

ABSTRACT

Abstract of thesis presented to the Senate of Universiti Malaysia Terengganu in fulfilment of the requirements for the degree of Master of Science

TAXONOMIC COMPOSITION OF NEREIDIDAE AND REPRODUCTIVE EPITOKES OF *Neanthes glandicineta* IN KUALA IBAI ESTUARY, TERENGGANU**SITI SYAZWANI AZMI****2021****Main Supervisor : Assoc. Prof. Dr. Yusof Shuaib Ibrahim, Ph.D****Co-Supervisor : Professor Zainudin Bachok, Ph.D****School/Institute : Institute of Oceanography and Environment**

Taxonomic and reproductive biology of Family Nereididae Blainville, 1818 were studied as limited species validity and no records on their reproduction recorded in Terengganu. This study aimed to describe nereidid species collected from Kuala Ibai Estuary, based on the collection of worms from sediment and rotten nypa fronds from March 2018 to March 2019, and as swimming worms. The swimming mature adults (epitokes) was done at new and full moon phases mostly within three hours after sunset time from January to March 2019. Taxonomic study was performed to all the nereidid species collected, while reproductive study was done only for swimming epitoke worms. A total of 256 nereidid worms were collected from rotten nypa frond (186 individuals), sediment (60 individuals), and as swimming epitokes (10 individuals) from six stations. Six genera and nine species of Nereididae were recorded from rotten nypa fronds, sediment, and as swimming epitoke; seven species were newly recorded from Malaysian waters. The first swimming epitokes of *Neanthes glandicineta* was discovered spawning in the water surface accompanied with morphological changes known as epitokous metamorphosis. Species reproductive and

development of *N. glandicineta* were characterised by the enlargement of the eyes in both sexes, a division of the body into three parts, modification of parapodia with additional lobes in the mid-body of males, and replacement of atokous chaetae in the mid-body by the epitokous natatory chaetae; completely in males and incompletely in females. The relationship between environmental parameters and nereidids distribution were studied using only the specimens collected from sediment samples. Principal Components Analysis (PCA) showed no significant differences of nereidids distribution during the Northeast monsoon (NEM) and Southwest monsoon (SWM) indicates their distribution pattern was similar between both monsoonal seasons. Spearman correlation and regression analysis showed some of nereidids distribution; *Namalycastis* spp., *Solomononereis* sp., and *Ceratonereis* spp. were influenced by the water parameters reading (*Namalycastis* spp./DO and *Ceratonereis* spp./temperature) and sediment type (*Namalycastis* spp./clay and *Solomononereis* sp./gravel). However, other species (*Neanthes* spp., *Composetia* spp., and *Perinereis* sp.) showed no statistical influences between their distribution and environmental parameters (water and sediment type). Thus, the findings of current research provide an updated of polychaetes checklist and biological information in some nereidid species collected from Malaysian waters which can be utilized in fisheries and aquaculture industries as the Nereididae widely known as baitworms.

Abstrak tesis yang dikemukakan kepada Senat Universiti Malaysia Terengganu
sebagai memenuhi keperluan untuk Ijazah Sarjana Sains

**KOMPOSISI TAKSONOMI NEREIDIDAE DAN EPITOK PEMBIAKAN
Neanthes glandicincta DI MUARA KUALA IBAI, TERENGGANU**

SITI SYAZWANI AZMI

2021

Penyelia : **Prof. Madya Dr. Yusof Shuaib Ibrahim, Ph.D**

Penyelia Bersama : **Profesor Zainudin Bachok, Ph.D**

Pusat Pengajian/Institut : **Institut Oseanografi dan Sekitaran**

Taksonomi dan biologi pembiakan cacing Family Nereididae Blainville, 1818 telah dikaji berikutan kekurangan validasi spesies dan tiada rekod terhadap pembiakan cacing di Terengganu. Kajian ini berperanan untuk mengenalpasti cacing (Nereididae) yang diambil di muara Kuala Ibai, berdasarkan pengumpulan cacing daripada sedimen, pelepah nipah yang reput, dan cacing matang yang berenang (epitok). Pengumpulan cacing matang yang berenang (epitok) telah dijalankan pada fasa rembulan muda dan purnama sekitar tiga jam selepas waktu matahari terbenam bermula Januari 2018 sehingga Mac 2019. Kajian taksonomi telah dijalankan terhadap semua cacing (Nereididae) yang dijumpai, sementara kajian pembiakan telah dijalankan hanya pada cacing matang (epitok). Sebanyak 256 ekor cacing (Nereididae) telah diambil daripada pelepah nipah yang reput (186 individu), sedimen (60 individu), dan cacing berenang yang matang (epitok) (10 individu) daripada enam stesen. Enam 'genera' dan sembilan spesies cacing (Nereididae) telah direkod di dalam pelepah nipah yang reput, sedimen, dan sebagai cacing yang matang (epitok); tujuh spesies merupakan rekod baharu daripada perairan Malaysia. Spesies cacing berenang (epitok) yang pertama, *Neanthes glandicincta* dijumpai telah bertelur di permukaan air ditemani oleh perubahan morfologi yang dikenali sebagai "epitokous metamorphosis". Pembiakan dan perkembangan spesies cacing dicirikan berdasarkan pembesaran mata pada kedua-dua jantina, pembahagian badan kepada tiga bahagian, pengubahsuaian

'parapodia' dengan lobus tambahan pada pertengahan badan cacing jantan, dan pertukaran 'atokous chaetae' dengan 'natatory epitokous chaetae' dipertengahan badan; sepenuhnya pada cacing jantan dan tidak sepenuhnya pada cacing betina. Hubungkait diantara parameter sekitaran dengan taburan cacing (Nereididae) telah dikaji menggunakan cacing (Nereididae) yang hanya diambil daripada sedimen. 'Principal Components Analysis' (PCA) menunjukkan tiada perbezaan diantara taburan cacing (Nereididae) ketika Monsun Timur Laut (NEM) dan Monsun Barat Daya (SWM) yang bermaksud taburan cacing ini (Nereididae) adalah sama ketika NEM dan SWM. Kolerasi dan regresi 'Spearman' menunjukkan beberapa taburan cacing (Nereididae); *Namalycastis* spp., *Solomononereis* sp., dan *Ceratonereis* spp. dipengaruhi oleh bacaan parameter air (*Namalycastis* spp./DO dan *Ceratonereis* sp./temperature) dan jenis tanah (*Namalycastis* spp./clay and *Solomononereis* sp./gravel). Akan tetapi, cacing lain (*Neanthes* spp., *Composetia* spp., dan *Perinereis* sp.) menunjukkan tiada perbezaan diantara taburan cacing (Nereididae) dengan parameter sekitaran (air dan jenis tanah). Oleh itu, hasil kajian ini dapat membantu dalam memberikan rekod poliket yang terkini dan informasi biologi tentang beberapa spesies cacing (Nereididae) yang dijumpai di perairan Malaysia dan boleh diguna pakai dalam industri perikanan dan akuakultur kerana cacing ini (Nereididae) sangat terkenal sebagai cacing umpan.