LIFE HISTORY AND MOLECULAR DETECTION OF GIANT LIVER FLUKE, Fasciola gigantica IN CHIANG MAI PROVINCE

ANAWAT PHALEE

DOCTOR OF PHILOSOPHY IN BIODIVERSITY AND ETHNOBIOLOGY

GRADUATE SCHOOL CHIANG MAI UNIVERSITY MAY 2014

LIFE HISTORY AND MOLECULAR DETECTION OF GIANT LIVER FLUKE, Fasciola gigantica **IN CHIANG MAI PROVINCE**

ANAWAT PHALEE

A THESIS SUBMITTED TO CHIANG MAI UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN BIODIVERSITY AND ETHNOBIOLOGY

GRADUATE SCHOOL, CHIANG MAI UNIVERSITY MAY 2014 rig

LIFE HISTORY AND MOLECULAR DETECTION OF GIANT LIVER FLUKE, *Fasciola gigantica* IN CHIANG MAI PROVINCE

ANAWAT PHALEE

THIS THESIS HAS BEEN APPROVED TO BE A PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN BIODIVERSITY AND ETHNOBIOLOGY

Examination Committee:

(Asst. Prof. Dr. Kanokporn Saenphet)

L. Wongpawood Member

(Assoç. Prof. Dr. Chalobol Wongsawad)

o jamapathe Member

amcheo

.....Member

(Dr. Amnat Rojanapaibul)

(Dr. Kanda Kamchoo)

Dech Thespanya Member

(Dr. Decha Thapanya)

Advisory Committee:

L Wongrowal Advisor

(Assoc. Prof. Dr. Chalobol Wongsawad)

...Co-advisor

(Prof. Dr. Jong Yil Chai)

(Dr. Amnat Rojanapaibul)

16 May 2014

Copyright © by Chiang Mai University

The author is dedicated to my parents, brother and sister who are greatly inspired, encouraged and supported me, until this thesis comes to a perfect end

ลิขสิทธิ์มหาวิทยาลัยเชียงไหม Copyright[©] by Chiang Mai University All rights reserved

ACKNOWLEDGEMENT

The author is deeply grateful to Assoc. Prof. Dr. Chalobol Wongsawad, my thesis advisor for her invaluable advice, inspire and enhance the completion of this study. Furthermore, the author also sincerely thanks Dr. Amnat Rojanapaibul and Prof. Dr. Jong Yil Chai Assistant for their helpful suggestion. Their ideas are so useful that this thesis becomes more helpful for my thesis completely.

I would also like to extend sincere thanks to Asst. Prof. Dr. Kanokporn Saenphet, Dr. Kanda Kamchoo and Dr. Decha Thapanya from the thesis examination committee for their helpful suggestions and corrections my thesis writing format proofing.

Special thanks go to Miss Waraporn Noikong and Dr. Suksan Chuboon for their assistances. Additionally, I would like to thanks the Parasitology Research Laboratory, Department of Biology, Faculty of Science, Chiang Mai University for lab facilities and the grateful thanks the Graduated School, Chiang Mai University for some financial support.

Anawat Phalee