

## 中文摘要

台灣絨螯蟹 (*Eriocheir formosa* Chan, Hung and Yu, 1995) 俗稱青毛蟹，目前僅分布於臺灣東部與西南部，是重要的水產資源。其春夏之際降海生殖洄游的習性，與同屬的其他種類在秋冬季節降海的習性不同。因此台灣絨螯蟹除了具有高經濟性外亦有學術研究價值。

本研究利用 PCR sequencing 等技術，以粒線體核酸之細胞色素氧化酶 I (mitochondrial cytochrome oxidase I, COI) 序列前段 602bp，作為台灣絨螯蟹的分子標誌(molecular marker)。利用此分子標誌探討本島台灣絨螯蟹族群的遺傳多樣性(genetic diversity) 與遺傳結構。

分析台灣東北部到西南部的 88 隻台灣絨螯蟹個體，結果在序列鹼基對比例方面，A 所佔比例為 25.9%，T 佔 35.38%，C 佔 20.4%，G 佔 18.27%。A+T=61.28%，呈現 A-T rich 的現象。全部標本共得到 23 個基因型，分散於所有族群中。單倍體基因多樣性指數 (Haplotype diversity,  $h$ ) 為 0.73093，核苷酸多樣性指數 (Nucleotide diversity,  $\pi$ ) 為 0.00185。高的  $h$  值和低的  $\pi$  值顯示族群曾經經歷過瓶頸效應，之後接著迅速的族群擴張。Tajima's  $D$  和 Fu and Li's  $D$  均呈現負值，進一步證明台灣絨螯蟹族群曾經經歷過族群擴張。以 Neighbor-joining 法進行台灣絨螯蟹的親緣關係樹建構，其 bootstrap 值均小於 70，顯示無明顯分群現象。遺傳分化指數( $F_{st}$ )接近零，另外基因交流指數( $Nm$ )趨於無限大，顯示族群間幾乎無分化且族群間基因交流程度很高。另外經由分子時鐘計算推測，台灣絨螯蟹約於 5.3~7.51 百萬年前，從大陸來到台灣。並研判近岸流可能是促使不同水系台灣絨螯蟹基因交流的主要原因。

## Abstract

The green mitten crab, *Eriocheir formosa*, is endemic to Taiwan. Its sea-ward reproductive migration period occurs between spring and summer unlike that for other species of *Eriocheir* which migrate during autumn-winter . Therefore, it has high commercial value and is also an important subject for academic studies.

The aim of this study was to obtain the molecular marker (mitochondrial cytochrome oxidase I, COI) from *E. formosa* and to analyse the genetic diversity and population genetic structure for different groups in Taiwan.

In the present study, we analysed 602 base-pair fragment of the mitochondrial COI gene from 88 specimens collected from the Northeast to the Southwest of Taiwan. The studied segment of COI sequence is A-T rich (A: 25.9%, T: 35.38%, C: 20.4%, and G: 18.27%) .

The haplotype diversity ( $h$ ) was found to be 0.73093 with a nucleotide diversity ( $\pi$ ) of 0.00185, indicating the population of *E. formosa* had met a population bottleneck effect and population expansion event. The negative values of Tajima's D test support the population expansion event. Pairwise  $F_{st}$  values and high gene flow revealed a low level of isolation between populations and molecular dating implied *E. formosa* first appeared in Taiwan around 7.51~ 2.92 million years ago.