Correlation between ovarian maturation and physiological indices in the slipper lobster Ibacus novemdentatus: A macroscopic and microscopic analysis

Po Yu Huang*†[1], Sin-Wen Hu[2], Chia-Shan Tsai[2], Wan-Rong Lin[2], Ping-Jung Lin[2], Hsin-Yiu Chou[3,4], and Li-Li Chen[2,4]

[1]Department of Life Science, National Taitung University – Taïwan
[2]Institute of Marine Biology, National Taiwan Ocean University – Taïwan
[3]Department of Aquaculture, National Taiwan Ocean University – Taïwan
[4]Center of Excellence for the Oceans, National Taiwan Ocean University – Taïwan

Résumé

Crustaceans, such as lobsters, are valuable fishery resources globally. However, the decline in wild lobster populations and the inability of current aquaculture techniques to achieve full artificial breeding puts this resource at risk. Scientific research-based fishery policies are crucial for sustainable resource management. While studies have established maturation benchmarks for lobsters using histological methods, research on slipper lobsters (*Ibacus novemdentatus*), particularly in Taiwan's northern waters, is limited. This study aimed to identify and categorize ovarian maturation stages of female *I. novemdentatus* using macroscopic and microscopic observations. The stages were characterized by ovarian appearance, yolk-filled oocytes, and physiological indices such as gonadosomatic index (GSI), hepatopancreatic index (HPI), and hemolymph absorbance at 334 nm and 480 nm. Two types of ovarian resorption were identified: partial post-spawning resorption (stage 5a) and complete resorption without egg production (stages 5b and 1b). The study also refined the classification of immature ovaries into more specific stages, differentiating between females that failed to spawn and those that recovered after spawning. A weak negative correlation between GSI and absorbance at both wavelengths suggests a trade-off between reproductive effort and metabolic activity. HPI remained stable across stages, supporting metabolic functions during reproduction. This study establishes a nine-stage ovarian maturation system and a preliminary non-destructive maturity assessment method, providing valuable insights for the sustainable management of *I. novemdentatus* populations and aquaculture.

Mots-Clés: Ibacus novemdentatus, ovarian maturation, GSI, hemolymph absorbance, sustainable fishery management, non, destructive assessment.

*Intervenant
†Auteur correspondant: abcm0113@nttu.edu.tw