

MOVING BEHAVIOUR OF THE BLOOD COCKLES *ANADARA GRANOSA* AND *A. NODIFERA*

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ABSTRACT

In the beginning of the 1970's blood cockle farms in Thailand based their culture on *Anadara granosa*. Subsequent attempts to substitute *A. granosa* with *A. nodifera* were not quite successful. Field observations showed that *A. nodifera* apparently had migrated far away from the culture sites. We have tested if the locomotive behaviour of the two species of blood cockle can elucidate the field observations. We found that *A. nodifera* is much more mobile than *A. granosa*. Hence the present study indicates a possible explanation of the failure of *A. nodifera* culture simply due to *A. nodifera*'s ability to escape the culture areas.

INTRODUCTION

Cockles have been collected from nature for centuries. In South East Asia at least 5 species of cockles are common: *A. granosa* (L.), *A. nodifera* (von Martens), *A. antiquata* (L.), *A. troscheli* (Dunker), *A. inaequalis* (Bruguere) as mentioned by Vongpanich (1996).

A commercial scale cockle culture was established in Thailand around 1973 (Tookwinas 1983) using cockle seeds (*Anadara granosa*) transplanted from Malaysia. The use of transplanted seed started a massive build-up of cockle farms along the coasts of Thailand. Around 1983 the Malaysian Government banned export of cockle seed to Thailand and thereby stunned the whole industry. The only solution was to find a species in Thai waters to substitute *A. granosa*. The Petchaburi area has a large natural population of *A. nodifera* and both government institutions and private enterprise farmers started transplanting this species to on-growing sites all over Thailand.

Unfortunately the substitution of *A. granosa* with *A. nodifera* was not quite successful. The density of *A. nodifera* in the farms decreased quickly after stocking and only very few empty shells could be found in the culture areas. Experiments performed by Senakasp *et al.* (1986) and Tandavanitj

(1995) indicated that some cockles were recaptured far from the culture sites. In the same period farmers still using *A. granosa* were performing without problems of this kind.

This study compares the locomotive behaviour of the two species of cockles in a series of small scale laboratory experiments to elucidate this behavioural difference.

MATERIALS AND METHODS

At Phuket Marine Biological Center, a rectangular fibre glass tank (180 x 80 cm) with sediment (mud) from a local culture area was placed in the laboratory and filled with about 15 cm of sea water. The tank was separated into 2 compartments by inserting a plate vertically into the mud and the tank was left for a minimum of 2 hours to let the suspended sediment settle.

In experiment 1, a total of 12 specimens of *A. granosa* were placed in the sediment in the left compartment and 12 specimens of *A. nodifera* in the right compartment in a grid with equal distance between individuals. Movements of each of the individuals were thereafter recorded by a video camera mounted above the tank. After the experiment the distance travelled by each individual within half an hour was estimated. In experiment 2, the procedure was the same

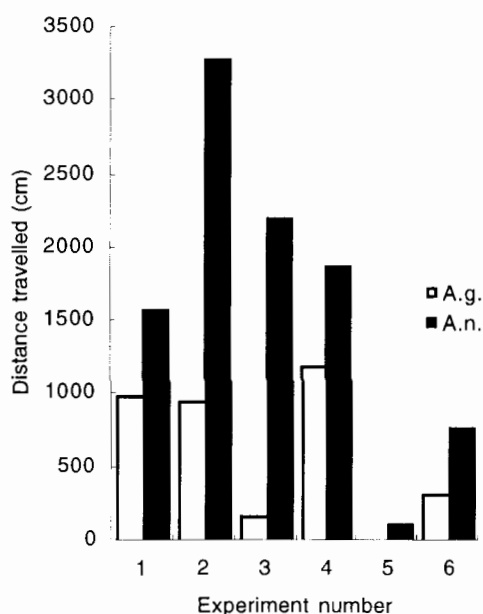


Figure 1. Total distance moved (cm) during 30 minutes by 12 individuals of *A. granosa* and *A. nodifera* in the 6 experiments conducted in Phuket.

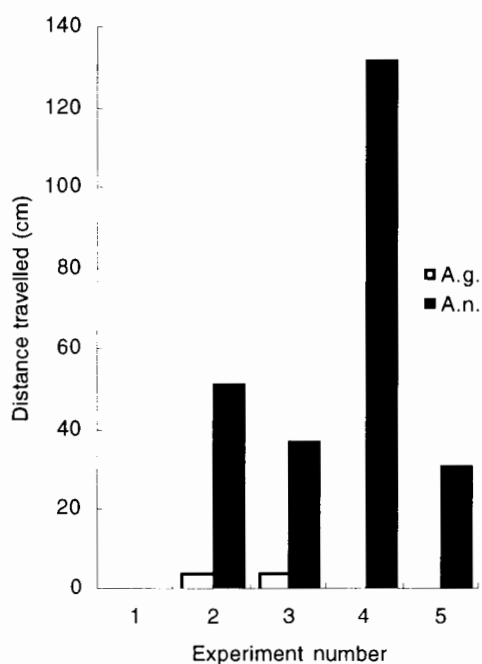


Figure 2. Total distance moved (cm) during 3 hours by 12 individuals of *A. granosa* and *A. nodifera* in the 5 experiments conducted in Petchaburi.

but new individuals were used and the two species switched compartments. This was repeated in experiments 3 and 4. Next 2 experiments were run where the 12 individuals of each species were placed in a circle in the middle of each compartment.

To minimise effects of local conditions the experiment was repeated in Petchaburi using a similar procedure. Because of the very limited mobility of the cockles in the Petchaburi experiments the experimental periods were extended to 3 hours.

RESULTS

In the Phuket experiment the total distance moved by 12 *A. granosa* was less than the distance moved by 12 *A. nodifera* in all 6 experiments (Fig. 1).

In the Petchaburi experiment the cockles moved considerably less and *A. granosa* hardly moved at all within the 3 hours. Total distance moved by *A. nodifera* was higher in all 4 experiments where mobility was recorded. In experiment 1 no individuals moved at all (Fig. 2).

DISCUSSION

The experiments clearly indicated that the moving behaviour of the two species of cockles were different. *A. granosa* moved less in all experiments except the one where no individuals moved at all. The results indicate a possible explanation of the failure of *A. nodifera* culture simply due to *A. nodifera*'s ability to escape the culture areas. If the migration of *A. nodifera* is caused by transplants to unsuitable habitats the problems may be overcome by selecting more optimal habitats for culture.

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