



# Prevalence of trichinellosis and cysticercosis in indigenous pigs from ethnic minorities for selected communes in the Central Highlands (Dak Lak)

## Summary report

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## **Background**

Traditionally applied free grazing/roaming of pigs is a known risks factor for selected zoonoses such trichinellosis and cysticercosis which have the potential to cause long lasting health problems in affected humans with sporadic complications such as fatal encephalitis. The ban of free grazing in pigs due to recent policy changes may have contributed to a decrease of both zoonoses and consequently making pork from local or wild pigs safer for the consumer. Despite of the ban some farmers might still use free roaming management at least partly for certain age classes of their pigs. Information on the presence of these zoonoses in pigs produced by ethnic groups is lacking or not updated. Therefore, a serological survey was carried out to provide base line information on the presence of cysticercosis and/or trichinellosis in native pigs in selected communes of the Central Highlands as being part of the Cross CRP project “Scoping study to evaluate the potential of integrated indigenous pig systems to improve livelihoods and safe pork consumption for poor ethnic minority smallholders in the Central Highlands of Vietnam”. While the serological sampling was implemented by WASI all laboratory analysis were carried out by NIVR, a research institute with known experience on the diagnosis for both zoonoses in Vietnam. In addition NIVR provided a training on sample collection and storage.

## **Objectives**

- Determine the perception and awareness of local pig farmers and other VC actors and groups (as appropriate) on zoonoses, with special focus on cysticercosis and trichinellosis
- To provide base line information on the presence of cysticercosis and/or trichinellosis in native pigs (serological) and through available records (e.g. meat inspection)
- To identify more in-depth research topics on food safety aspects in the future

## **Methods**

Blood samples were collected from local pig in up to five districts/communes in Daklak. Serum samples were collected by WASI staffs. To ensure appropriate sample collection and storage NIVR supported a training of WASI staff prior to the survey. Serum samples were shipped to NIVR by airplane with cool system.

All samples were subjected to an ELISA test which was developed by NIVR for detection antibody against either trichinella or cysticercus. In brief, the antigen (trichinella or cysticercus) was coated on 96 wells plate overnight. The plate was block to cover the nonspecific binding positions by skim milk to a final concentration of 2%. The diluted test serums were added into wells and incubated for 1h at room temperature. Anti-pig sera plus HRPO (Conjugate HRPO) were added into all wells. In a final step, OPD were added into the wells. The optical density (OD) of each plate was measured at a filter of 490nm. Positivity was calculated versus 8 wells for negative serum controls. It means the pig serum contained antibodies against the corresponding antigen.

## Results and achievements

- **Training of WASI staffs on blood collection in native pigs**

A two days training on collection of serological samples (serum) in native pigs was done by NIVR (2) staff with support from ILRI. NIVR provided lectures to WASI staffs on how to collect appropriate blood samples from native pigs under minimal stress conditions for the animal. In addition trainees received information on random sampling methods.

Output: Trainees (3 female and 1 male) able to collect serum samples from native pigs and use appropriate sampling procedures.

- **ELISA tests and interpretation**

A total 208 serum samples from 89 households was collected from WASI and sent to NIVR for analysing sero-prevalence of Cysticercosis and *Trichinellosis* by ELISA. The samples were stored under -20 C at NIVR laboratory until the analysis started. Out of the 208 samples 200 were subjected to serological test for Trichinellosis and Cysticercoses, 8 samples were suitable for analyses.

ELISA tests were conducted at NIVR. An overview is provided in the table below.

Total samples	Trichinellosis (positive)	Cysticercoses (positive)
200	12.5 % (25/200)	28.5% (57/200)*

\* Sero-positivity due to cross-reactivity with other *Taenia* cannot be excluded

### Cysticercoses

Overall 28.5% of pigs were tested positive for Cysticercoses. It needs to be taken into consideration that the Ab-ELISA for cysticercosis faces in South East Asia some location specific cross-reactivity with other taeniasis in pigs as a fraction of *Taenia solium* antigen may e.g. cross-react with the *Taenia hydatogena* or *T. asiatica*. At this point it can not be concluded on what is the proportion of cross-reactions due to other Taeniasis. NIVR has developed tools to distinguish between these two parasites, which will be further investigated using confirmatory tests. Further contacts have been also established with the Institute of Tropical Medicine Antwerp (ITM), Dr. Piere Dorny, one of the leading scientist on Cysticercoses diagnostic.

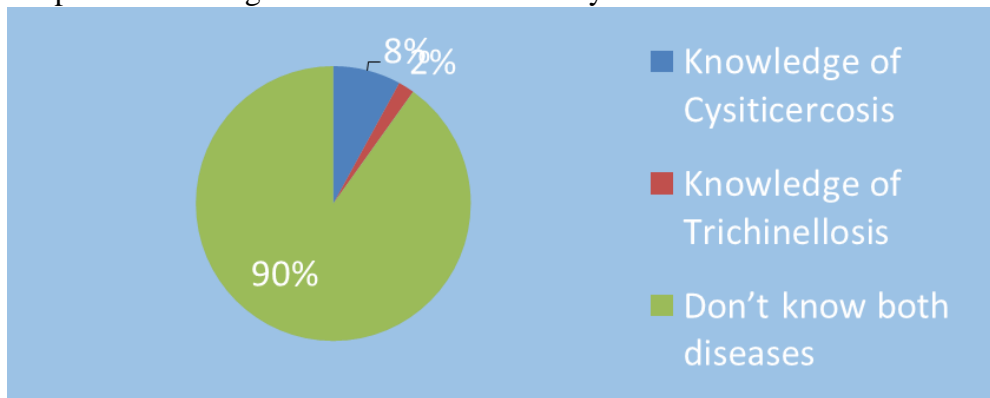
## Trichinelloses

*Trichinella* infections (In Vietnam that refers to *Trichinella spiralis*) have been detected in human and pigs (mainly native) in the northern mountainous area. For Dak Lak no recent information is available. The prevalence reported in this study was 12.5% and is in the range with other studies reported for northern Vietnam (1.1 to 19.2 %, depending on the location and production system) or southern Laos (17.6%, ComAcross unpublished results, 2016).

## Perception and awareness on pig zoonoses

Most of farmers had no knowledge on Trichinelloses and Cysticercoses as shown in Graph 1. Among the tiny fraction of farmers having some knowledge of the disease only 10% stated some more specific knowledge on the mode of transmission from pigs to human.

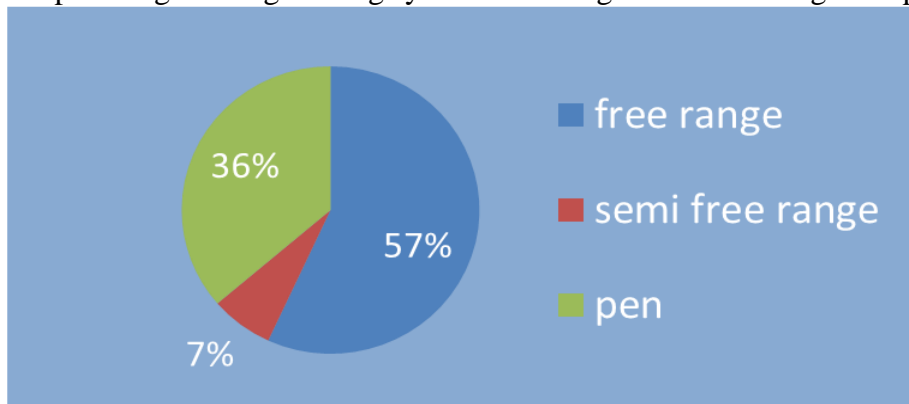
Graph 1: Knowledge on Trichinelloses and Cysticercoses



## Potential risk factors

Nearly 2/3<sup>rd</sup> of farmers practiced free ranging or semi free range production systems for their pigs. Rearing pigs has been confirmed as a risk factor for Cysticercoses (Graph 2).

Graph 2: Pig housing/fencing system: free range/ semi free range and pigs kept in pen



## Conclusions

### Trichinellosis

- With a prevalence for *Trichinella* of 12.5% in pigs of the study population (based on serology) this zoonosis can be considered as an important public health hazard.
- Trichinellosis is transmitted to humans by consumption of raw or undercooked pork, anyhow the actual risk is unknown and would require further studies on consumption preferences among the final consumers.
- No information was available on results of meat inspection in the study area to triangulate them with serological findings.
- Further studies should include direct antigen detection methods, ideally combined with findings from meat inspection e.g. using PCR.

### Cysticercosis

- Results for cysticercosis are inconclusive due to high cross-reactivity with other *Teania* spp. Further research is needed to overcome the diagnostic difficulties with cross-reactions.

### Perception and awareness

- Very low knowledge on the zoonotic importance of both parasites was expressed by villagers
- There is an immediate need to address those knowledge gaps which would require combined efforts of PH and animal health authorities.

### Farm management

- Free rooming of pigs is a known risk factor for the investigated zoonoses (in particular cysticercosis) and should be further reduced or avoided
- Regular deworming schemes of pigs should be introduced to farmers to reduce parasite infestation. This would also have positive effects on other not zoonotic parasites.

### Conclusion from a value chain perspective

- Indigenous pork, originated from the studied farms, cannot be considered as safe from a public health perspective.
- More representative studies (only 7 communes were involved), are needed to better understand epidemiology of both zoonoses including risk factors.