

sure off wild populations. Finally, although Hong Kong is the major importer of this species and has a good CITES record, the very real difficulties of monitoring imports by sea will have to be addressed. All of these challenges will need action from governments, but tertiary institutions and non-governmental organisations could provide substantial support by helping to tackle some of the issues.

For more information on this species see: Sadovy et al. 2003; [www.scrfa.org](http://www.scrfa.org); and [www.humpheadwrasse.info](http://www.humpheadwrasse.info).

Important details of an Appendix II listing in relation to its international trade have been extracted from the CITES website ([www.CITES.org](http://www.CITES.org)) and include:

- The export of any specimen of a species included in Appendix II shall require the prior grant and presentation of an export permit. An export permit shall only be granted when the following conditions have been met: (a) Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species; (b) Management

Authority of the State of export is satisfied that the specimen was not obtained in contravention of the laws of that State for the protection of fauna and flora; and (c) Management Authority of the State of export is satisfied that any living specimen will be so prepared and shipped as to minimize the risk of injury, damage to health or cruel treatment.

- International trade in specimens of Appendix-II species may be authorized by the granting of an export permit or re-export certificate; no import permit is necessary (*but imports must be accompanied by export/re-export documentation*). Permits or certificates should only be granted if the relevant authorities are satisfied that certain conditions are met, above all that trade will not be detrimental to the survival of the species in the wild.

## Reference

- Sadovy, Y., Kulbicki M., Labrosse P., Letourneur Y., Lokani P. and Donaldson T.J. 2003. The humphead wrasse, *Cheilinus undulatus*: Synopsis of a threatened and poorly known giant coral reef fish. *Reviews in Fish Biology and Fisheries* 13(3):327–364.



## First successful hatchery production of Napoleon wrasse at Gondol Research Institute for Mariculture, Bali

Bejo Slamet<sup>1</sup> and Jhon H. Hutapea<sup>1</sup>

The Napoleon, or humphead, wrasse (*Cheilinus undulatus*) is one of the most expensive live reef food fish in Asian markets, especially Hong Kong, Singapore and China. Because this species is being overfished, many countries in the Asia-Pacific region have regulated its capture and export. Consequently, there is considerable interest in the potential for culturing Napoleon wrasse to supply these high-value markets. The Research Institute for Mariculture (RIM) at Gondol, Bali, Indonesia, initiated research on hatchery production technology for Napoleon wrasse in 1997. Captive broodfish began spawning in 1998, and numerous attempts were made to rear the larvae. After many years of research on gonadal development, spawning and larval rearing, RIM researchers finally produced 120 juvenile Napoleon wrasse in 2003. This is the first reported hatchery production of this species.

Rearing Napoleon larvae is difficult compared to other marine finfish such as snappers and groupers. The difficulty is related to the small size of the newly hatched larvae and their small mouth gape. Egg diameter is only 620–670 micrometers ( $\mu\text{m}$ ), the total length of newly hatched larvae is 1.5–1.7 millimeters (mm), and mouth gape at initial feeding is only 133  $\mu\text{m}$ .

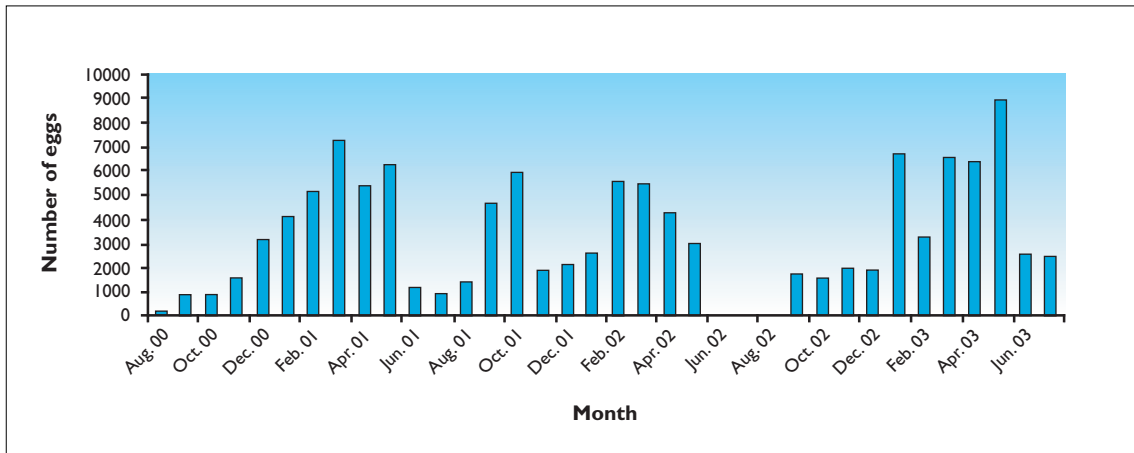
RIM researchers attribute the successful larval rearing to the provision of high quality feed to broodstock, resulting in good quality eggs. In addition, researchers were able to provide good quality and appropriately sized live food (40–80  $\mu\text{m}$ ) to the larvae during the initial feeding period before the yolk and oil globule were exhausted.

RIM researchers note that the growth of Napoleon wrasse is extremely slow; at around six months of

1. Research Institute for Mariculture at Gondol, Bali, Indonesia. Email: [gondol\\_dkp@singaraja.wasantara.net.id](mailto:gondol_dkp@singaraja.wasantara.net.id)

age the juveniles were only 5–6 cm in total length. This feature may limit their attractiveness for aqua-

culture, despite the high price of this species in the live reef food fish trade.



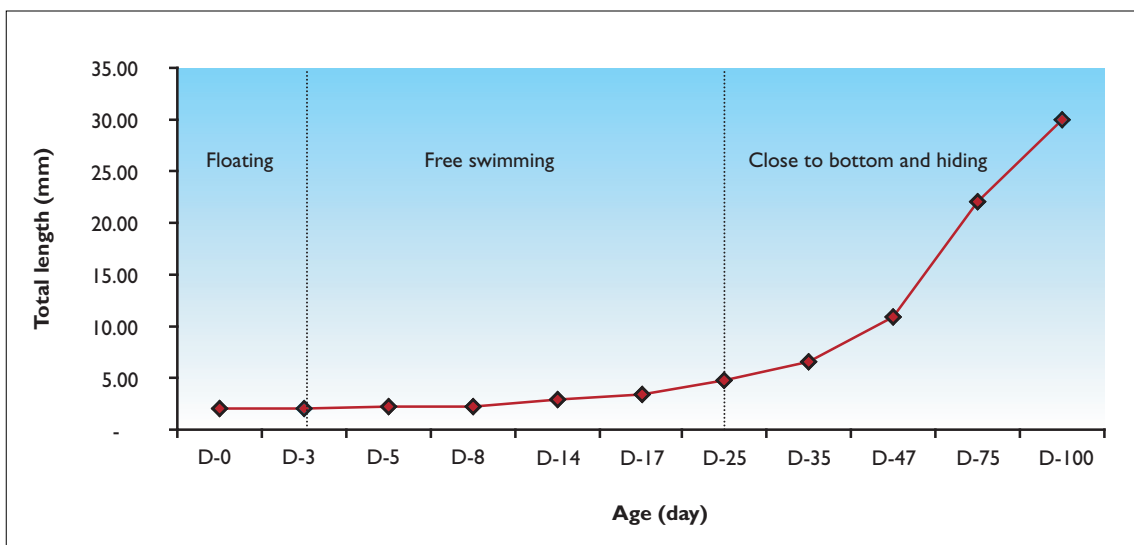
**Figure 1.** Egg production by Napoleon wrasse broodfish at Research Institute for Mariculture, Gondol, Bali, from 2000 to 2003.



**Figure 2.** Napoleon wrasse larvae one day (D-1) and four days (D-4) after hatching.



**Figure 3.** Napoleon wrasse hatchery-raised juvenile.



**Figure 4.** Growth pattern and behaviour of Napoleon wrasse larvae.