

CHAPTER 1

Introduction

The giant liver fluke: *Fasciola gigantica* is important as plant-borne trematodes. It is the main cause of fascioliasis in ruminants, which have a significant impact on growth rate, development and productivity in ruminants, and therefore, are considered economically significant. However, many reports have also conducted on humans, as an accidental host, and widely distributed in temperate and subtropical areas around the world. The larval stages of this parasite as cercaria and radia are infected various species of lymnaeidae snails and the metacercaria (infective stage) is adhered on vegetation. The life cycle completes itself when the definitive hosts eat vegetation containing the metacercaria. The adult stage has been commonly recorded in cows and water buffaloes. The most studies of *F. gigantica* in Thailand are focused on the epidemiology and molecular detection of adult worm, but the larval stages are limited studies. Therefore, there is few information of life history of *F. gigantica*, especially with regard to the dynamics of the larval stages as eggs, miracidium, sporocyst, redia and cercaria and metacercaria (infective stage), as well as transmit to definitive hosts are needed to be more study. An understanding of these stages is lead to prevent the epidemiology of fascioliasis in ruminants and humans. Moreover, the development of novelty approaches for detection the larval stages of this parasite are also important. The larval stages are similar to other trematodes found in snail hosts and also concomitantly found with several trematode species in the same snail hosts. It is difficult to distinguish these parasite species by classical methods. Specific and accurate detection is needed for epidemiological control programs. Molecular approaches using PCR have been recognized as effective to identify with the genetic variation, specific and accurate results. The high annealing temperature random amplified polymorphic DNA (HAT-

RAPD) technique has reproducible, high resolution results and is a suitable method for specific DNA marker construction.

This study is designed to investigate the life history and species-specific molecular markers based on fragments generated by the HAT-RAPD technique for detection of *F. gigantica* larval stages. Simultaneously, the phylogenetic relationships based on ITS-2 sequences among *F. gigantica* found in Chiang Mai province and other related species including heterophyid trematodes, were also determined. The results can be applied for treatments, management and the controlling programs of this parasite.

1.1 Research Objectives

- 1.1.1 To investigate the life history of *F. gigantica* in experimental hosts.
- 1.1.2 To investigate the prevalence of *F. gigantica* larval stages in snail intermediate hosts.
- 1.1.3 To develop specific primers based on HAT-RAPD technique for detection of *F. gigantica* larval stages in snail intermediate hosts.
- 1.1.4 To analyze phylogenetic relationships among *F. gigantica* found in Chiang Mai province and other related trematodes based on ITS2 sequences.