NATURAL INFECTION OF TREMATODES IN *LYMNAEA (RADIX) AURICULARIA RUBIGINOSA* IN WATER RESERVOIRS IN AMPHOE MUANG, KHON KAEN PROVINCE

A Charoenchai[1,2], S Tesana[2], M Pholpark[1]

[1]Northeastern Regional Veterinary Research and Diagnostic Center,
Department of Livestock Development, Ministry of Agriculture and Cooperative;
[2]Department of Parasitology, Faculty of Medicine, Khon Kaen University, Khon Kaen Province 40002, Thailand

Abstract. *Lymnaea (Radix) auricularia rubiginosa* (Michelin, 1831) was surveyed in 54 reservoirs of 18 districts in Amphoe Muang, Khon Kaen Province during February to May 1994. Lymnaeid snails were found in the water of 20 reservoirs, of which 16 reservoirs contained clear water and 4 turbid water. Two of the four turbid water reservoirs received drainage water from Khon Kaen Town. Two thousand four hundred and eight *L. auricularia rubiginosa* were collected and examined by shedding and crushing. Trematode infection occurred in 163 (6.77%) of 2,408 *L. auricularia rubiginosa* and some snails were infected with more than one cercarial species. Ninety-nine snails (4.11%) were infected with echinostomes, while mixed infection of echinostomes with *Fasciola gigantica* and with schistosomes was found in 5 snails (0.21%) and 2 snails (0.08%), respectively. Only 1 snail (0.04%), 19 snails (0.79%) and 37 snails (1.54%) were infected with *F. gigantica*, schistosomes and unidentified species, respectively. The mean size of infected snails was 6.89 ± 2.02 mm (6.20 - 22.36) while the mean of sampled snails was 13.46 ± 3.64 mm (4.00 - 26.55). The water plants which were found in reservoirs and presented with snails, were creeping water primose *(Jusstaea repens)*, water lily *(Nymphaea* sp), water hyacinths *(Eichornia crassipes)* and grass.

INTRODUCTION

Lymnaea (Radix) auricularia rubiginosa (Michelin, 1831) is a freshwater gastropod. The shell is dextral, ovately oblong, thin, translucent and brittle, corneous color with small short pointed spine and a large oval body whorl. The body whorl is wide with 5-51/2 whorls. The shell length and width are 12 - 32 mm and 17 - 20 mm, respectively (Brandt, 1974). The shell lenth of the fully mature adult snail is 15 mm or more (Upatham *et al*, 1983).

The snail is found in freshwater reservoirs such as lakes, ponds, brooks, canals and even rivers. Clear water, still or slightly moving water with aquatic plants is the most favored habitat. The geographical distribution of these snails is in the Southeast Asian countries : Lao PDR, Cambodia, Vietnam, Malaysia, Indonesia, Myanma and Thailand. This race is found everywhere in Thailand, except for the northernmost province.

L. (R.) a. rubiginosa is an important intermediate host of several trematode species. It is known to habor with the larval stage of *Fasciola gigantica* (Dissamarn *et al*, 1961; Brandt, 1974; Chompoochantra *et al*, 1976; and Viboolyawatana *et al*, 1981), *Echinostoma revolutum* (Ito, 1962), *E. malayanum* (Brandt, 1974; Viboolyawatana *et al*, 1981), *Schistosoma incognitum*, *Orientobilhazia harinasutai* (Brandt, 1974) and *S. spindale* (Viboolyawatana *et al*, 1981).

Among these parasites *F. gigantica* is the most important parasitic disease in adult cattle and buffalo in Thailand and the prevalence rate is about 11.8% (Sukhapesana *et al*, 1990). The variation of prevalence rate among the villages is between 0 and 75%, due to the different biotopical conditions for the intermediate host snails (Hoerchner *et al*, 1989). *F. gigantica* is usually found in adult cattle and buffalos and causes economic loss throughout Thailand (Dissamarn *et al*, 1961; Hoerchner *et al*, 1989; Pholpark and Srikitjakarn, 1989; Srihakim and Pholpark, 1990). The Department of Livestock Development estimated the economic loss due to fascioliasis at about 100 million Bahts per year (Meemark, 1988). People can also be infected by

F. gigantica which causes death in some cases. Since 1967 more than 30 human fascioliasis cases have been reported in Thailand (Sawaengkij, 1991).

This investigation examined and identified trematode cercariae, the ecology of their habitat, the distribution and size of the snail population and infected snails. This investigation will get base line data about *L. (R.) a. rubiginosa* to control its population and reduce the distribution of parasites.

MATERIALS AND METHODS

Water reservoirs

Fifty-four reservoirs were selected from 18 districts of Amphoe Muang, Khon Kaen Province according to data of the Institute of Water Reservoirs and Environment, Faculty of Engineering, Khon Kaen University and the map of villages in Amphoe Muang, Khon Kaen Province.

Investigation period

February to May 1994

Methods

Snails were collected by scoop as far as possible. The snails were selected for *L. (R.) a. rubiginosa* in all sizes. Thirty percent of the snails were sampled and identified according to Brandt (1974). The snails were cleaned up with dechlorinated tap water and placed in Petri dishes, 5 snails per Petri dish for shedding the cercariae. The shape and movement of cercariae were recorded. All snails were measured for length and width, and crushed between the glass. Sporocysts, rediae and cercariae were collected and preserved in 10% formalin. Identification of cercariae was performed according to Ito (1962), Frandsen and Christensen (1984).

RESULTS

Lymnaeid snails were found in 20 reservoirs out of 54 of which 16 reservoirs contained clear water and 4 turbid water. Two of the four turbid water reservoirs received drainage water from Khon Kaen city. The water plants in which snails were present were creeping water primose *(Jusstaea repens)*, water lily *(Nymphaea* spp), water hyacinths *(Eichornia crassipes)* and grass.

Two thousand four hundred and eight of *L. (R.) a. rubiginosa* were collected. The length and width of the snail population varied between 4.00 - 26.55 mm (mean 13.46 ± 3.64) and 1.50 - 13.45 mm (mean 6.79 ± 2.03), respectively. Most of them (1,922 snails, 79.82%) had body length between 10.00 - 12.00 mm. Seven hundred and forty snails (30.75%) were fully mature adults with a body length of 15 mm or more (Table 1).

The trematode infected 163 (6.77%) *L. (R.) a. rubiginosa* out of 2,408 and some snails were infected with more than one cercarial species. Ninety-nine snails (4.41%) were infected with echinostomes. While the mixed infection of echinostomes with *F. gigantica* and schistosomes was found in 5 snails (0.21%) and 2 snails (0.08%). Only 1 snail (0.04%), 19 snails (0.79%) and 37 snails (1.54%) were infected with *F. gigantica*, schistosomes and unidentified species, respectively. The length of infected snails was between 6.20 - 22.36 mm (mean 6.89 ± 2.02) (Tables 2, 3).

Table 1

Distribution of length of snail population.

Length interval (mm)	No. of snails	Percentage
≤ 5	7	0.29
6-10	334	13.87
11-15	1,327	55.11
16-20	595	24.71
21-25	144	5.98
26-30	1	0.04
Total	2,408	100.00

Table 2

Cercarial species and snail infection rate.

Cercarial species	No. of infected snails	Percentage
Echinostome	99	4.11
Echinostome + *F. gigantica*	5	0.21
Echinostome + Schistosome	2	0.08
F. gigantica	1	0.04
Schistosome	19	0.79
Unidentified	37	1.54
Total	163	6.77

Table 3

Distribution of length of infected snail.

Cercarial species	Length interval						No. of snails	Range	Mean ± SD
	≤ 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30			
Echinostome	0	20	68	8	3	0	99	6.20 - 22.60	12.27 ± 2.92
Echinostome + *F. gigantica*	0	0	1	4	0	0	5	13.50 - 19.85	16.02 ± 2.33
Echinostome + Schistosome	0	0	2	0	0	0	2	13.80 - 14.80	14.30 ± 0.70
F. gigantica	0	0	1	0	0	0	1	10.80	-
Schistosome	0	2	7	10	0	0	19	8.20 - 18.90	14.26 ± 3.24
Unidentified	0	2	13	17	5	0	37	7.00 -- 20.60	16.02 ± 3.83
Total	0	24	92	39	8	0	163	6.20 - 22.60	13.48 ± 3.52

DISCUSSION

Lymnaeid snails are usually found in still or slightly moving water, clear to slightly turbid water with aquatic plants being the favored habitat. The aquatic plants which were present with snails, were creeping water primrose *(Jusstaea repens)*, water lily *(Nymphaea* sp), water hyacinths *(Eichornia crassipes)*, Hoerchner *et al*, 1989). In this investigation Lymnaeid snails were found in drainage water from the town.

The percentage of fully mature (length 15 mm or more) and young adult snails (length 11 - 15 mm) were 30.73 and 55.11, respectively. These groups of snails were preferable for trematode infection and also parent stock. Therefore the snail population will be increased. Thus the possibility of human and animal infection with parasites will also be increased. It is necessary to control the snail population to reduce the distribution of parasites.

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