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 $\pm$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 μm) than those from other cyst sources that were studied. Cyst diameters ranged from 248.7 to 267.9 μm. Dry weight of a freshly hatched nauplius from different cyst sources ranged from 2.21 to 2.77 μg.

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.