

lements are few; the human population of this 100-mile-long island is only about 18,000, 75% of which are concentrated in one small area.

Some fishermen said that they had never seen *kobiri* other than in estuaries. Several others asserted, however, that they had seen it in coastal waters where, in contrast to its coloration in estuaries, it possessed small white blotches.

In addition to *E. polystigma*'s ability to live in estuarine conditions, other characteristics make it appear worth investigating for aquaculture. It is said by fishermen to taste as good as other groupers. It is attractively coloured; the body is a uniform chocolate brown, without the pale abdomen of many species. Small circular yellow spots densely cover the body and all fins except the ventrals. The fact that it can apparently live out of water for a long time suggests that it would withstand air-shipment well. In addition, the species is apparently rare in Southeast Asia, and rarity is seen as a gastronomic virtue among Cantonese consumers. How appealing it would be to satisfy this demand for rarity with a species that is apparently common in at least one part of its range.

## Acknowledgements

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# Taiwan grouper hatchery production in 2000

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Two million giant grouper (*Epinephelus lanceolatus*) fry were produced in Taiwan hatcheries and sold in 2000. The price dropped from HK\$ 25 per 3-cm-long fish at the beginning of the season to HK\$ 2.5/fish at the end of the season<sup>2</sup>. A large quantity of fry was sold to Hainan and some to Hong Kong, Sabah, Malaysia and Vietnam, but the survival rate was reported to be unsatisfactory. Overseas markets could not be found to absorb all the fry produced and large quantities are now being reared by Taiwanese culture fishermen.

The current price of the (eating-sized) giant grouper in Hong Kong is around HK\$ 90/catty and we believe the price will drop to HK\$ 60/catty when the fish start going into the Hong Kong market in August and September in 2001<sup>3</sup>. This will also badly affect the price of *Epinephelus coioides*, which could be replaced by giant grouper. It is believed that the harvest of fry in Taiwan will continue to be good in 2001.

Since the price of fish is low, green groups may want to consider raising funds to buy the fry for release in order to improve the population of this type of fish in the wild.

A hatchery in Penang is working hard to produce giant grouper but no news of success has been heard.

About 300,000 tiger grouper (*Epinephelus fuscoguttatus*) fry were produced by Taiwanese hatcheries. The majority of the fish were sold to the local culture fishermen. The survival rate of the fish has been very good and they grow very fast. Hatcheries from Bali, Indonesia, and Penang, Malaysia, also produced some fry of this species, but information on the quantities is unavailable. Tiger grouper fry are being reared in Thailand, Vietnam, Sabah, West Malaysia, Hainan and Hong Kong.

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2. HK\$ 1.00 = US\$ 0.128 (Feb. 2001)

3. 1 catty = 600 g

The price of this fish remained stable in 2000. Cultured fish of 0.5–0.8 kg could be sold at about HK\$ 95–100/catty.

At least one hatchery in Taiwan and two hatcheries in Bali, Indonesia, produced high-finned grouper (*Cromileptes altivelis*) fry. Taiwan culture fishermen are not interested in this species because it grows very slowly and cannot be reared in ponds there.

The asking price was very high at the beginning of the season at HK\$ 55 per 6-cm-long fish. No culture fishermen wanted to take the risk. The price dropped to HK\$ 8/fish for fish 2–3 cm long but there were still no buyers from Hong Kong or PRC.

We believe at least 20,000–30,000 high-finned grouper fry were hatched and grew bigger than 3 cm but we do not know their fate, as no buyers were available.

Hatcheries in Taiwan are currently able to hatch more than 40 species of marine fish for mariculture with *Epinephelus coioides*, *Trachinotus blochii*, *Lutjanus argentimaculatus*, *L. stellatus* and *Acanthopagrus latus* being the species raised in greatest numbers. Giant grouper (*E. lanceolatus*) joined this list in 2000.



## Seed supply for grouper cage culture in Khanh Hoa, Vietnam

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Source: Condensed from *Aquaculture Asia* 5(2):39–41, April–June 2000.

Grouper culture has developed in recent years in Khanh Hoa in response to high market value, the availability of unused shrimp ponds because of disease, and a cage culture tradition related to the fattening of lobsters. Grouper culture is dependent on wild seed.

A broad-based study was undertaken between January and July 1998, which examined technical, environmental, and socio-economic issues related to wild grouper seed supply in Khanh Hoa in order to assess the prospects for the sustainable development of grouper culture in the province as well as elsewhere in Vietnam. Field work for the study was carried out from December 1997 to April 1998 in four districts of Khanh Hoa Province (Van Ninh, Ninh Hoa, Nha Trang, and Cam Ranh) which are the main areas for grouper seed supply and grouper culture in Central Vietnam.

The study used existing information, supplemented with an interview survey of fishermen, and a physical/ecological survey of catching grounds. Parameters related to grouper seed supply, such as physical and ecological characteristics of catching areas, technical attributes of seed fisheries, and market and socio-economic aspects of seed supply, were recorded and investigated using a framework adapted from the "Handbook for

rapid appraisal of fisheries management systems" (version 1) (Pido et al. 1996).

The method of determining the coverage of seaweed, seagrass and coral samples were collected and identified based on the FAO key. The ecological data was analysed using cluster analysis, as developed in the ADE 4 package (University of Lyons). The methodology and results have been described in detail elsewhere (Tuan 1998).

Field work for the study was funded under the DFID Renewable Natural Resources Knowledge Strategy: Improved management of small-scale tropical cage culture systems in Asia.

### Ecological attributes of catching areas

Four *catching areas* were identified: Van Phong, Nha Phu, Nha Trang and Cam Ranh, corresponding broadly to the four coastal districts of Van Ninh, Ninh Hoa, Nha Trang and Cam Ranh, respectively. These areas were all characterised by the presence of seagrass "forest" or seaweed beds. Two seagrass species were common to all areas: *Thalassia hemprichii* and *Enhalus acoroides*. Within each area were several catching sites where the bulk of fishing for seed took place, amounting to a total of 16 catching sites. Cluster analysis revealed

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