UNIVERSITI TEKNOLOGI MARA

MODELLING THE INFLUENCE OF RAINFALL, TEMPERATURE, AND HUMIDITY ON THE POPULATION DYNAMICS OF *AEDES* MOSQUITOES IN PENGKALAN HULU, PERAK

MUHAMMAD KASYFI BIN ABDUL KHALID

Project submitted in fulfillment of the requirements for the degree of
Bachelor in Environmental Health and Safety (Hons.)

Faculty of Health Sciences

January 2021

ACKNOWLEDGEMENT

In the name of Allah, The Most Gracious, The Most Merciful.

Assalamualaikum w.b.t. and Alhamdulillah, all praise to Allah S.W.T. The Supreme Lord of the Universe. Peace and Blessing to Nabi Muhammad S.A.W., all prophets and their families. I pray to Allah S.W.T. for strength and His blessings in completing my study.

Thousands of thanks and love to my parents and my lovely wife for their support and encouragement through thick and thin of my study. My deepest gratitude and appreciation to my dearest supervisor, Dr. Shantakumari Rajan who spent her time and efforts in guiding and advising from the beginning till the end of my research journey. Not to forget, I would like to thank all the lecturers in Department of Environmental Health and Safety, Faculty of Health Sciences who always share their thoughts, knowledge and advice throughout my study in UiTM Puncak Alam. Only God can reward all of you with goodness.

My sincere thanks and appreciation goes to all the staff from the department and laboratory who gave their full cooperation and assisted me in many ways throughout my study. A special thanks to my friends from HS243 who always give me support and motivation while completing my study. May our friendship last forever. Lastly, I would like to thank everyone who involved directly and indirectly in this study. Thank you.

TABLE OF CONTENTS

ABSTRACT

Dengue fever is one of the vector-borne diseases carried by *Aedes* mosquitoes either *Aedes aegypti* or *Aedes albopictus*. This disease is a global issue which is still out of control until today and it is still increasing day by day. The purpose of this study is to identify the factors affecting the density of *Aedes* mosquitoes in an area in terms of climate change. The three weather factors that been used in this study are rain distribution, ambient temperature, and relative humidity which will be associated with the density of *Aedes* mosquitoes in Taman Damai and Kampung Baru, Pengkalan Hulu, in the state of Perak. This study uses secondary data obtained from the Malaysian Meteorological Department, which are rainfall distribution, ambient temperature, and humidity data. Besides, ovitrap index data was obtained from the Entomology Unit of Hulu Perak District Health Office. To find the relationship between weather factors and *Aedes* mosquito densities, the Spearman's correlation test was used because the data obtained were not normally distributed. The test results found that the density of *Aedes* mosquitoes in Taman Damai and Kampung Baru Pengkalan Hulu had low correlation with rainfall distribution, moderate correlation with humidity, and no correlation with temperature. The result of this study can be used to determine appropriate methods in reducing the density of Aedes mosquitoes in the study area and in turn can reduce the incidence of dengue fever in the future.

Keywords: *Rainfall, temperature, humidity, ovitrap, Aedes*

CHAPTER 1

INTRODUCTION

1.1 Study Background

Vectors are arthropods that carry pathogens mechanically or biologically from one to another either animals or humans. Some types of vectors include insects, mosquitoes, flies, bugs, and pests. Mosquitoes are organisms that can transmit a variety of diseases that infected from human to human, or from animal to human. Among the vector-borne diseases that transmitted from mosquitoes are Dengue Fever, Malaria, Filariasis, Japanese Encephalitis (JE), Yellow Fever, West Nile Fever, Chikungunya and the newest mosquitoes-borne disease that attracting global attention nowadays is Zika Virus. Dengue fever is a serious public health problem in many countries around the world including Malaysia. The number of people infected with Dengue fever worldwide is 390 million cases while the mortality rate is 1 million.

Dengue fever is now considered as the most rapid and widely distributed mosquito-borne viral disease around the world. In Malaysia, there are 130,101 cases were reported including 182 deaths between January to December 2019 which is higher than the cases reported in 2018 for the same period of time which 80,615 cases reported including 147 deaths. Factors contributing to the increase in the transmission of dengue infections are poor environmental hygiene, high-density of urban areas, environmental disturbances such as climate change and unplanned development (Pang et al., 2016).