Publié dans : «SHRIMP AND PRAWN FARMING IN THE WESTERN HEMISPHERE. Hoe HANSON and Harold GOODWIN. Dowden Hutchinson & Ross, Inc. 1977»

14

E. Dr. Alain Michel of AQUACOP - Centre Oceanologique, Tahiti

Dr. Michel explained that obtaining spawners in Japan and the United States is quite different from the Tahitian problem, since AQUACOP's gravid shrimp must be flown in to Papeete from New Caledonia or the Fiji Islands and then trucked several hours to the Centre Oceanologique.

The first attempt at air transport employed oxygenated plastic bags containing one shrimp each at 22° C. All the animals arrived dead due to repeated jumping in the relatively large space of the inflated bags. The next attempt employed the same bags, but the shrimp were enclosed in a roll of soft plastic screen to restrict their movements; all arrived in Tahiti in good condition. The species with which AQUACOP is working presently include: P. merguiensis, P. aztecus, P. japonicus, P. monodon, and M. ensis.

Photo courtesy Centre Oceanologique, Tahiti

Figure III-1
P. merguiensis ready to spawn.

F. Mr. Jerry Broom of Groton Associates, Costa Rica

The area in which spawners are collected by Groton Associates in Costa Rica is relatively small and narrow since there is a steep dropoff in that location. At this time, Groton is leasing boats and having its share of the sorrows mentioned earlier by Mr. Sweat. Usually, Groton fishes in 10 fathoms or less for gravid females.

Mr. Broom suggested that the presence of a spermatophore or remnant thereof alone is a sufficient criteria for selecting white spawners from a haul. The olive green ovaries may well not be a necessary criterion since Mr. Broom has found that, with indications of the sperm plug present, ovaries mature very

A. Dr. Wallis Clark, Jr., of the NMFS, Galveston Laboratory

Dr. Clark led this session. In his introductory remarks, he observed that there appear to be three approaches to maturation of penaeid shrimp in captivity. They are:

- Maturation in pond cultures.
- Maturation under controlled rearing conditions after eyestalk ablation.
- Laboratory studies which manipulate individual females under careful control to stimulate ovarian growth, vitellogenesis (yolk formation), and, finally, nuclear maturation followed by stripping of eggs and fertilization.

Dr. Clark stated that scientists of the NMFS Galveston Laboratory have been taking an essentially cellular approach to the biology of ovarian maturation in penaeid shrimp for the past one to two years. At present the research is focused upon isolating and defining the hormonal mechanisms responsible for maturation and spawning as well as looking into the links between nutrition and vitellogenesis.

Dr. Clark defined nuclear maturation as the change from 4n chromosomes to 1n as determined by DNA concentration. So far, no true nuclear maturation has been demonstrated in females in which ovarian maturation was induced, except in some unexplained instances. The best guess of the moment is that the process is controlled by a small polypeptide of nervous system origin. According to Dr. Clark, some evidence suggests that lipids are particularly important in stimulating yolk laydown in ovarian oocytes.

As of now, Dr. Clark reports that the Galveston laboratory can stimulate female brown shrimp (*P. aztecus*) to mature and spawn at will, although he did not state exactly how this is done. So far, success with the white shrimp (*P. setiferus*) has been more limited but fertilized eggs are being obtained.

B. Mr. Alain Michel of AQUACOP, Tahiti

Mr. Michel then reported on recent life cycle work by AQUACOP in Tahiti. Since there are no species of penaeid shrimp appropriate for commercial culture indigenous to the waters of Tahiti, it has been particularly necessary for the Centre Oceanologique to achieve maturation and spawning in captivity. As of now, spawning experiments have been conducted with members of five different species, all of which came to the laboratory in Tahiti as postlarvae or juveniles. All species are reared either in "small" 12 m^2 tanks or in larger ones ranging from 400-1,200 m^2. The water used is clear and has tropical oceanic characteristics (salinity = 34 °/oo, 26-30° C, and pH = 8.3). The animals are fed a dry preparation produced in the laboratory.

Under these conditions, Mr. Michel reports, P. merguiensis matures spontaneously throughout the year and spawning has been observed to occur at a rather small size (6 g) in this species. P. japonicus and M. ensis also have been maturing spontaneously in Tahiti while P. aztecus and P. monodon have not yet undergone ovarian maturation without unilateral eyestalk ablation (Ref. 460). This is done by pinching off one of the eyestalks. Survival is as high as 95%. Since the water is quite clear in AQUACOP's facilities, maturing females may be observed and hand netted easily in the 12 m^2 tanks. In the larger tanks, the same operation is accomplished by diving. After the mature females are retrieved, spawning takes place in special one-cubic-meter tanks where an airlift device achieves recovery of the eggs in four baskets fitted with 207-micron plankton mesh. With this approach, AQUACOP, as of August 1976, has achieved the sixth generation of P. merguiensis, the third generation of P. aztecus, the second generation of P. japonicus and P. monodon, and the first generation of M. ensis. According to Mr. Michel, production of commercial quantities of fertile eggs from captive-reared females appears to be a strong likelihood in the near future.

In answer to questions from the floor, Mr. Michel mentioned that the number of eggs produced by captive-reared females in Tahiti (40,000 eggs per 22 g female P. aztecus and 50,000 eggs per 50 g female P. japonicus) was lower than that said by the literature to be spawned from wild-caught females. This, however, is not the case with P. monodon and P. merguiensis; the egg rates being 150,000 per 80 g female and 30,000 per 25 g female, respectively. Hatching

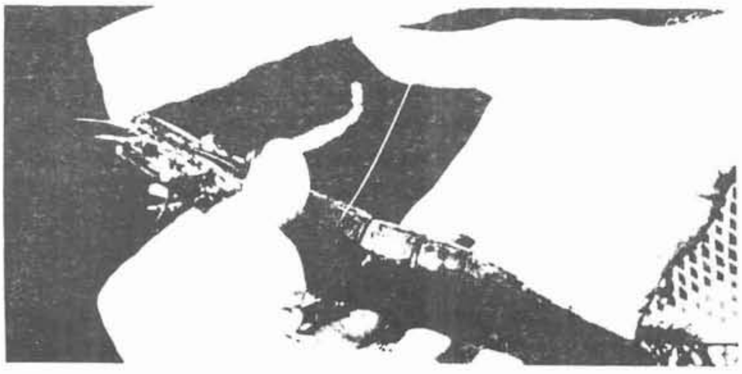

Figure IV-1 Photo courtesy of Centre Oceanologique, Tahiti

Female P. monodon with one eyestalk ablated.

rates average about 80% which compares favorably with results obtained from wild stock. There have been no attempts by AQUACOP to induce polyploidy and as yet, no attempts at hybridization. Mr. Michel also mentioned that unilateral eyestalk ablation does not always work; the ablation must be done on healthy animals and, to obtain a prompt response, probably at the right intermolt stage. Some females mature 3 or 4 days after the ablation; others molt first and mature after. With P. monodon, all the ablated females have matured and, in 3 months, 18 spawnings have been obtained from 6 females giving a total number of $3,3 \times 10^6$ eggs. This is the proof that females can mature more than one time in a short period of time.

Unilateral eyestalk ablation in Tahiti was begun when it was first noticed that all maturing P. aztecus in the stock had only one eye. Later work in the Philippines by SEAFDEC with P. monodon (Ref. 478) shows heavy (usually total) mortality when bilateral ablation is practiced (ed).