Book of Abstracts

XVI AGRICULTURAL SCIENCE CONGRESS 2023

10-13 OCTOBER 2023 | KOCHI | KERALA

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Transformation of Agri-Food Systems for Achieving Sustainable Development Goals

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Theme: Ensuring Food & Nutritional Security: Production, consumption and value addition
Sub theme: Resource Efficient, Environment Friendly Production of Nutrient-dense Farm Foods in India

Mass seed production and rearing of small indigenous fish mola carplet (*Amblypharyngodon mola*) to promote nutrition-sensitive aquaculture

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Nutrition-sensitive aquaculture is a transformative approach that aims to enhance nutritional outcomes by promoting nutrient-rich small fish alongside traditional carp polyculture. Integrating small indigenous fish species (SIS) into conventional carp farming is seen as a promising solution to address micronutrient deficiencies, especially among women and children. At the forefront of this promotion is the introduction of the mola carplet (*Amblypharyngodon mola*), a remarkable SIS boasting elevated levels of vital micronutrients such as calcium, iron, vitamin A, and vitamin B12. The research commenced with successful mass seed production of mola and its subsequent culture in carp polyculture ponds at a farmer's field in Jagatsinghpur district, Odisha. Pioneering techniques combining hormone administration, using a Synthetic GnRH analogue, and environmental manipulation were employed to stimulate seed production. The inducing hormone was administered at 0.25 and 0.5 mL kg^{-1} of body weight for males and females, respectively. Breeding was facilitated in specially designed tanks with a double hapa arrangement, while an aeration tower ensured a continuous supply of oxygen-rich water to enhance breeding performance and larval survival. Depending on seasons, temperature and maturity status of brooders, the protocol allowed 1.5-3.0 kg of matured female mola to produce roughly 1 million spawns. Furthermore, a successful nursery-rearing protocol for mola seed was developed, with a stocking density of 500 m^{-2} yielding higher fry harvests after 21 days with a survival rate of over 50%. In 2022, more than 30 farmers received mola spawn and fry from the partner hatchery. The stocking densities were recommended at 50 numbers m^{-2} for spawn and 5-10 numbers m^{-2} for fry in carp polyculture ponds. Stocking hatchery-produced mola seed in dried and newly water-filled ponds was found to be ideal to avoid predation. After 3-4 months of stocking, mola was ready for consumption or sale, and frequent partial harvesting was recommended to increase household consumption and manage overpopulation by auto recruitment. Although not all ponds were fully harvested, mola production in carp polyculture ponds ranged from 500-550 kg ha^{-1} y^{-1} without additional management. While mola can breed naturally in the ponds and continue to produce, the research recommends stocking hatchery-produced uniform-sized mola seed annually for several advantages. It is recommended to stock the mola seeds in a carp polyculture pond well before the carp fingerlings for better survival. This research presents a significant contribution to scaling nutrition-sensitive carp-mola polyculture by developing mass seed production and rearing technology of mola.

Keywords: Mass seed production, Mola carplet, Nutrition-sensitive aquaculture, Polyculture, Small indigenous fish species (SIS).