

SPAWNING OF MILKFISH, CHANOS CHANOS,  
IN CAPTIVITY\*

by

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Abstract

Newly captured milkfish released 0.8 mm in diameter non-hydrated eggs spontaneously in captivity. After injection with partially purified salmon gonadotropin (SG-G100), 1.2 mm in diameter hydrated eggs were released. These eggs, however, were not fertilized.

Introduction

The major initial objective of the SEAFDEC-IDRC Milkfish (Chanos chanos) Research Project is to ensure an adequate and dependable supply of milkfish seed, in addition to those collected from natural sources, and to extend and stabilize the period of fry availability throughout the year. This is to be mainly accomplished by breeding milkfish in captivity and by raising the fry from the egg. A major obstacle to this objective was the difficulty in capturing and domesticating adult milkfish captured in the wild. This problem has now been largely solved (Madden et al., 1976; Vanstone et al., 1976) and investigators can now concentrate on developing techniques designed to control the reproductive cycle of this species.

The present report is based on three spawning experiments that have been completed to date, 12 May 1976, during the present fishing season, November to June, 1975 along the Antique Coast of Panay Island, Central Philippines.

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## Materials, Methods and Results

Methods of capture, transport and domestication of adult milkfish or sabalo together with catch statistics at each of the five capture sites have been reported elsewhere (Vanstone *et al.*, 1976). On 6 April 1976, a few non-hydrated eggs were found in the screened outflow from one of the 12 m diameter holding tanks which at that time contained three sabalo in diluted sea water of 20 ‰ salinity with a daily temperature range of 28 to 29°C. These almost spherical eggs had a mean diameter of 0.89 mm (range 0.80-1.07 mm) and were filled with granulated yolk but no oil globules (Plate 1). The salinity of the water in the tank was then increased to 34 ‰ over the next 12 hours. No further eggs were observed.

### Experiment No. 1:

Eight fish captured at Bagaas on 9 (Fish 9/4), 12 (Fish 12/4) and 15 April (Fish 15/4A-F) were distributed equally between two 4 m diameter x 1.5 m high experimental tanks containing 60-70 cm of the 20 ‰ diluted sea water. At 1630 hours on 15 April, non-hydrated eggs identical to those obtained on 6 April, were discovered in one of the tanks and at 1700 hours semi-purified chum salmon gonadotropin (SG-G100, prepared by B.C. Research Council, Vancouver, Canada and assayed on 1 July 1974) was injected into the dorsal musculature 2-3 cm below the dorsal fin in each of the eight fish. Each large fish, weighing approximately 7 to 8 kg, received 3 ml of 1.0% NaCl solution containing 10 mg SG-G100/ml and each smaller fish of approximately 6 to 7 kg received 2 ml. Following injection all fish were placed in a single 4 m diameter tank. The fresh water supply was then turned off and the salinity increased to 34 ‰ over the next eight hours. Beginning at approximately 1900 hours the fish became very active, swimming very fast, and jumping and circling each other. At 2020 hours on 15 April 1976, a sexually mature male (No. 15/4D weighing 6.0 kg) with freely flowing milt killed itself by jumping and hitting its head on horizontal bamboo poles located 50 cm above the top of the tank. At 2130 hours a female (No. 15/4A weighing 6.7 kg) with gonads at late stage III, killed itself in the same manner.

At 0830 hours on 16 April the abdomens of fish (15/4/E and F) were observed to be considerably enlarged and at 0945 hours hydrated eggs were observed in the tank. These eggs ranging in diameter from 1.07 to 1.36 mm and with a mean diameter of 1.18 mm (Plate 2) were spherical, without oil globules and contained yellow granulated yolk. Fish No. 15/4F died at 1600 hours. This fish

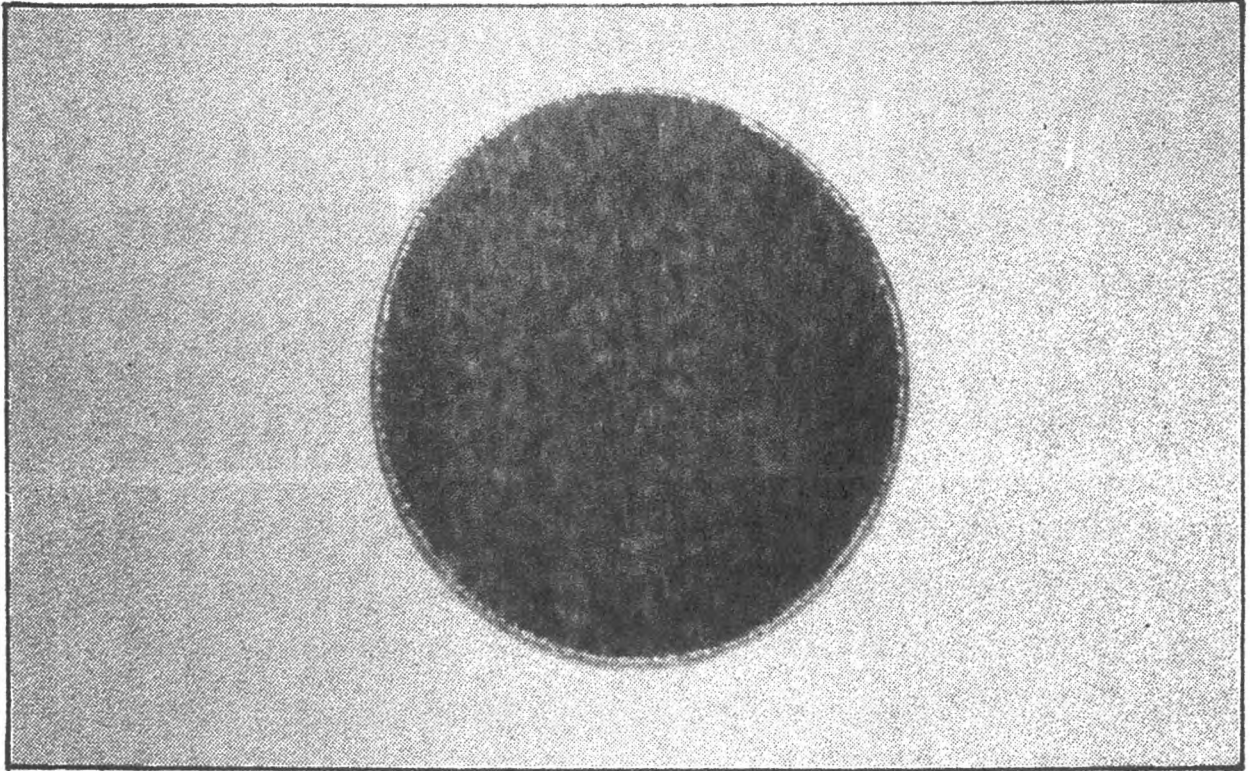


Plate 1. Non-hydrated milkfish egg.

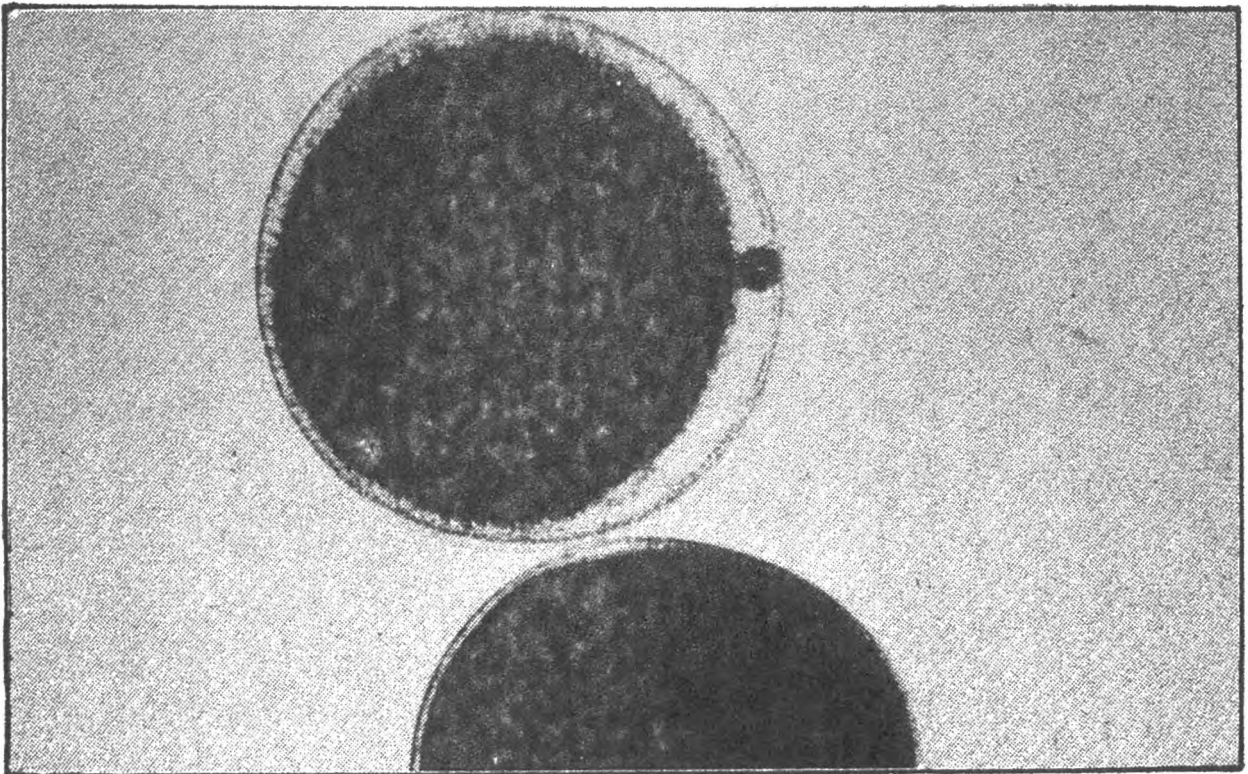


Plate 2. Hydrated milkfish eggs.

weighed 8.5 kg and its ovaries weighing 631 g were at late III state of development. At 1700 hours fish No. 15/4E appeared to be dying and was transferred to a second 4 m diameter tank where she died at 1900 hours. This fish weighed 7.8 kg and was partially spawned. At 1830 hours the four remaining fish in the experimental tank were again injected with 2 or 3 ml SG-G100.

On 18 April at 0900 hours hydrated eggs, ranging in diameter from 1.05 to 1.18 mm (mean - 1.11 mm), were found in the experimental tank. The four fish were then examined but were kept alive because of our desire to build up a brood stock for the 1977 spawning season. Fish numbers 9/4A, 12/4 and 15/4B were assessed to be sexually immature males or females and number 15/4/C was a spawned female. These four fish were transferred to the domestication tank.

#### Experiment No. 2:

During transport of the sabalo catch from Bagaas on 4 May, it was observed that fish number 4/5A, which had received several bad head wounds during capture, released non-hydrated eggs in the transfer cage at 1430 hours and also in the tank on the truck at 1530 hours. This fish together with two mature males, number 4/5B and C captured at the same time, was placed in a 2 m diameter experimental tank containing water at 34 ‰ salinity and 30°C at 1600 hours. The female fish was injected with 5 ml and the males with 2 ml SG-G100 solution at 1600 hours and non-hydrated eggs were released in the tank at 2000 hours. At 2330 hours the same day hydrated but unfertilized eggs were discovered in the tank.

This fish did not spawn again and died on 6 May. When examined, it was found that the fish was completely spent.

#### Experiment No. 3:

One mature male (No. HAM 6/5B) was obtained from Hamtik and two mature males (BAG 6/5N and T) together with a female (BAG 6/5S) which was believed to be at ovarian stage III were captured at Bagaas on 6 May. The males were injected with 1 ml and the female with 3 ml of SG-G100 solution when transferred from the truck to a 12 m diameter holding tank containing sea water at 34 ‰ at 30°C. The salinity of the water in the tank was lowered to 25 ‰ over the next 12 hours. On 7 May another sexually mature male (No. 7/5) captured at Bagaas, was injected with 1 ml SG-G100 solution, and placed in the same tank. The female fish was injected with 5 ml

SG-G100 solution, and placed in the same tank. The female fish was injected with 5 ml SG-G100 solution on 8 May at 1600 hours. On the possibility of obtaining ovulated eggs the female fish was killed at 1100 hours on 9 May. On examination it was discovered that the ovary contained a uniformly distributed mixture of I, II and early III stages of ova (Plate 3).

#### References

- Kuo, C-M. 1974. A procedural guide to induce spawning in gray mullet (Mugil cephalus L.). *Aquaculture*, 3:1-14.
- Madden, W.D., A.J. Tiedeman and M. Suiso. 1976. Fish collection and field work. In: Oceanic Institute, Waimanalo, Hawaii, Annual Report, 1975: 22-24.
- Vanstone, W.E., A.C. Villaluz, P.E. Bombeo and R.B. Belicano. 1976. Capture, transport and domestication of adult milkfish, Chanos chanos. International Milkfish Workshop-Conference, Tigbauan, Iloilo, Philippines, May 19-22, 1976.

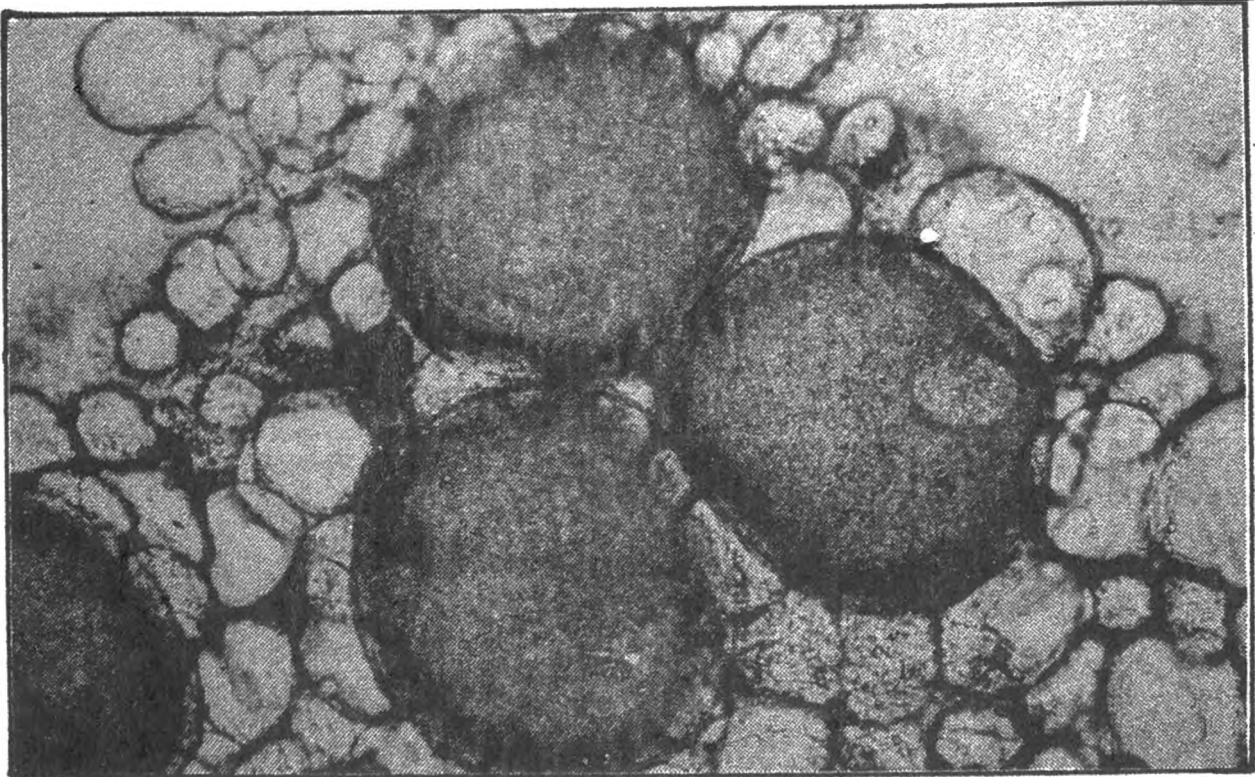


Plate 3. Ovarian tissue from sexually developing milkfish containing a mixture of I, II, and early III stage ova.