

THE CHARACTERISTICS OF MANGROVE'S LIFE POLLEN  
FOR EXCLUSINE SPECIES AT TUMPAT, KELANTAN

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**THE CHARACTERISTICS OF MANGROVE'S LIFE POLLEN FOR  
EXCLUSIVE SPECIES AT TUMPAT, KELANTAN**

**By**

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**Research Report submitted in partial fulfillment of  
the requirements for the degree of  
Bachelor of Science (Marine Science)**

**Department of Marine Science  
Faculty of Maritime Studies and Marine Science  
UNIVERSITI MALAYSIA TERENGGANU  
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**DECLARATION AND VERIFICATION  
 FINAL YEAR RESEARCH PROJECT**

It is hereby declared and verified that this research report entitled:

**The Characteristics of Mangrove’s Life Pollen for Exclusive Species at Tumpat Kelantan by Nursyela binti Md. Amir Shah, Matric No. UK16883** have been examined and all errors identified have been corrected. This report is submitted to the Department of Marine Science as partial fulfillment towards obtaining the **Degree of Science (Marine Science)**, Faculty of Maritime Studies and Marine Science, University Malaysia Terengganu.

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## LIST OF ABBREVIATION

No.	Number
SEM	Scanning electron microscope
CM	Compound light microscope
PCD	Critical Point Dryer
<i>sp.</i>	Species
e.g.	Example
Ha	Hectare
%	Percentage
µm	Micrometer
N	North
M	Mole
°C	Degree Celsius
CO <sup>2</sup>	Carbon dioxide

## ABSTRACT

Pollen consists of different several characteristic which are shape, size, aperture, and wall sculpture for each species. Four species have been choosing for the pollen characteristics identification which is *Rhizophora apiculata*, *Rhizophora mucronata*, *Avicennia alba* and *Sonneratia caseolaris*. The samples were obtained at Tumpat Delta by taking their flower for each species. The Scanning Electron Microscope (SEM), Inverted Microscope and Light Microscope (LM) have been used to analyze the morphology of the pollen for each species. The apertures characteristic resulting the three species which are *Rhizophora apiculata*, *Rhizophora mucronata* and *Avicennia alba* shared the same types of apertures which is tricolporate while the *Sonneratia caseolaris* is triporate due to the absent of the colpi for that species. The similarities of *Rhizophora apiculata*, *Rhizophora mucronata* and *Avicennia alba* also have been identified on the sculpture characteristic which is reticulate but different for *Sonneratia caseolaris* species which is verrucate-psilate. Next, the characteristic of the pollen shape is simile for both Rhizophoraceae species which is triangular shape for polar view and prolate for equatorial view. The shape is different for *Avicennia alba* that resulting triangular for polar view and prolate-spheroidal shape for equatorial view while *Sonneratia caseolaris* circular for polar view and prolate shape for equatorial view. Lastly, for the size, *Rhizophora apiculata* is 13.98  $\mu\text{m}$  in length and 11.87  $\mu\text{m}$  in width while *Rhizophora mucronata* size is 18.60  $\mu\text{m}$  in length and 15.99  $\mu\text{m}$  in width. The *Avicennia alba* species size is 21.78  $\mu\text{m}$  in length and 18.94  $\mu\text{m}$  in width but *Sonneratia caseolaris* is 37.55  $\mu\text{m}$  in length and 31.15  $\mu\text{m}$  in width.

Ciri-ciri Debunga Hidup Bagi Spesies Tumbuhan Eksklusif Hutan Paya Bakau di  
Tumpat, Kelantan

ABSTRAK

Debunga memiliki beberapa ciri-ciri seperti bentuk, saiz, rongga dan permukaan dinding debunga yang berbeza bagi setiap spesies. Empat spesies telah dipilih untuk mengenalpasti ciri-ciri debunga iaitu *Rhizophora apiculata*, *Rhizophora mucronata*, *Avicennia alba* dan *Sonneratia caseolaris*. Sampel diambil di Delta Kelantan. Mikroskop Pengimbas Elektron (SEM), Mikroskop *Inverted* dan Mikroskop Cahaya (LM) telah digunakan untuk menganalisa ciri-ciri debunga bagi setiap spesies ini. Keputusan menunjukkan ciri rongga bagi *Rhizophora apiculata*, *Rhizophora mucronata* dan *Avicennia alba* sama iaitu '*tricolporate*' sementara *Sonneratia caseolaris* ialah '*triporate*'. Persamaan dari segi permukaan dinding bagi *Rhizophora apiculata*, *Rhizophora mucronata* and *Avicennia alba* turut dikenalpasti iaitu '*reticulate*' tetapi berbeza bagi *Sonneratia caseolaris* iaitu '*verrucate-psilate*'. Seterusnya, bentuk debunga adalah sama bagi spesies Rhizophoraceae iaitu berbentuk '*triangular*' dan '*prolate*'. Jenis bentuk berbeza pula pada spesies *Avicennia alba* iaitu '*triangular*' dan '*prolate-spheroidal*' sementara '*circular*' dan '*prolate*' untuk *Sonneratia caseolaris*. Bagi saiz, *Rhizophora apiculata* ialah 13.98  $\mu\text{m}$  panjang dan 11.87  $\mu\text{m}$  lebar manakala saiz *Rhizophora mucronata* ialah 18.60  $\mu\text{m}$  panjang dan 15.99  $\mu\text{m}$  lebar. Saiz bagi *Avicennia alba* ialah 21.78  $\mu\text{m}$  panjang dan 18.94  $\mu\text{m}$  lebar tetapi berbeza bagi *Sonneratia caseolaris* yang bersaiz 37.55  $\mu\text{m}$  panjang dan 31.15  $\mu\text{m}$  lebar.