

**PhD THESIS SUMMARY TO BE SUBMITTED TO THE WEBSITE OF
THE MINISTRY OF EDUCATION AND TRAINING**

Thesis title: Study on epidemiological characteristics and species composition of small liver flukes and minute intestinal flukes in Kim Son and Yen Khanh districts, Ninh Binh province (2016-2019).

Major: Epidemiology **Code:** 972 01 17

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Main findings of the thesis:

1. Objectives, subjects and sites

Determine some epidemiological characteristics and species composition of small liver fluke, minute intestinal fluke by morphology and molecular biology techniques in Kim Son and Yen Khanh districts, Ninh Binh province (2016 - 2019).

2. Research Methods: The study employed a cross-sectional study, experimental research at the laboratory.

3. Results and Conclusions

3.1. Some epidemiological characteristics of small fluke infection in Kim Son and Yen Khanh districts, Ninh Binh province (2016)

There were 400 persons aged 15 years or older involved in the study and 19.5% of them were infected with small fluke. The average intensity of infection was 517.06 eggs/g faeces; the majority (87.2%) of subjects was lightly infected, and no object is severely infected. The rate and intensity of infection in men was higher than in women.

The majority of people have been communicated about small liver flukes. The proportion of persons eating raw fish was high (73.3%) and men ate more frequently than women. The fish commonly used to raw consumption was dotted gizzard shad (62.25%), silver carp (52.75%), common carp (34.75%), and grass carp (32%). People ate raw fish for many reasons and fish from many different sources. People with the habit of eating raw fish were 6.8 times more likely to become infected with flukes compared to those without this habit.

Among 345 tested fish belong to 6 species (*Cyprinus carpio*, *Hypophthalmichthys molitrix*, *Ctenopharyngodon idellus*, *Cirrhinus molitorella*, *Oreochromis niloticus* and *Konosirus punctatus*) there were 44.1% infected with metacercariae of small flukes. Common carps (86.5%), grass carp (78.4%) and silver carp (66.7%) were the 3 fish species having the highest infection rate. All 5 species of freshwater fish were infected with metacercariae of flukes but not for brackish water fish. The average intensity was 1.24 metacercariae per gram of freshwater fish and the highest number was of grass carp (6.4 cysts/gram) and the lowest was tilapia (0.0004 cysts/ gram of fish).

3.2. Species composition of small liver flukes and minute intestinal flukes

Based on the genetic analysis of two markers (ITS2 and cox1) of faecal samples with PCR products (42.85% of positive samples) all yielded DNA products belonged to *Clonorchis sinensis*. All collected adult flukes were also identified as *Clonorchis sinensis* based on morphological and genetic characteristics (ITS2 analysis).

From 18.323 collected cysts 3 species of small flukes were identified. Metacercariae of minute intestinal fluke *Haplorchis pumilio* accounted for the main proportion (99.84%) and the remaining belonged to *Haplorchis taichui* (0.14%) and *Clonorchis sinensis* (0.02%). Metacercariae of *Haplorchis pumilio* presented on all 5 freshwater fish species and grass carp was the only fish that harbored metacercariae of the three flukes (*Haplorchis pumilio*, *Haplorchis taichui* and *Clonorchis sinensis*). The highest intensity was of *Haplorchis pumilio* (1.0591 cysts/gram of fish) and the lowest was of *Clonorchis sinensis* (0.0002 cysts/gram fish).

Hanoi, 4 September 2020

Supervisor 1

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