

**BIOLOGY, CULTURE,
CYST PROCESSING AND
NUTRITIONAL STUDIES ON SRI LANKAN**

Artemia parthenogenetica



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ABSTRACT

The brine shrimp, *Artemia parthenogenetica*, occurs naturally in solar salterns in Sri Lanka. In the Mahalewaya saltern, Hambantota, natural populations of *Artemia* inhabit condenser pans where salinity and temperature increased gradually from 80 to 200 ppt and from 28 to 33.6 °C, respectively, along the condenser pan series. Water depths, dissolved oxygen, primary productivity and population numbers decreased along the series of condenser pans. Highest population numbers occurred within a salinity range of 100 to 125 ppt. The highest number of adults (28/l) and instar I stages (101/l) occurred in January and in March 1987, respectively. Flooding with low salinity waters resulted in abrupt salinity fluctuations and heavy adult mortality.

Fecundity ranged from 23 to 36 cysts/female. Cyst production took place from June to October 1986 and from April to October in 1987 and coincided with the salt production season. Cyst yield totalled 0.34 kg dry weight/ha/mth in 1986 and 0.42 kg dry weight/ha/mth in 1987.

Experimental pond culture of *Artemia parthenogenetica* in Palavi using inorganic fertilizer and a 15 nauplii/l inoculation density resulted in a dry cyst yield of 0.5 kg dry cysts/ha/mth. Organic fertilizer with a 20 nauplii/l inoculation density yielded 2.3 kg dry cysts/ha/mth. Biomass yield was 272.8 kg wet weight/ha/mth. A foreign strain of *Artemia* (*A. franciscana*) yielded 7.2 kg dry cysts/ha/month and 611.8 kg/wet weight biomass/ha/mth. Highest fecundity was 72 nauplii per female and 38 cysts/female in *A. parthenogenetica* and 126 nauplii/female and 119 cysts/ female in *A. franciscana*.

In laboratory culture at 29 ± 1 °C and 35 ppt salinity *Artemia parthenogenetica* nauplii reached adult stage in 15 days and reproduced ovoviviparously. Increase in salinity to 136 ppt resulted in oviparity. Survival was 80% in a temperature range of 28 to 30 °C and a salinity range of 100 to 120 ppt.

Biometric studies showed that nauplii hatched from Mahalewaya cysts were significantly longer (475.4 μ m) than those from other cyst sources that were studied. Cyst diameters ranged from 248.7 to 267.9 μ m. Dry weight of a freshly hatched nauplius from different cyst sources ranged from 2.21 to 2.77 μ g.

Hatching percentage ranged from 77.9% to 89.9%. Maximum hatching occurred at either 5 or 35 ppt salinities within 29 to 32 °C temperature range and 7.5 to 8.5 pH. 90% of freshly hatched nauplii of all Sri Lankan cyst sources were harvested within 24 hours incubation in 35 ppt salinity water. Hatching efficiency ranged from 175,360 nauplii/g cysts in Mahalewaya to 200,480 nauplii/g cysts in those cultured in Palavi.

Dry cysts that were vacuum-packed retained long shelf life when stored in room temperature. Other methods of processing (such as bottled semi-dry or wet cysts) and storage under refrigeration resulted in a decrease in shelf life.



Based on its fatty acid profile the Sri Lankan *Artemia* was classified as of the "marine" type having increased amounts of HUFA n-3 $\geq 20:3n3$ amounting to 9.9 % (area %) in Palavi *Artemia* and 22.8 mg/g dry weight (17.3 %) in Mahalewaya *Artemia*. Both Sri Lankan *Artemia* and *A. franciscana* produced in Palavi were equally good as food for both freshwater and marine predators. The Sri Lankan *Artemia* can be highly recommended for use as a larval feed in fish and shrimp hatcheries.