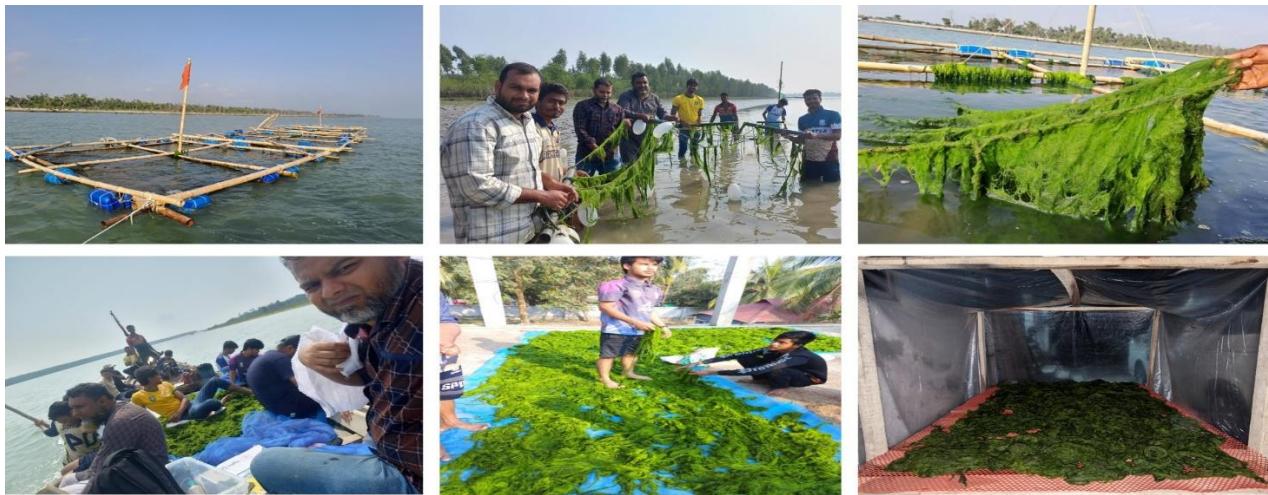


Research Spotlight -1

Sea weed culture in Marine Environment



Sea weed culture and harvested from the Coast of Bay of Bengal

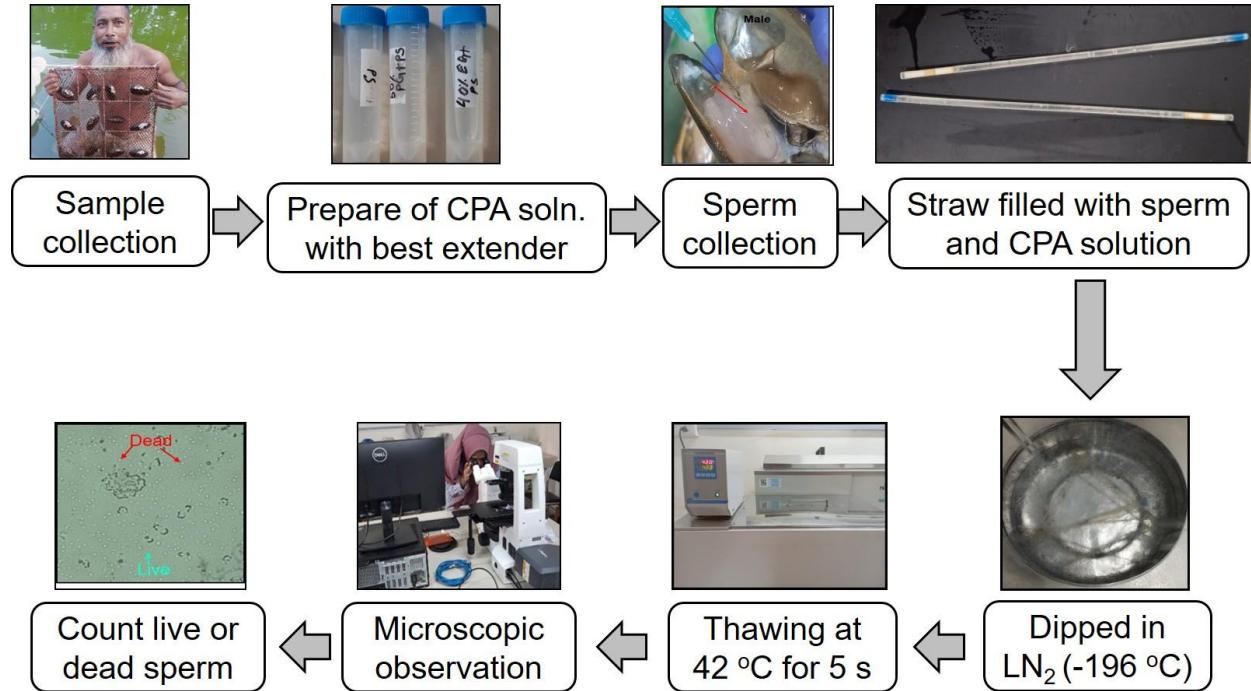


Development of seaweed based value added products



Research Spotlight -2

Development of a protocol for the cryopreservation of freshwater mussel, *Lamellidens marginalis*.



Research Spotlight -3



Reproductive Biology Study

Research Spotlight -4

Microinjection-based Cryopreservation: A Promising Tool for Fish Eggs or Embryo Preservation

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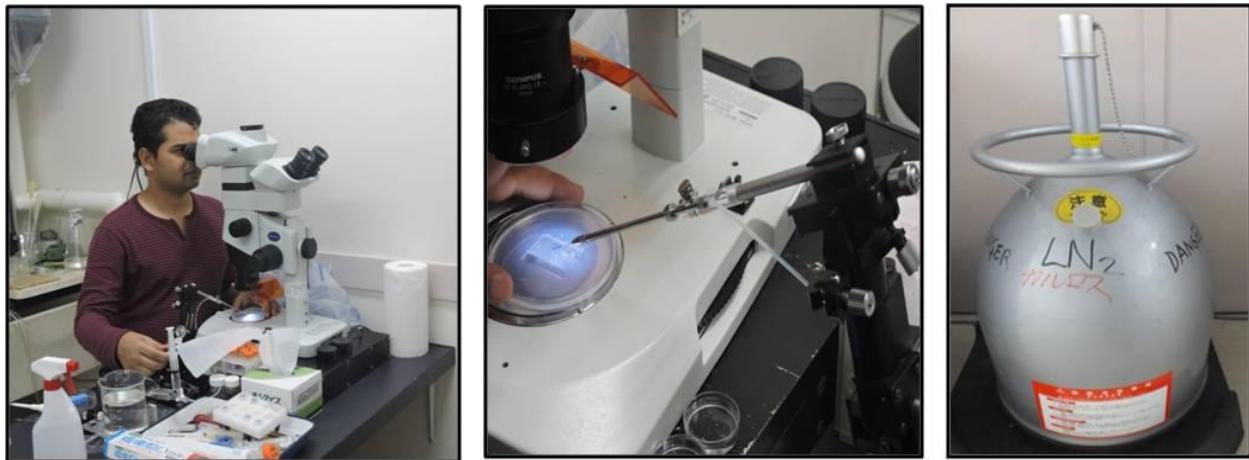
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In Bangladesh, there are approximately 476 marine water and 265 freshwater fish species available in marine, brackish and fresh water systems (Fishbase, 2016). However, natural fish stocks are under constant threat of overfishing, habitat deterioration, and even climate change (Strayer and Dudgeon, 2010; Vörösmarty et al., 2010) and there have been dramatic worldwide declines (New, 1997). Rapid destruction of ecosystems is a global event (Hagedorn and Kleinhans, 2000) and IUCN (2015) estimated that more than 9 fish species had become critically endangered whereas nearly 64 species have been added to the list of endangered species during the last two decades ago. In view of this scenario, it seems urgent to establish fish germ plasm repositories to preserve vanishing genetic materials and conserve fish genetic biodiversity.

Cryopreservation of fish gametes and embryos is a promising tool for efficient production of seeds for aquaculture and for the conservation of endangered species. Cryopreservation of fish sperm has been successfully developed and protocols are available for numerous species but there has been little progress in the case of eggs and embryos. The insufficient impregnation of cryoprotective agents (CPAs) due to the presence of complex structural barriers in fish eggs and embryos such as the chorion and other membranes seems to be the main impediment for successful cryopreservation. In the absence of CPAs, water freezes during cooling causing the formation of ice crystals, which in turn cause damage and finally death of the cells. Among the methods for CPA incorporation in fish embryos and eggs tested so far (electroporation, chemical treatment of eggs/embryos, sonication, dehydration, etc), microinjection stands out as one of those with the greatest possibility of development.

Microinjection may be a good candidate and alternative experimental strategy to reliably deliver CPAs into specific compartments (like perivitelline space or yolk mass) of the embryos than conventional methods. Actually, microinjection is a technology to introduce DNA, proteins, or liquid solutions into the cell using a micromanipulator. It may be time consuming and arguably difficult to apply in the treatment of large numbers of embryos, but in the first stage of research, it provides us with tools to test the importance of various parameters such as CPA type, concentration and distribution inside the embryos, as well as freezing and thawing rates. Equally the important fact is that microinjection allows the introduction of substances that due to their large molecular size would normally have very low or negligible permeability including proteins or even the gold nanorods in the cryopreservation of fish eggs or embryos. In this context, direct delivery of CPAs into embryos through microinjection could help attaining a sufficient internal CPA concentration

for preventing ice-crystallization during freezing and/or recrystallization during thawing. Overall, microinjection provides a reliable method for introduction of all types of CPAs and other foreign substances into fish eggs or embryos for cryopreservation.



Microinjection-based Cryopreservation