The University of Hong Kong
School of Biological Sciences

Qualifying Seminar

Stress management strategies in "Triploid" Hong Kong oyster

Date: 7 December 2023

Time: 14:30

Venue: KBSB 3N01

About the speaker:

Mohamed Madhar Fazil obtained his Master of Technology in Biotechnology from the Indian Institute of Technology Guwahati, India. He joined the HKO-HIRU lab (with Dr Rajan) to pursue his PhD at HKU. His PhD focuses on the development of high salt stress tolerant triploid strain technology in Hong Kong oyster, specifically focused on identifying anti-microbial and anti-stress peptides in those strains using proteomics and peptidomics techniques.

Abstract:

Hong Kong oyster species is nutrient rich delicacy and is contributing almost 1/4th to global oyster production. However, aquaculture production of this species is facing challenges due to overcrowding in their optimal habitat (salinity: 15-20 ppt). Growers tend to expand its culture into salty coastal areas (Salinity: 20 to 25 ppt) to meet the rapidly increasing demand. Despite their high stress-tolerant ability, prolonged exposure to high salinity makes them highly vulnerable to pathogens and finally cause mass mortality. Growers and my laboratory colleagues have recently identified a relatively high stress tolerant broods for seed production in the hatchery. Recently, I have mastered hatchery seed production technology and then subsequently also developed novel technology for triploid seed production from those stress-tolerant broods. This technology is yet to be patent.

Triploid oysters with three sets of chromosomes are non-reproductive individuals with added commercial values such as fast growth, disease resistant and notorious. As first part of my thesis research, I have developed grower's friendly triploid seed production technology and now using those individuals to address the following objectives and hypotheses. First, testing the hypothesis that triploid HK oyster seeds are fast growing, disease resilient and nutrient rich not only at ambient salinity conditions but also under its upper salinity stress limit by using both controlled laboratory and field conditions. Secondly, I will be testing whether those commercially important and value-added traits are persistent in nature and importantly whether the selected triploid strains are high salt stress tolerant and resilient to winter mass mortality, by using transgenerational inheritance studies. Finally, I will be using a multiple omics approach to understand the stress tolerant mechanisms adapted by those triploid individuals by using transcriptomic, peptidomic and proteomic analyses of stress related genes, peptides and proteins in their blood (haemolymph). Our preliminary results showed that application of peptidomics approach, in collaboration with HKU's proteomics experts (Ivan Chu) is able to identify several novel bioactive peptides in oysters.

My ongoing and proposed applied aquaculture research plans are expected to have immediate impact on the development of sustainable and resilient oyster aquaculture in the region to ensuring a stable supply of this valuable seafood delicacy.