

Health and Maintenance

Fish should be observed daily during feeding to assess their health. Dead or moribund fish must be removed immediately. Handling should be minimized to reduce stress, and recommended stocking densities should be maintained throughout the rearing period.

Harvest and Supply

After a month, juveniles attain a length of >15 cm and a body weight of ~25 g, making them suitable for cage stocking. Harvesting should be carried out using soft scoop nets with minimal handling stress. Fish should be starved for at least 24 hours prior to harvesting and transport. Fish should be transported in oxygenated containers. Temperature should be maintained using ice packs (in sealed bags) or by using air-conditioned vehicles. Under proper management, the system can achieve:

- Final weight of ~25–26 g
- Survival of ~90–92%
- Feed Conversion Ratio (FCR) of ~1.3
- Daily weight gain of ~0.8–0.9 g per fish



Output and Benefits

This technology enables the production of healthy, uniform, cage-stockable juveniles suitable for HDPE cage systems (20 mm mesh).

Key advantages include improved growth performance, better feed utilization efficiency, reduced production cost, and suitability for decentralized nursery production systems

Tank-based nursery rearing systems	Pond-based Nursery Rearing
Expensive, Space-intensive, Labor-demanding	Low investment, Easy to adopt, Suitable for farmers, Large-scale seed production, Better survival & growth

Farmer Benefits	Impact on Aquaculture
Lower cost than tank systems, High survival, profitable business, Uniform fish size, Easy to scale, Ideal for coastal entrepreneurs	Boosts cage farming success, reduces pressure on hatcheries, and creates rural livelihood opportunities

Impact

Adoption of this technology can strengthen the marine cage aquaculture value chain, reduce dependency on hatchery-based nursery systems, promote entrepreneurial nursery units, and contribute to the blue economy and coastal livelihoods.

Key Message

Pond-based hapa systems offer a biologically favorable and economically viable approach to producing stockable cobia juveniles, enabling faster growth, improved feed efficiency, and higher biomass production.

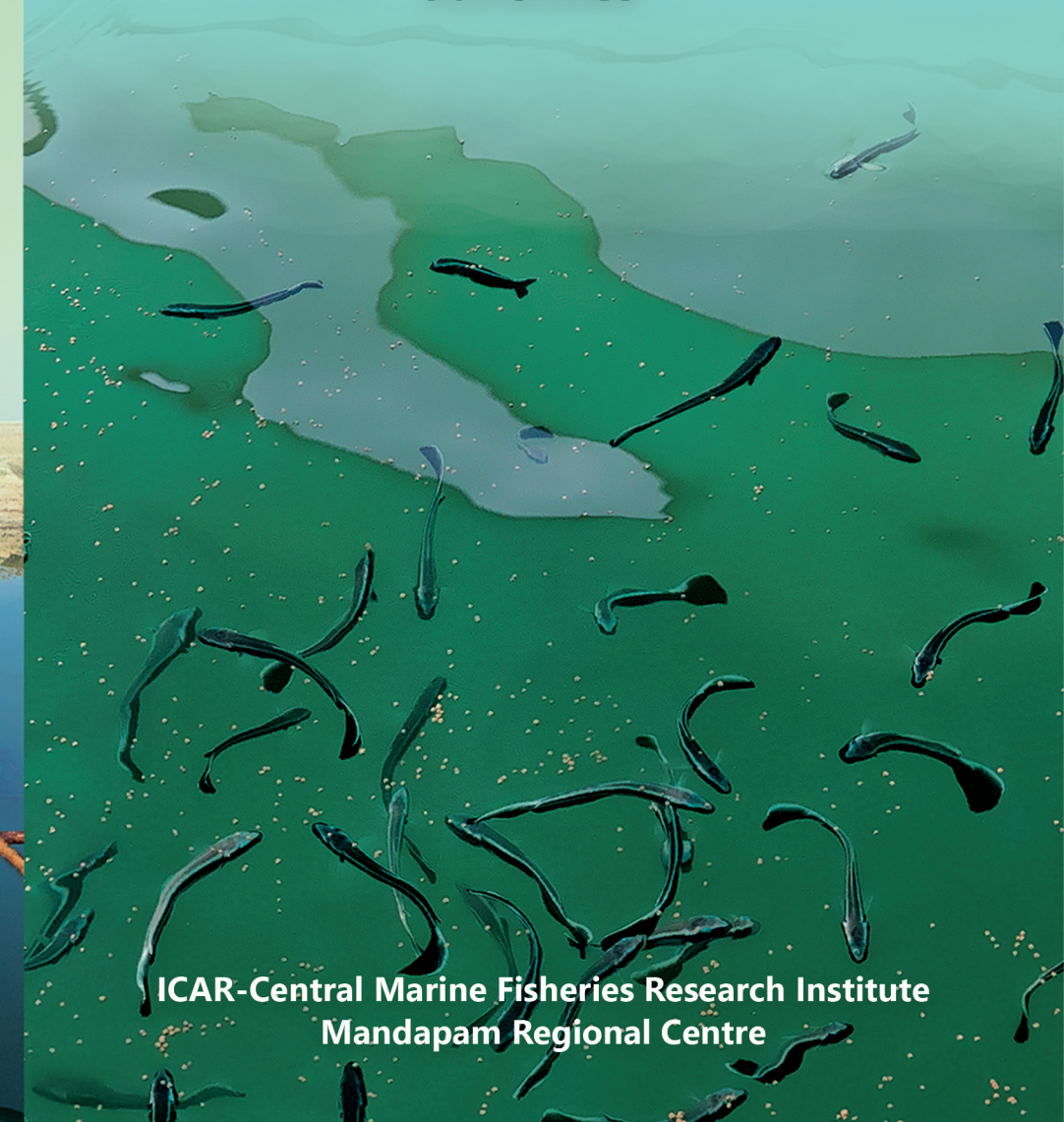
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Pond-Based Nursery Rearing of Cobia (*Rachycentron canadum*) for Production of Cage-Stockable Juveniles





Cobia (*Rachycentron canadum*) is a fast-growing marine finfish with high market demand and excellent suitability for sea-cage aquaculture. The minimum size required to commence cage aquaculture is approximately 15 cm in length and 25 g in body weight. They can reach 3 to 4 kg over a culture period of about 6 to 8 months under cage-farming conditions with proper feeding and management strategies. However, producing juveniles of stockable size from ~1 g using existing technologies requires large-scale infrastructure and intensive management, limiting the scope for rapid expansion of cobia aquaculture. The present technology provides a pond-based hapa nursery rearing protocol to rear hatchery-produced fry (~1–2 g) into cage-stockable juveniles within ~28 days under controlled pond conditions. The approach offers a practical and scalable alternative to conventional tank-based nursery systems.

Why This Approach?

Tank-based nursery rearing systems require well-equipped hatchery infrastructure and technical skills to handle fish under indoor tank conditions. Nursery rearing within hatcheries requires additional space, manpower, and infrastructure, and may limit the handling of large numbers of fish.

If a suitable protocol is available, hatcheries can supply ~1 g juveniles to farmers with nursery rearing facilities, thereby allowing them to focus more efficiently on breeding operations. Hatcheries can prioritize breeding, while farmers undertake nursery rearing up to cage-stockable size.

Pond-based nursery rearing method

The ideal site for implementing this technology is a marine pond near the sea with direct access to seawater. The recommended water depth is 1.5–2.0 m, with salinity ranging from 25 to 35 ppt. Optimal water quality includes temperature 26–30°C, dissolved oxygen above 5 mg L⁻¹, and pH between 7.5 and 8.5.

The pond should be dried and weeds and predatory fish eradicated prior to stocking. Apply lime at approximately 2–4 kg per 100 m² of the pond area, then fill the pond with seawater.

Stage 1 (7 days): Small mesh size Hapa

Initial rearing should be carried out in small-mesh (4 mm) hapa nets made of synthetic fabric (nylon hapa cloth). Hapa size of 4 × 4 × 4 ft is recommended.

The hapa should be installed approximately 1 ft above the pond bottom using bamboo poles. A square PVC pipe frame (1 m × 1 m) filled with sand can be placed inside the hapa as a sinker to maintain shape and stability.

Clean the hapa nets regularly, or replace them to prevent clogging and ensure proper water exchange.

Stage 2 (7 days): Shifting to HDPE Hapa

After about 7 days, transfer the fish into HDPE hapa nets (2 m × 2 m × 1.3 m), with approximately 12 mm mesh size and 0.5 mm net thickness to ensure easy water flow through the nets.

These HDPE cage nets can be floated in water using a PVC float frame made from 90 mm PVC pipemeasuring 2 m × 2 m. A PVC pipe square sinker made from a 32 mm PVC pipe, filled with sand (1.8 m × 1.8 m), should be placed inside the HDPE net to maintain its structure and proper positioning in the water column.

Stocking

Healthy cobia fry without any deformities (~1.5–2 g), already weaned to artificial feed in the hatchery, should be stocked in the hapas. The initial stocking density is 100 fish/m³, which should be reduced to 25 fish/m³ after shifting into HDPE hapa nets.

Feeding and Management

Fish need to be fed floating formulated pellet feed, containing 50–55% crude protein and 10%–14% crude lipids. Feeding should be carried out five times daily (06:00, 10:00, 13:00, 16:00, and 22:00 h).

Feed size should be gradually increased from 1.2 mm pellets during the first 10 days to 2 mm pellets in the later stage. Feeding quantity should be adjusted based on the biomass and feeding response.

Routine checking of temperature, salinity, pH, and ammonia is essential. Adequate water exchange should be maintained, and hapa nets should be cleaned regularly to prevent biofouling and clogging.

