



Phenotypic Variation Among Some Species of Shrimps

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ABSTRACT

Variation in phenotype based on morphometric character indices and meristic counts of different population of shrimps, (*Metapenaeus monoceros*, *Penaeus vannamei*, *Penaeus japonicas*, *Penaeus semesulacatus*, *Penaeus penicillatus*, *Penaeus monodon*, *Penaeus kerathurus*), were analyzed phylogenetically to study and compare the amount of differences in phenotypes. The results revealed that there were significant differences ($P \leq 0.05$) in most of morphometric character indices and meristic counts among different population tested. The hierarchical cluster analysis based on quantitative phenotype (morphometric character indices and meristic counts), grouped the seven shrimp species into two major category groups; *Penaeus vannamei*, *Penaeus penicillatus*, *Penaeus monodon* and *Penaeus semesulacatus* species first group and *Metapenaeus monoceros*, *Penaeus kerathurus* and *Penaeus japonicas* species second group. Within these major grouping, the first group showed that *Penaeus vannamei* and *Penaeus penicillatus* were grouped close together. While the second group showed that *Metapenaeus monoceros* appears to be more phenotypically similar to that *Penaeus kerathurus* species than that of *Penaeus japonicas*. Therefore, it was observed in this study that the phenotype analysis based on a large number of morphometric character indices and meristic counts, can be used to discriminate shrimp species..

INTRODUCTION

Shrimp aquaculture plays a significant role in the world economy. According to the information of the Food and Agriculture Organization (FAO) of the United Nations, marine and brackish water shrimp culture productions have expanded from less than 10, 000 metric tonnes in 1970 more than 4, 000, 000 metric tonnes in 2014. The most of the aquaculture shrimp contribution has come from *Penaeus vannamei* which accounts 80% of the whole shrimp production. Although the cultivated shrimp production has rapidly increased during these years, the annual economic losses due to disease were estimated to be approximately 1 billion US dollar per year since the early 1990s (Dugassa and Gaetan, 2018).

Aquatic food production has transformed from primarily based on fisheries to the culture of increasing numbers of farmed species. According to

the statistics of (FAO, 2016), the total world aquaculture production was found around 73.8 million tonnes in 2014. This figure has almost increased by 11% compared to the production of 2012 which was around 66.5 million tonnes (FAO, 2016). The total world aquaculture production of crustacean was 6.9 million tonnes in 2014 with an estimated total value of 32.33 billion Euros. This figure of crustacean production is almost increased by 7% compared to the production figures of 2012 (6.4 million tonnes) with a value of 27.60 billion Euros (FAO, 2016). Till now, more than 62 crustacean species have been cultured in aquaculture farms around the world. The mariculture contributes to 60.8% of the crustacean production. The remaining 39.2% of the production is from inland aquacultures (FAO, 2012). The production from mariculture is dominated by *P. vannamei* which has reached 3.18 million of tonnes with an estimated first sale value of 12.15 billion Euros.

الاختلافات المظهرية بين بعض أنواع الجمبرى

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فى هذه الدراسة تم مقارنة الاختلاف بين الشكال المظهرية وتطور نشوء النوع لسبعة انواع مختلفة من الجمبرى، اعتمادا على دليل الصفات المورفومترية وتعداد الميرستيك. وقد أظهرت النتائج وجود اختلافات ذات دلالة احصائية فى معظم الصفات المورفومترية وتعداد الميرستيك التى تم دراستها. وقد أظهرت النتائج من hierarchical cluster analysis اعتمادا على تحليل الاشكال المظهرية للأنواع المختلفة من الجمبرى تحت الدراسة انه يمكن تقسيمها الى مجموعتان رئيسيتان وفقا لدرجة القرابة بينهم : المجموعة الاولى تضم كل من *Penaeus vannamei*, *Penaeus penicillatus*, بينما المجموعة الثانية تضم كل من *Metapenaeus monodon*, *Penaeus semesulacatus*, *Penaeus japonicas*, *Penaeus kerathurus*, *monoceros monoceros*. حيث أظهرت المجموعة الاولى ان أكثر تقارب كان بين النوعين *Penaeus vannamei* و *Penaeus penicillatus* ، بينما أظهرت المجموعة الثانية أن أكثر تقارب سجل بين كل من *Metapenaeus monoceros monoceros*, *Penaeus kerathurus* و *Penaeus japonicas*.