Centro de Aquicultura Marinha e Repovoamento

CAMAR





I INTRODUCTION

CAMAR is a research laboratory specialized in aquaculture and environmental studies. It is part of an advanced campus of the Federal University of Paraná (in Portuguese, UFPR), in the sector of Agrarian Sciences, located on the shores of the southern state of Paraná, Brazil.

CAMAR was built as part of a state sponsored project to enhance fisheries throughout the province. It is structured as a shrimp hatchery because the initial objective is to function as a native shrimp stock enhancement facility. Upon its completion the laboratory had already been transformed into a multispecies facility in order to broaden its social and ecological reach.

CAMAR became operational in December of 2013. Although there still remain several adjustments to be done, since then several projects have been approved and are currently been executed on premises.

2 THE STRUCTURE

CAMAR is a two story building with a nominal area of around 1,800 m^2 installed in front of the Southern Atlantic Ocean. It is constructed out of a concrete premold superstructure covered with isothermic roofing.



Figure 1. CAMAR is an experimental laboratory of UFPR located on the Southern Brazilian ocean.

The ocean water is collected right in front of the laboratory through a well system installed on the beach and transferred to a 300,000 liter reservoir system. The water is then pumped indoors where it is filtered and disinfected with a UV system before being reserved in a set of elevated heated water tanks.



Figure 2. The water, abundantly collected in the beach in front, has excellent ocean qualities.



The laboratory has a total of 12 rooms, two of them large enough (250 $m^2)$ for the maturation and larviculture of marine shrimp.

Figure 3. CAMAR was originally built as a shrimp hatchery but today functions as a multispecies laboratory.

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The remaining rooms are used for microalgal production, live-feed production, controlled environment experimental room, microscopy and image acquisition room, as well as staff and administrative offices.



Figure 4. Internal rooms serve different purposes.

Outside of the building, CAMAR counts with around 3,000 m² of available area. In this place a set of 12 earth ponds lined with HDPE membrane, will be installed. These tanks were originally intended to be used as broodstock maintenance tanks but they will also be used for other projects.



Figure 5. CAMAR has large external area for future expansion.

The water used in the cultivation processes is collected and sent to a treatment system, before its release back to the ocean. This system is composed by a set of different subsystems like bead filters, sedimentation tanks, sand filters, skimmers, biological filters and aeration tanks. Depending on the quality of the served water, it may not have to pass throughout the entire system.

3 PROJECTS

CAMAR currently has four projects underway.

3.1 Maturation of Brazilian native white shrimp Litopenaeus schmitti under laboratory conditions

As the cultivation of *Litopenaeus vannamei* spreads throughout the Americas due to the good adaptability of different strains of the species to the cultivation environment, native species are not receiving same attention in terms of research. On the other hand, with the increasing of resistance from governmental environmental agencies and society in general towards the use of non-indigenous species in Brazil's aquaculture, it is important to develop options for Brazilian farmers.

This project aims to evaluate the effect of special maturation feed on the gonadal development of *L. schmitti* with the objective of assessing the breeding potential of the species.

3.2 Performance comparison between L. schmitti and L. vannamei under laboratory conditions

Due to the wide distribution of *L* schmitti along the middle and South Atlantic coast of the Americas, differences between distant populations are foreseeable and it could reflect on different responses to the same cultivation methodology. With that in mind, CAMAR is conducting a doctoral research project titled "Comparison of biological aspects of white shrimp *Litopenaeus schmitti* populations in Cuba and Brazil" as a basis for its culture at an artisanal scale. We are comparing the some reproductive and genetic characteristics among populations of *L*. schmitti between the coast of the State of Paraná, Brazil, and the Southeast platform of Cuba.

Additionally, we will compare the growth performance of post-larval and juvenile white shrimp *L. schmitti* and gray shrimp *L vannamei* under both controlled laboratory and at pilot scale conditions.

3.3 Integrated cultivation of gray shrimp L. vannamei and the mangrove-oyster, Crassoestea brasiliana

This project will test different methodological protocols for cultivation of *L. vannamei* integrated with the Brazilian native oyster, aiming for both the reduction of nutritional load of outlet water and a supplementary income for the farmer.

3.4 Development of a novel method for production of soft shelled swimming crab

Presently we do not have an established business chain for the swimming crab in Brazil, although this kind of seafood is frequently harvested by the fishermen and is well accepted by the public. Previous attempts to explore this segment have failed due to the lack of sustainability of the catches in the long run.

This project aims to develop an economical methodology for producing soft shelled crab, while working on social, economical and ecological strategies to keep catches within sustainable levels.

3.5 Graduate level projects

Due to its proximity to the Aquaculture Faculty of UFPR, CAMAR is also conducting many smaller scale graduate level projects, such as the re-introduction of the yellow tail *Characidae*, *Astyanax bimaculatus* and the carid shrimp, *Macrobrachium acanthurus* to the city's anthropized drainage canal, and sex reversal in grouper *Epinephelus marginatus*, gamete extrusion, fertilization and larviculture.



Figure 6. We are presently developing different projects using both internal and external structures.

4 THE FUTURE

In terms of infrastructure, CAMAR is just like any other laboratory, with typical capabilities and restrictions. But our goals are disproportionate. We desire to contribute to human knowledge, especially in the areas of enhancing marine and fresh water fisheries.

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CAMAR would like to establish partnerships with other institutions, public and private, anywhere in the world, to work together and exchange information with the aim of achieving a safe, sound and scientific way of restoring, stabilizing and enhancing exploited populations of aquatic animals.

5 CONTACTS

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