by thin-walled fusiform wood cells is mainly responsible for making this the lightest wood known.

The structure of sola wood provides the basis for being an ideal material for traditional art work where softness, lightness and resiliency are required. Sola can be easily cut, peeled, stretched and bent owing to the presence of abundant fusiform wood cells. The air-filled cells account for the insulating property of the wood. The wood of *A. aspera* is easier to peel than that of *A. indica*, a property that could be attributed to the presence of distinct growth rings in the former.

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Is pH(i) a factor for dormancy in freshwater fairy shrimps?

N. Munuswamy, A. K. Abdul Nazar and H. J. Dumont*

Department of Zoology, University of Madras, Guindy Campus, Madras 600 025, India

*Laboratory of Animal Ecology, University of Ghent, Belgium.

***Cellular dormancy* is a common event in the life cycle of lower crustaceans, especially in brine shrimps and fairy shrimps. We have studied termination as well as initiation of cellular dormancy in the cryptobiotic cysts of a freshwater fairy shrimp *Streptocephalus dichotomus* by elevating the internal pH optima of the cysts. Experimental evidences clearly indicate that alkalinization had no significant effect on the termination of dormancy, but subsequently no hatching occurred. Thus the dehydrated gastrula, containing approximately 4000 cells, undergoes dormancy with environmental adversity combined with physiological status of the growing embryo. The cysts of fairy shrimps, thus, do not come under the category of either aerobic or anaerobic dormancy as described for the brine shrimp *Artemia* sp.**

In the brine shrimp *Artemia* sp. hypometabolic status is regulated, at least in part, by moderate alkalinization of intracellular pH [pH(i)]. In the brine shrimp *Artemia*, larger pH(i) changes bring meaningful conditions accompanying transitions between profound dormancy (cryptobiosis) and development in encysted gastrulae stage embryos (cysts)[1]. Similarly, an increase in pH(i) accompanies the transition between dormancy and development in the sea urchin.

Under natural environs, the cysts remain developmentally arrested even in the presence of atmospheric oxygen. Accordingly, Busa and Crowe[1] classified the dormant cysts of *Artemia* into aerobic and anaerobic dormant types based on O_2 and CO_2 availability respectively. It is known that changes in pH(i) accompany the reversible transition between aerobic development and anaerobic dormancy.

Based on the foregoing account on the influence of pH(i) optima in development, we also tested the effect of intracellular alkalinization on the cryptobiotic cysts of the fairy shrimp *Streptocephalus dichotomus*, using weak bases, as outlined by Busa *et al.*[2]

It is well known that a majority of anostracan crustaceans (fairy shrimps and brine shrimps) are adapted to a life in intermittent aquatic environments, and hence they produce encapsulated, dehydrated gastrulae, called cysts. Each cyst contains ca. 4000 morphologically undifferentiated embryonic cells[3] (Figure 1).

Elevation of the internal pH of the cryptobiotic cysts of *S. dichotomus*, by incubating in NH_4Cl (0.1 μM) as well as in $(NH_4)_2SO_4$ (40 μM), had no significant effect on their dormancy, although the cysts were kept for 30 days of observation (Table 1). On the other hand, cysts kept in Cairns' medium showed hatching within 24 h of incubation (Table 1). This may clearly suggest that these cysts do not come under the category of either aerobic or anaerobic dormancy like *Artemia*. Hence the initiation of the dormancy is thus coupled with environmental adversity combined with physiological status of the growing embryo[3].

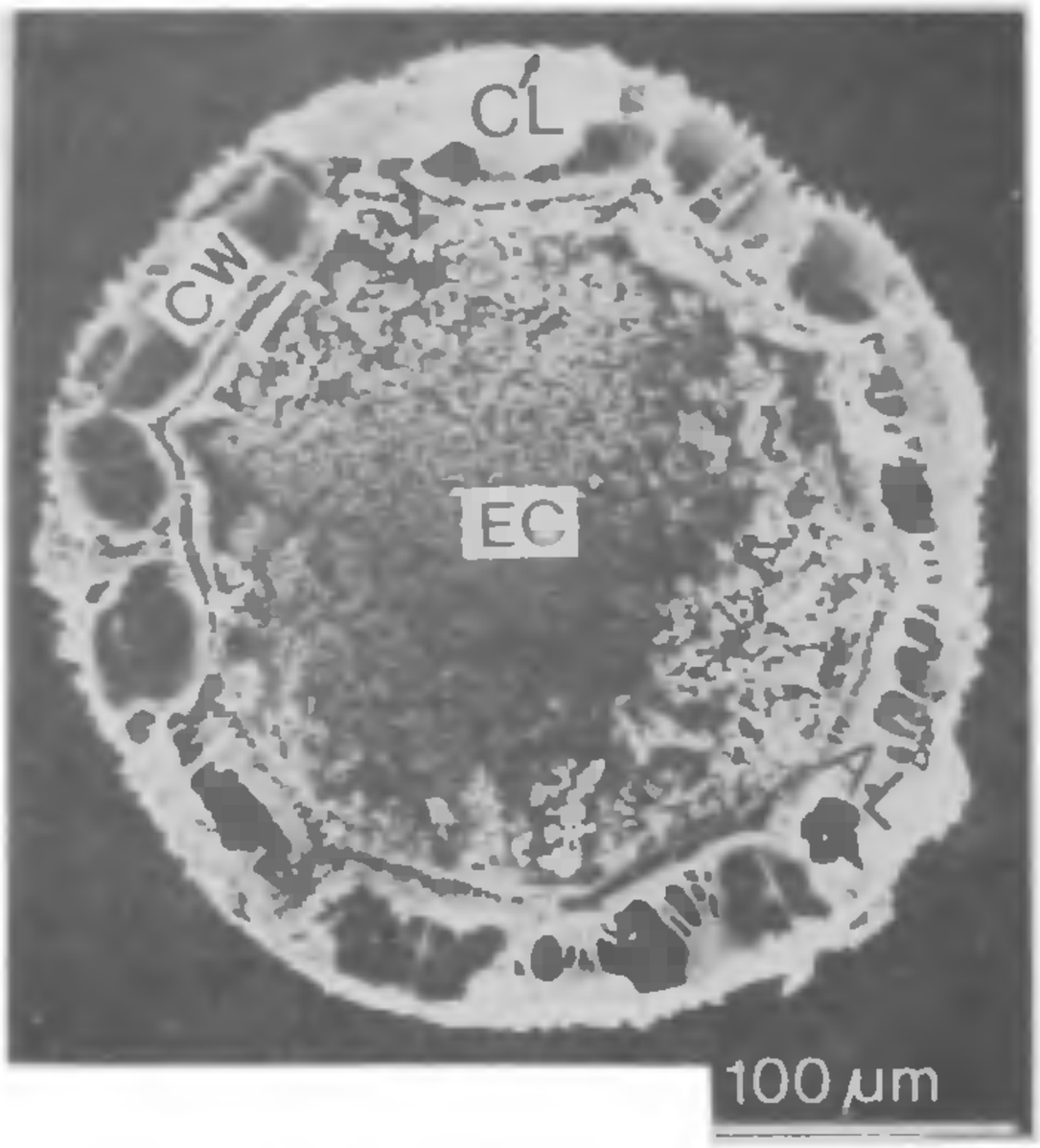

Figure 1. Scanning electron micrograph of a transversely sectioned cyst of a freshwater fairy shrimp (*Streptocephalus dichotomus*). The cyst wall (CL) is broken at hatching by the water-attractive force of glycerol produced by the morphologically undifferentiated embryonic cell (EC). The growing gastrula is surrounded by a thick outer cortex layer (CL) and inner alveolar layer (AL).

Unlike the brine shrimp, freshwater anostracans produce only one type of egg, and this is capable of resisting desiccation. Hence, the dormancy is not due to anoxic conditions as the cysts are exposed to atmospheric oxygen. Experiments performed with weak bases indicated that alkalinization of the cyst internal pH did not show any impact on cellular development unlike in the brine shrimp and also in some bacteria during spore formation[4].

Fairy shrimps, thus, possess a rare quality, and

Table 1. Hatching in *S. dichotomus*

Medium	pH	Hatched (%)
Control (distilled water)	7.0	48 ± 2.5*
Cairns' medium	7.7	60 + 2.62*
NH_4Cl (0.1 µM)	8.27	--**
$(NH_4)_2SO_4$ (40 µM)	8.54	--**

Values indicate mean ± SD of six observations.
*% hatching within 24 h of incubation.
**No hatching even after 30 days of incubation.

rewetting of the cysts provide a powerful environmental signal. In general, only a part of a population of cyst is hatchable. The source of variation is probably genetic as well as epigenetic as suggested by Dumont *et al.*[3] and not strictly by any change in pH(i) as described[1] in the brine shrimp *Artemia*.

We strongly feel that hatching may be due to various epigenetic factors such as age, feeding history of the fairy shrimp, temperature, light and availability of necessary signal molecules. Hence, it may he concluded that the question of aerobic or anaerobic dormancy does not arise in freshwater anostracans, where dormancy generally synchronizes with environmental conditions.

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