

PhD defence Nguyen Thi Thuy Man

Pig - transmitted *Taenia* spp. in Vietnam: epidemiology and risks to the human population

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Ghent University - Merelbeke



Dit is de omschrijving

Attendance

If you would like to attend, please register before May 25th 2022, by email to pdorny@itg.be.

Supervisors

- Prof. Dr. Pierre Dorny (Ghent University)
- Dr. Veronique Dermauw (ITM)
- Dr. Nguyen Thi Giang Thanh (Ministry of Public Health, Vietnam / National Institute of Veterinary Research, Hanoi, Vietnam)

Summary

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In many low and middle income countries, *Taenia* spp. infections are responsible for human suffering and economic losses in livestock. Pigs are the intermediate hosts of zoonotic and non-zoonotic *Taenia* species. In Vietnam, pork is the most common consumed meat, and appropriate implementation of regulations to ensure safe meat is often lacking. The aim of this thesis was to characterize the pork supply chains and to estimate the occurrence of pig-transmitted *Taenia* spp. in northern Vietnam.

First, a literature review (Chapter 1) of the three pig-transmitted *Taenia* spp. is given, focusing on their morphology, lifecycle, epidemiology, burden and diagnosis. *T. solium* is a leading cause of epilepsy and chronic headaches in humans in endemic countries. Porcine cysticercosis can cause condemnations of infected carcasses at slaughter. In contrast, the impacts of *T. asiatica* and *T. hydatigena* are less documented. In Vietnam, lack of sanitation, inappropriate pig management practices and consumption of raw/undercooked meat/organs perpetuate the transmission of *Taenia* spp.

In Chapter 2, the pork value chains (PVC) in Vietnam were mapped. A systematic review was performed by consulting 7 databases. A total of 10 main PVC types were identified, among which the one involving producers, slaughter men, retailers and consumers is most common. In cities or export routes, middlemen and/or traders are important additional actors. More industrial forms of PVCs are developing; however, the traditional PVCs are still prevailing in Vietnam. The weak linkages between actors and poor hygienic practices in these chains form a risk to pork safety.

Chapter 3 describes a systematic review of the global occurrence of *T. hydatigena* in pigs and cattle. Results showed a worldwide occurrence of *T. hydatigena* in these livestock species. In pigs, there was a higher prevalence in Asia (17.2 %) and South America (27.5%), compared to a low prevalence of 3.9% in Africa. Overall, the prevalence of *T. hydatigena* in cattle was low (mean of 1.1 %). The results show that interpretation of results of sero-diagnostic tests for zoonotic *Taenia* species in pigs and cattle has to take into account the prevalence of *T. hydatigena* in different settings.

Chapter 4 presents a cross-sectional survey of the apparent prevalence of *Taenia* spp. in pigs in Phu Tho, northern Vietnam. Carcasses of 399 pigs from 51 small-scale abattoirs were inspected for cysticerci, while predilection sites were sliced and examined. Cysticerci underwent PCR-RFLP and sequencing for species confirmation. Specific antibodies and circulating antigens were measured on blood samples. *T. asiatica* cysticerci were found in two pigs. Cysticerci of *T. solium* were found in none of

the pigs, although one serum sample was antibody-positive. A high prevalence of *T. hydatigena* cysticercosis was observed (18.0%). *Spirometra erinaceiuropeaei* was found in one pig liver. The findings confirm the complex epidemiology of *Taenia* spp. in pigs in Vietnam.

The high prevalence of *T. hydatigena* cysticercosis in pigs necessitated the investigation of its occurrence in dogs, the definite host, in N Vietnam (Chapter 5). A cross-sectional survey was carried out in four dog slaughter-slabs in Phu Tho province, aiming to reveal the occurrence of gastro-intestinal helminths in dogs. A total of 350 dog samples were collected and identified by morphological and molecular techniques. Nine species, including *T. hydatigena*, *S. erinaceiuropeaei*, *Dipylidium caninum*, *Spirocerca lupi*, *Ancylostoma ceylanicum*, *Ancylostoma caninum*, *Toxocara canis*, *Toxascaris leonina* and *Trichuris vulpis*, were found. *T. hydatigena* had a very low prevalence of 0.3%. Six of the recovered helminth species have a zoonotic potential.

Finally, the findings presented in the thesis are discussed (Chapter 6) in relation to the supply and the health risks for humans of currently available pork in northern Vietnam, and the role of the non-zoonotic *T. hydatigena* in parasite control. It can be concluded that the current lack of meat inspection and traceability of a large proportion of pigs and pig products, and the habit of eating undercooked meat and liver form a risk to the consumers. Epidemiological studies and monitoring of *T. solium* control or elimination programmes are hindered by the non-specificity of currently available serological tests.