The Biological Research of *Austinogebia narutensis* (Sakai, 1986) (Crustacea: Decapoda: Thalassinidea: Upogbeiidae) in Penghu

Student: Chia-Wen Yeh
Advisor: Dr. Jhy-Yun Shy

Submitted to Institute of Aquatic Bio-resources and Aquaculture
College of Marine Resources and Engineering
National Penghu University
In Partial Fulfillment of the Requirements
for the Degree of
Master of Science
in
Agriculture
July 2013
Penghu, Taiwan, Republic of China
摘要

鳴門奧螯蛄蝦 *Austinogebia narutensis* 彰湖俗稱「蝦猴、猴仔」，
主要被用做於飼料，與以食用為主的美食養殖蝦蝦有所不同。本研究
探討其生物學特性，以期提供養殖評估及生態保育等之具體資訊。

結果顯示，最大雌、雄蝦頭胸甲長為 19.49mm、21.07mm，體長
為 66.38mm、67.61mm，其中雄蝦有大、小鉗之性雙型現象。經比較分
析，雌蝦、大鉗、小鉗雄蝦三者的頭胸甲長對體長及第一步足掌節
均為直線迴歸關係，而頭胸甲長對體重及第一步足重均呈曲線迴歸分
關係，唯小鉗雄蝦各形質相關係數較低。此外，雌蝦最小性成熟體型
之頭胸甲長為 12.61mm、體長為 40.07mm，卵囊在繁殖季前達最高峰，
繁殖季開始時（11 月）逐漸下降，繁殖季結束（4 月）後則又上升。

雌蛄蝦在離岸 15m 之處開始發現，到離岸約 250m 處達洞口密
度分佈高峰，雌蛄蝦密度為 232 尾/m²。洞穴為 Y 型，主要結構包含 U
型部（U-part）及 shaft 部（S-part），而次要結構則有迴轉室（turning
chamber）及側支（side branch）。洞穴在夏季較深，開口間距亦較近。

在水溫 24~25℃、鹽度 34~35‰的條件下，雌蝦初產下的卵呈橘黃
色不透明，略呈圓形，卵徑為 0.55mm×0.54mm，卵重為 0.09mg，在抱
卵後第 4~5 天出現眼點，卵色為灰綠色，呈椭圓型，卵徑增大為
0.61mm×0.58mm，卵重為 0.15mg，在第 13 天將近孵化時之色卵色為
半透明，卵徑為 0.72mm×0.62mm，卵重為 0.24mg。孵化後幼苗經過 4
期幼螺幼體（Zoea）變態後，在第 13 天變態為底棲性的後期幼苗
（Decapodid）。

本種蝦整年都有卵巢發育，推測應屬於多次抱卵種類，經分析年
齡至少為 2 年。另外，底質平均粒徑大小在 0.5~0.125mm 的中等粗砂
至細砂之底質環境是洞穴密度最高的區域。

關鍵字：澎湖、奧螯蛄蝦、蝼蛄蝦科、生物學、幼苗形態
Abstract

The *Austinogebia narutensis*, also named “He-Gao” or “Gao-A”, is mainly used for fishing bait in Penghu. It is different from *A. edulis* that mainly used for food of human beings. This thesis focuses on the biology and habitat researches of *A. narutensis* that can be applied for future management of resources and conservation.

The results showed that maximal Cl (Carapace length) were 19.49 and 21.07 mm, and Bl (Body length) were 66.38 and, 67.61 mm for the female and male of *A. narutensis*, respectively. The male showed sexual dimorphism due to have either big chela or small chela in adult individuals. The Cl was highly linearly correlated to both Bl and PwPI (Propodus width of Pereiopod I) in the female, and also the male with big and small chela. The Cl showed curvilinearly related to the Bw (Body weight) and PIw (Pereiopod I weight). In addition, the minimal Cl and Bl of sexual maturity were estimated to be 12.61 mm and 40.07 mm for females, respectively. The OI (Ovarian index) decreased at the beginning of breeding season on November, and increased after the end of breeding season on April in the next year.

The caves of *A. narutensis* located from 15-250 m off the coast, and the highest density (232 ind/m²) was found at the latter location. The cave was Y-shape containing major structures of both U (U-part) and shaft (S-part), and also the secondary structures of turning chamber (tc) and side branch (br). The caves were deeper in summer, but shallower in winter. The distances of the cave openings were lower in summer and higher in winter.
The egg sizes, wight and colors of the freshly spawned, eyed and pre-hatched eggs were 0.55×0.54 mm, 0.09 mg in orange, 0.61×0.58 mm, 0.15 mg in greyish green, and 0.72×0.62 mm, 0.24 mg in translucent, respectively. Under the conditions of water temperature, The hatched larva had four zoeal stages and metamorphosed into the decapodid at the 13th day reared in 24-25°C and 34-35‰ salinity.

The *A. narutensis* should belong to multi-spawning pattern since the ovary developed during the sampling period. The life duration were two years at last. Moreover, the analysis of sediment in the habitat with the highest density suggests that the favorite particle size for *A. narutensis* were medium sand to fine sand.

*Keywords*: Penghu, *Austinogebia*, Upogebiidae; Biology, Larval morphology