to confront this problem.

Hence, an alternative method was devised. The beginning of this was done through visitation of other aqua farms or aquaculture facilities in the Philippines to see what technology they have regarding egg incubation. Books were also scanned for the same purpose. The recollection of past experiences in egg incubation enriched the ideas of the concept. After the many discussions regarding the right type of incubator, the group opted to make a new design based from the previous innovation made in Saudi Arabia in 1989. This was made of PVC pipes so tailored to become cone-funnel type egg hatching through with an in-placed egg tray. The system used a closed type water recirculation. This proved to be an effective method of intensive fry production. The only problem here was the small hatching area of the funnel that makes it the limiting factor in fry production. So a new design that could give more fry production but fitted for Bicol conditions was made using the same principle of operation. At Regional Freshwater Fisheries Center (RFFC), Fabrica, Bula, Camarines Sur previously of the Department of Agriculture (DA) now under the Bureau of Fisheries and Aquatic Resources (BFAR), the need to modify the traditional fry collection system was recognized because of increasing demand of tilapia fingerlings region-wide. By June 30, 2003 the SCV artificial incubators was introduced at the phase 2 of the RFFC. It was composed of twenty (20) hatching troughs or boxes measuring 75cm x 50cm x 20cm made of concrete materials and PVC water supply system. The stocking density in every trough was 30,000-50,000 eggs. This system hastened the hatching of eggs and shortened the breeding cycle of tilapia in captivity. This proved to have a better capability than the former design. The potential output of this could be increased by increasing the number of

boxes or the area of the trough. Now in rural areas in backyard hatchery-nursery operation for tilapia and catfish, a marine plywood boxes are being used as an alternative of concrete materials for economic reasons.

### **Description of SCV artificial incubator**

- Overall Dimension: 1.75m x 6.55m x 0.35m
- 20 hatching trough: 0.75m x 0.5m x 0.2m
- 4 fry trough: 0.15m x 0.35m x 2m
- 1 pc GI sheet (gauge 18) is enough to make 2 fry trough
- Water source: showering water is supplied via 2-3 mm hole at 6-7 cm interval from ½” PVC pipe
- As open (flow-through) supply system  
Overflow pipe: ¾” PVC pipe
- As close water (circulating) supply system  
Water is pumped by ¾ hp electric motor from the filter tank (1m x 3m x 0.8m) to an elevated plastic water tank (900 L cap)
- Water filter: a concrete box with 1m x 3m x 0.8m with layers of charcoal, sand and gravel
- Water flow: 5-7 liters per minute
- Hatching period: 5-7 days
- Tank disinfecting and egg incubation in different tanks could be done simultaneously

### **Advantages**

- Material components are flexible
- Applicable for multi-egg species production, either in freshwater or marine species of fish
- Applicable for tropical, subtropical or temperate regions
- Adoptable to open or close water supply system
- High pressure of water is not required
- Embryonic development can be easily observed
- Bad/rotten eggs can be easily removed by siphoning
- Eggs and sac fry are not stressed by soft shower and flow of water
- High fry/fingerling production in a limited area and time
- Applicable for rural or urban communities
- Shorten the breeding cycle of the breeder
- Definite batch, quantity, size and purity of offspring is attained
- Healthy and abnormal breed are classified
- Shorter interval period of harvesting (every 10<sup>th</sup> day)
- Can be operated under winter or summer condition

## **Impact**

The adoption of this system by the RFFC proved that it was a worthy investment. It has now attained a higher fry to fingerling production at a better quality than the previous one. Thus, the increasing demand from the provinces in the region was sufficiently met. This new system had been shared to many interested fishers in the region for fry production for backyard or commercial type. Because of the simplicity of its operation and its adaptability to small area to be able to operate, the cat fish fry producers are using this system too. In fact it is available to egg bearer fishes, like carp, snakehead, and the like. The advent of the new tilapia strain called GET EXCEL Tilapia under the GET EXCEL TILAPIA PROJECT as part of the Ginintuang Masagang Ani (GMA) Program of the Bureau of Fisheries and Aquatic Resources (BFAR) with the Department of Agriculture (DA), the usage of this SCV breeding system once again proved its value in effective production of quality GET EXCEL tilapia fingerlings.

## **Potential**

This SCV system offer a possibility in incubating eggs from other kind of species of fish of brackish or marine origin, be it induced or naturally spawned.

At the tropical area, the set of incubator need no further improvement but in the temperate or sub-tropical region, this is preferable to be in the tropical house or covered with plastic and/or with heater especially in winter to maintain the proper temperature for egg development.

Because of flexibility in material components and simple design of the system, this is adoptable for massive fry production, like commercial or for mass dispersal operation of fisheries agencies or non-government organizations. Likewise this promotes rural sustainable development in those riparian or coastal communities where aquaculture is thriving or has its potential. The dependency of fingerling needs from the fry/fingerling suppliers outside the community would no longer be needed. Instead the community can be able to sustain their own requirements in fish production.

### **Economic Analysis of SCV Operation for 1 Incubating Operation**

*Production* (income) 1,000,000 fry @ P 0.35 P 350,000.00

#### *Operating Cost*

Breeders 1,000pcs. @ P10/pc	P 10,000.00	
Feeds for breeders: 50g/pc x 1,000 pcs x 0.2 = 10kg/day x 30 days = 300 kg = 12 sacks x P400/sack	4,800.00	
Water 5 cu. m. x 5 days @ P10/cu. m.	7,200.00	
Labor cost for 4 persons @ 230/day x 35 days	32,200.00	
Plastic bags 1000 pcs x P5/pc	5,000.00	
Oxygen	3,500.00	
Transportation	2,000.00	
Miscellaneous	5,000.00	
Subtotal	<u>P 69,700.00</u>	
10% Contingency	6,790.00	
Depreciation Cost (20 years)	<u>1,975.00</u>	
<i>Total Operating Cost</i>		<u>78,645.00</u>
NET INCOME		P 271,355.00