

INSECTIVOUS COMMUNITIES IN PITCHER PLANT (*Nepenthes*  
SPP.) FROM SELECTED HEATH VEGETATION  
OF TANJUNG SAMARU

MUHAMMAD FIRDaus bin ANHAID

FACULTY OF SCIENCE TECHNOLOGY

NOVTECH UNIVERSITY, SCIENCE & TECHNOLOGY, MALAYSIA

2005

3/2896

Peroustakaan  
Kolej Universiti Sains Dan Teknologi Malaysia (KUSTEM)

1100036857

LP 16 FST 4 2005



1100036857

## Insect's community in pitcher plant (*nepenthes gracilis*) from selected heath vegetation of Terengganu / Muhammad Firdaus Amhad.



PERPUSTAKAAN

KOLEJ UNIVERSITI SAINS & TEKNOLOGI MALAYSIA  
21030 KUALA TERENGGANU

**Lihat sebelah**

HAK MILIK  
PERPUSTAKAAN KUSTEM

**INSECT'S COMMUNITY IN PITCHER PLANT (*Nepenthes gracilis*) FROM SELECTED  
HEATH VEGETATION OF TERENGGANU**

By

**Mohammad Firdaus bin Ahmad**

Research Report submitted in partial fulfillment of  
the requirements for the degree of  
**Bachelor of Applied Science (Biodiversity Conservation and Management)**

Department Of Biological Sciences  
Faculty of Science and Technology  
**KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA**  
**2005**

This project should be cited as:

Ahmad, M. F. 2005. Insect's community in pitcher plant (*Nepenthes gracilis*) from selected heath vegetation of Terengganu. Undergraduate thesis, Bachelor of Applied Science in Biodiversity Conservation and Management, Faculty of Science and Technology, Kolej Universiti Sains Dan Teknologi Malaysia, Terengganu. 48p.

No part of this project report may be produced by any mechanical, photographic, or electronic process, or in the form of phonographic recording, nor may it be stored in a retrieval system, transmitted, or otherwise copied for public or private use, without written permission from the author and the supervisor(s) of the project.



JABATAN SAINS BIOLOGI  
FAKULTI SAINS DAN TEKNOLOGI  
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA

PENGAKUAN DAN PENGESAHAN LAPORAN  
PROJEK PENYELIDIKAN I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **INSECT'S COMMUNITY IN PITCHER PLANT (*Nepenthes gracilis*) FROM SELECTED HEATH VEGETATION OF TERENGGANU** oleh **Mohammad Firdaus Bin Ahmad**, no. matrik: **UK 6886** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperolehi **Ijazah Sarjana Muda Sains Gunaan (Pemuliharaan dan Pengurusan Biodiversiti)**, Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

Disahkan oleh:

Penyelia Utama

Nama: JAMILAH MOHD SALIM @ HALIM  
Lecturer  
Cop Rasmi: Department of Biological Sciences  
Faculty of Science and Technology  
Kolej Universiti Sains dan Teknologi Malaysia  
(KUSTEM)  
21030 Kuala Terengganu, Terengganu.

Tarikh: 20/05/05

Ketua Jabatan Sains Biologi

Nama:

Cop Rasmi:

ENDA MADYA DR. NAKISAH BT. MAT AMIN  
Ketua  
Jabatan Sains Biologi  
Fakulti Sains dan Teknologi  
Kolej Universiti Sains dan Teknologi Malaysia  
(KUSTEM)  
21030 Kuala Terengganu.

Tarikh: 20/04/05

## **ACKNOWLEDGEMENT**

I would like to say most gratuitous to the God that gave me will to finish up this thesis. Secondly to my parents, Encik Ahmad Zakaria and Puan Rohayah Yaakob. My project supervisor, Cik Jamilah Mohd Salim @ Halim for support on my project and report writing from the beginning till the end. For my fieldworks and specimen preparation in the laboratory, I thank Haji Razali, Encik Syed, Encik Mat Zan, and Encik Mazrul. Also not forgotten to my friends who encouraged me to complete my project.

Ahmad M. F.

## **TABLE OF CONTENTS**

<b>CONTENT</b>	<b>PAGE</b>
THESIS APPROVAL FORM	ii
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF ABBREVIATIONS	x
LIST OF APPENDICES	xi
ABSTRACT	xii
ABSTRAK	xiii
1.0 INTRODUCTION	1
1.1     Objective	2

<b>2.0 LITERATURE REVIEW</b>	<b>3</b>
2.1 <i>Nepenthes</i>	3
2.2     Heath vegetation	5
2.3     Insects	6
<b>3.0 METHODOLOGY</b>	<b>8</b>
3.1     Study area	8
3.11   Sampling site description	8
3.2     Insects Identification and Quantification	9
3.3     Data analysis	9
3.4     Images	10
<b>4.0 RESULTS</b>	<b>11</b>
4.1     Sampling site physical general characteristic	11
4.2 <i>Nepenthes</i> species identification	14
4.3     Insects identification and quantification	16
<b>5.0 DISCUSSION</b>	<b>35</b>
<b>6.0 CONCLUSION</b>	<b>37</b>
<b>REFERENCE</b>	<b>38</b>
<b>APPENDICES</b>	<b>41</b>



## **LIST OF TABLES**

Table 2.1 Insect group found in <i>Nepenthes</i> pitchers from previous studies.	7
Table 4.1 Insect found in this study and its taxonomical hierarchy to Order taxon	24
Table 4.2 Summary of data on groups of insect collected from <i>N. gracilis</i> pitchers from heath vegetation of Terengganu.	26
Table 5.1 Characteristics of insects credited from Solomon <i>et al</i> (2002)	46

## **LIST OF FIGURES**

Figure 4.1 Sampling site I (wetland opposite Hutan Simpan Jambu Bongkok)	12
Figure 4.2 Sampling site II (Bukit Bidong Darat)	13
Figure 4.3 <i>Nepenthes gracilis</i> with opened pitcher indicated with red circle at heath vegetation site near Hutan Simpan Jambu Bongkok	
Figure 4.4 Ant (Order Hymenoptera)	17
Figure 4.5 Ant (Order Hymenoptera)	17
Figure 4.6 Ant (Order Hymenoptera)	18
Figure 4.7 Wasp (Order Hymenoptera)	18
Figure 4.8 Semi-dragged cockroach showing head without antennae	19
Figure 4.9 Thorax of cockroach	19
Figure 4.10 Abdomen of cockroach	20
Figure 4.11 Mosquito pupae stage	20
Figure 4.12 Mosquito larvae stage	21
Figure 4.13 Beetle	21
Figure 4.14 Dipteran larvae	22
Figure 4.15 Dipteran larvae	22
Figure 4.16 Spider	23
Figure 4.17 Insect abundance in terrestrial pitcher (Site I Hutan Simpan Jambu Bongkok)	27
Figure 4.18 Insect abundance in terrestrial pitcher (Site II Hutan Simpan Jambu Bongkok)	28

Figure 4.19 Insect abundance in aerial pitcher (Site I Hutan Simpan Jambu Bongkok)	29
Figure 4.20 Insect abundance in aerial pitcher (Site II Hutan Simpan Jambu Bongkok)	30
Figure 4.21 Insect abundance in terrestrial pitcher (Permaisuri- Penarik roadside)	31
Figure 4.22 Insect abundance in aerial pitcher (Permaisuri- Penarik roadside)	32
Figure 4.23 Insect abundance in aerial pitcher (Bukit Bidong Darat)	33
Figure 4.24 Insect abundance in terrestrial pitcher (Bukit Bidong Darat)	34

## **LIST OF ABBREVIATIONS**

CITES	Convention on International Trading of Endangered Species
H <sup>+</sup>	Deionized hydrogen
sp.	Species

## **LIST OF APPENDICES**

APPENDICE	PAGE
APPENDIX I	41
APPENDIX II	44
APPENDIX III	45

## **ABSTRACT**

Liquid from 195 pitchers of *Nepenthes gracilis* were sampled from three different sites of heath vegetation of Terengganu. Five common groups of insect that most frequently sample comprised of ants, wasps, mosquitoes (in larvae and pupae stage), cockroaches and beetles. Larvae and pupae of *Culex* sp. (mosquito) and unidentified dipteran larvae were among living specimens recorded in this liquid. Shannon-Weiner index indicated that Rantau Abang and Bidong Darat heath vegetation had a higher diversity and evenness in insect preys community of *N. gracilis*.

**KOMUNITI SERANGGA DALAM *Nepenthes gracilis* (PERIUK KERA) DI  
VEGETASI PADANG TERPILIH DI TERENGGANU**

**ABSTRAK**

Sampel cecair daripada 195 *Nepenthes gracilis* (periuk kera) dianalisis dari tiga kawasan berbeza di sekitar vegetasi padang di Terengganu. Lima kumpulan serangga memberikan kekerapan tertinggi ialah semut, penyengat, nyamuk (peringkat larva dan pupa), lipas dan kumbang. Spesimen hidup yang dikenal pasti ialah larva dan pupa nyamuk *Culex* sp.. Indeks Shannon Weiner menunjukkan vegetasi padang di kawasan Rantau Abang dan Bidong Darat mempunyai aras kepelbagaian dan keserataan yang lebih tinggi dari segi serangga mangsa kepada *N. gracilis* berbanding di Penarik, Setiu, Terengganu.