

STUDY OF COMPARISON OF DISEASE SUSCEPTIBILITY
IN RURAL AND URBAN AREAS

BY DR. S. S. SINGH

PH.D. THESIS, UNIVERSITY OF DELHI
1968

STUDY OF COMPARISON OF DIPTERAN SUCCESSION IN RURAL AREA
AND URBAN AREA

MOHD ILMAN BIN CHE ABDULLAH

Faculty of Science and Technology
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA
2006

STUDY OF COMPARISON OF DIPTERAN SUCCESSION IN RURAL AREA
AND URBAN AREA

By

Mohd Ilman Bin Che Abdullah

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
2006

This project should be cited as:

Mohd Ilman, C. A. 2006. Study of comparison of dipterans succession in urban area and rural area. Undergraduate thesis, Bachelor of Applied Science in Biodiversity Conservation and Management, Faculty of Science and Technology, Kolej Universiti Sains dan Teknologi Malaysia, Terengganu

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 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: STUDY OF COMPARISON OF DIPTERAN SUCCESSION IN RURAL AREA AND URBAN AREA. Oleh Mohd Ilman Bin Che Abdullah No. Matrik UK6959 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperoleh Ijazah Sarjana Muda Sains Gunaan-Pemuliharaan Dan Pengurusan Biodiversiti, Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

Disahkan oleh:

.....

Penyelia Utama

Nama: Prof. Madya Dr. Mohd Effendy Bin Abdul Wahid

Cop Rasmi:

Tarikh:



.....
Penyelia Kedua (jika ada)

Nama: Dr. Nor Afandy Bin Hamid

Cop Rasmi **Dr. Nor Afandy Hamid**
Pensyarah
Jabatan Agroteknologi
Fakulti Agroteknologi dan Sains Makanan
Kolej Universiti Sains dan Teknologi Malaysia
21030 Kuala Terengganu

Tarikh: *15/5/2006*



.....
Ketua Jabatan Sains Biologi

Nama: Prof. Madya Dr. Nakisah Bt Mat Amin

Cop Rasmi: **PROF. 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:

ACKNOWLEDGEMENT

Bismillah-AR-Rahman –AR-Raheem

Alhamdulillah, All praise to Allah the Almighty, by His gracious and merciful, I have completed my Final Year Project although with the difficulties and obstacles that I need to go through. First of all, I would like to state my deepest regard and sincere thanks to my supervisor, Assoc. Prof. Dr Effendy Abdul Wahid and my co supervisor Dr. Nor Afandy Hamid for their supervision, guidance and comments which is so valuable and help me to complete this project.

In this opportunity I would like to thank my parents, Che Abdullah Bin Che Endok and Fauziah Bt Mohamed in their countless support during the hard time. I also want to take this opportunity to express my regard to En Muhammad Bin Embong, Histology lab assistant for his advice and co-operation by providing the useful advice and logistic requirements. Without his support I my not completed this report on time.

Beside that, sincere thank to Siti Faridah Bt Mohd and Zuraidah Bt Mohd Nor for their contribution in this project and to my entire companion who had give the moral and material support through out this project. May God bless them all.

TABLE OF CONTENT

CONTENTS	PAGE
ACKNOWLEDGEMENT	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	vi
LIST OF FIGURE	vii
LIST OF SYMBOLS/ ABBREVIATIONS	viii
LIST OF APPENDIXES	ix
ABSTRACT	x
ABSTRAK	xi
1.0 INTRODUCTION	1
1.1 Significance of study	5
1.2 Objectives	5
2.0 LITERATURE REVIEW	6
2.1 Classification of Dipteran	6
2.2 Distribution of Dipteran	7
2.3 Life Cycle of Dipteran	8
2.4 Decomposition of Carrion	9
2.4.1 Stage of Decomposition	11
2.5 Factors of Decomposition	12

2.5.1	Temperature and Humidity	12
2.5.2	Acces To The Body	13
2.5.3	Size And Type of Carrion	13
2.6	Dipteran Related To The Carrion Decomposition	14
2.6.1	Calliphoridae	15
2.6.2	Sarcophagidae	16
2.6.3	Muscidae	18
2.7	Dipteran Succession On Carrion	19
2.8	Factors of Dipteran Succession	20
2.8.1	Temperature and Humidity	22
2.8.2	Light Intensity	23
2.9	The Significant of Dipteran In Judicial System	24
3.0	METHODOLOGY	25
3.1	Location Description	25
3.2	Carrion	28
3.3	Experimental Design	29
4.0	RESULT	
4.1	Physical parameters	33
4.2	Observation In Rural Area	43

4.3	Observation In Urban Area	46
5.0	DISCUSSION	49
6.0	CONCLUSION AND SUGGESTIONS	54
	REFERENCES	55
	APPENDICES	58
	CURRICULUM VITAE	69

LIST OF TABLES

Tables	Page
2.1 Taxonomy of Diptera	7
2.2 Diptera collected on corpses	20
2.3 The oviposition at night by three species of blowflies	22
3.1 Geofereence of study locations	26
4.1 Physical parameter of study locations	33
4.3 List of Dipteran present in rural area	40
4.4 List of Dipteran present in urban area	41

LIST OF FIGURES

Figures	Page
1.1 The zoogeographical region	4
3.1 The location of Kuala Terengganu at the East Coast Peninsular Malaysia	26
3.2 The environment in Batu Enam	27
3.3 The environment in Maras	27
3.4 The rabbit was slaughtered	28
3.5 Rabbit carrion was placed was placed in a steel cage	29
3.6 Collecting larvae of Dipteran	30
4.1 The comparison of daily mean temperature in rural and urban area	34
4.2 The comparison of daily mean humidity in rural and urban area	35
4.3 The comparison of daily mean light intensity in rural and urban area	36
4.4 The comparison of decomposition in rural and urban area	37
4.5 Nucleus apoptosis hours of post death in urban carrion	38
4.6 Nucleus apoptosis hours of post death in rural carrion	39
4.7 The composition of Dipteran species in rural area	42
4.8 The composition of Dipteran species in urban area	42

LIST OF SYMBOLS/ABBREVIATIONS

°C	Celsius
%	Percent
Lx	luxmeter (illuminance)
pH	Acidity
PMI	Post mortem interval

LIST OF APPENDICES

Appendices	Page
A. Instruments used in the study	59
B. Diptera anatomy	61
C. Carrion Decomposition stage	62
D. Skin nucleus apoptosis hours post death	63
E. Data collected in the study area	65
F. T test analysis	68

Ilman, M. 2006. Study of Comparison of Dipteran Succession In Rural Area and Urban Area. Undergraduate thesis, Bachelor of Applied Science in Biodiversity Conservation and Management, Faculty of Science and Technology, Kolej Universiti Sains dan Teknologi Malaysia, Terengganu. 69p.

ABSTRACT

This study was conducted to determine the Dipteran succession in two different locations, urban and rural area. Batu Enam representing the urban area while Maras representing the rural area. The Dipteran succession is highly depending on the availability of temperature, humidity and light intensity. The decomposition rate of carrion in both locations is largely influence by the combination of these factors. Thus the decomposition in urban area was faster compare to rural area. A maximum of 3 Dipteran families such as Calliphoridae, Sarcophagidae and Muscidae were found along the study duration. From this study, there were differences between each of these species succession duration on the carrion. The first Diptera group to arrive at the carrion was Calliphoridae consists of *Chrysomya megachepala*, then followed by *Sarcophaga* sp and *Chrysomya rufifacies*. However *Sarcophaga* sp was only found to succession in rural area and do not present in the urban area due to unfavorable conditions. The third group was Muscidae consist of *Musca domestica*, as this group is easily found in both locations due to their synanthropic pattern and only found to succession after the Calliphoridae and Sarcophagidae. However among the entire species, *Chrysomya rufifacies* was the most abundant and successful in their competition for nutrient and space. This finding can be used as additional data for further research in determine the post mortem interval using Diptera succession in this region

KAJIAN SESARAN DIPTERA SECARA TURUTAN PADA BANGKAI DIKAWASAN LUAR BANDAR DAN BANDAR

ABSTRAK

Kajian ini dijalankan untuk menentukan kehadiran Diptera di dua kawasan berbeza iaitu kawasan bandar dan kawasan luar. Batu Enam mewakili kawasan bandar manakala Maras mewakili kawasan luar bandar. Kehadiran Diptera ini sangat dipengaruhi oleh kewujudan suhu, kelembapan dan keamatan cahaya. Kadar pereputan bangkai di kedua dua kawasan banyak dipengaruhi oleh kombinasi faktor faktor ini. Oleh itu pereputan di kawasan bandar lebih cepat berbanding dengan kawasan pedalaman. Sebanyak 3 familiy seperti Calliphoridae, Sarcophagidae dan Muscidae ditemui sepanjang masa kajian. Daripada kajian ini terdapat perbezaan diantara masa kedatangan spesies tersebut ke bangkai. Kumpulan Diptera yang pertama sampai ke bangkai adalah Calliphoridae dan Sarcophagidae yang terdiri daripada *Chrysomya megachepala* kemudian diikuti oleh *Sarcophaga* sp dan *Chrysomya rufifacies*. Walaubagaimanapun *Sarcophaga* sp hanya dijumpai dikawasan luar bandar dan tidak dijumpai dikawasan bandar disebabkan oleh faktor persekitaran yang tidak sesuai Kumpulan ketiga adalah Muscidae yang terdiri daripada *Musca domestica*, dimana spesies ini mudah ditemui di kedua dua kawasan disebabkan sifat synanthropic mereka dan hanya sampai ke bangkai selepas daripada Calliphoridae dan Sarcophagidae. Walaubagaimanapun diantara semua spesies, *Chrysomya rufifacies* adalah spesies yang terbanyak dan berjaya didalam persaingan mereka untuk mendapatkan nutrien dan ruang. Penemuan kajian ini boleh digunakan sebagai maklumat tambahan bagi kajian lanjut dalam menentukan selang waktu antara kematian menggunakan kedatangan Diptera, terutamanya bagi rantau ini