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GRADUATE PROGRAM

**SPAT SETTLEMENT OF THE PHILIPPINE GREEN MUSSEL, *Perna viridis* (LINNAEUS, 1758) (MYTILIDAE: BIVALVIA: MOLLUSCA) ON DIFFERENT SUBSTRATES IN OUTDOOR TANKS WITH RECIRCULATING AND NON-RECIRCULATING WATER SYSTEMS**

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of the Requirements for the Degree  
Master of Science in Biology

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**AKLATANG EMILIO AGUINALDO ARCHIVES**



### ABSTRACT

**Name of Institution:** De La Salle University-Dasmarinas

**Address:** Bagong Bayan, Dasmariñas, Cavite,  
Philippines

**Title:** **Spat Settlement of the Philippine Green Mussel, *Perna viridis* (Linnaeus, 1758) (Mytilidae: Bivalvia: Mollusca) on Different Substrates in Outdoor Tanks With Recirculating and Non-Recirculating Water Systems**

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### STATEMENT OF OBJECTIVES

#### GENERAL

The study sought to determine the settlement of the Philippine green mussel, *Perna viridis* (Linnaeus 1758) larvae in: a) recirculating



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and non-recirculating water systems; b) improvised substrates made of nylon, abaca and bamboo; and c) placements of substrates in the tank, upper, middle and bottom.

**SPECIFIC**

1. Are there significant interactions among the three factors:

a. hydrodynamics in recirculating and non-recirculating systems.

b. Material of the improvised substrates made of

I. Nylon,

II. Abaca, and

III. Bamboo;

c. placement of the substrates-

I. upper,

II. middle

III. bottom on the settlement of *P. viridis* in terms of number of larvae;

2. What is the main effect of the different factors;

a. Hydrodynamics;

b. Materials used; and

c. Placement of the improvised substrates in the outdoor tanks



on the settlement of *P. viridis* as to the number of larvae?

**SCOPE AND COVERAGE:**

The focus of this study was to determine the effects of the three types of materials (nylon, abaca, rope and bamboo) as substrates hung in three placements (top, middle and bottom) for the settlement of the green mussel, *P. viridis* (L.) in two types of hydrodynamics (recirculating and non-recirculating systems). Construction of rectangular tanks, preparation of improvised substrates made of different materials, standardization of procedures, acclimatization, pre-runs and actual experiments were carried out during the eight-month period from July 2002 and February 2003. The study consisted of three trials or experimental runs, which were considered as block/replicates in the statistical analysis.

**METHODOLOGY:**

This study was carried out to determine the effect of the materials (nylon, abaca and bamboo) used in the improvised substrates for the settlement of *P. viridis* (L.) larvae. The improvised substrates were hung in three different placements or levels (upper, middle, bottom) in two outdoor rectangular cemented tanks (one was equipped with a submersible pump to simulate a recirculating/flowing system while the



other was only aerated to simulate a non-recirculating or still water system).

The split-split plot design replicated three times (experimental runs or trials) was used as an experimental design adopted from crop or plant experiments. The 200 *P. viridis* (L.) larvae were stocked in the tanks during the experimental runs over a 72-hour observation period. The number of spats was counted and shell lengths (in cm) were determined using a metal vernier caliper during this period on an hourly basis from Time 1 to Time 14 and finally observed irregularly from Time 15 to Time 72. Data on the number of spats and shell lengths were recorded, pooled, summarized and analyzed statistically using factorial analysis. Treatment means were compared using Duncan's Multiple Range Test (DMRT) at  $P > 0.05$  level of significance.

#### **MAJOR FINDINGS:**

The type of substrate most preferred by *P. viridis* was abaca ( $p > 0.05$ ). Using the Multiple Range Test, the mean value of the number of larvae that settled in the nylon material was almost the same as the bamboo material (6.56), while the abaca material (9.22) was much greater. These results imply that the abaca is the most preferred material for larval settlement compared to nylon and bamboo.



### CONCLUSION:

Based on the results presented, the following conclusions can be drawn:

1. There are no interactions between the three factors (hydrodynamics, Placement and materials) during the larval settlement of *P. viridis* (L.). However, there is a slightly significant difference in interactions between hydrodynamics and materials.

2. The nature of material alone had the main effect during the larval settlement of *P. viridis* (L.) in outdoor tanks. *P. viridis* (L.) larvae significantly preferred abaca compared to nylon and bamboo as materials for the improvised substrates during settlement. Whether the improvised substrates were placed from the upper level to the bottom level of the tanks, larval settlement was not influenced or affected.

### RECOMMENDATIONS:

Further studies can be carried out, particularly on the other substrates or materials locally available in the Philippines. It is also possible to consider the improvement of the design in hydrodynamics by considering other parameters like speed/velocity of the water current,



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diurnal rhythm of tides and other water turbulence. Experiments in glass aquaria could be undertaken so that settling process can be observed. With reference to future field experiments, larval settlement can be undertaken in enclosed and semi-enclosed coastal marine areas. Trials can also be done by comparing larval settlement in artificial substrates strategically located within or outside the mussel farming sites. Although it would be worthwhile to supplement intensive laboratory experiments, the larval settlement in the natural environment will always be subjected or influenced by the various environmental disturbances which may either increase or decrease the success of larval settlement among the bivalves. This clearly suggests some future research needs in this line of thought.