Oral Presentation (AQ-5)

The Study of the Determination of Toxoplasmosis as One of Quarantine Pests and Diseases for Animals (HPHK)

R. H. Suharto*[1], Qurniawaty[1], I. M. Widodo, Akbar[1]

[1]Kendari Agricultural Quarantine, Indonesian Agricultural Quarantine Agency of the Indonesian Ministry of Agriculture

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INTRODUCTION

Toxoplasmosis is one of the major zoonotic diseases spread throughout the world with varying degrees. This disease is caused by protozoa *Toxoplasma gondii*, intracellular parasite that can attack humans and all warm-blooded animals. Humans or animals suffering from toxoplasmosis do not show any specific clinical signs and often without signs at all because the disease is latent. Toxoplasmosis can be fatal and life-threatening in individuals with a decrease in the immune system.

Cats and other felidae is the definitive host for *Toxoplasma gondii*, a place where these parasites develop and multiply sexually. *Toxoplasma gondii* may develop intraintestinally (inside the intestinal tissue) as well as extraintestinally (outside the intestinal tissue) in feline's body. Intraintestinal development forms a life stage called oocysts. Oocysts are excreted along with the feces which then serves as a source of transmission for other hosts, such as rats, goats, sheep, and humans.

Cases of toxoplasmosis have been found in various regions or areas of Indonesia both in humans and animals since 1970. Researches on toxoplasmosis in pets such as cats, livestock such as cattle and buffalo, goats, and pig were conducted from year to year. It proved that toxoplasmosis pulled a great interest from academics and researchers, both in human medicine and veterinary medicine.

The Government of the Republic of Indonesia through the Decree of the Minister of Agriculture Number 4026/Kpts/OT.140/4/2013 on the Stipulation of Strategic Transmissible Animal Diseases has established toxoplasmosis as one of strategic transmissible animal diseases (PHMS) that have been found in Indonesia. Based on the PHMS status and situation map of 2011-2014 published by the Directorate General of Animal Husbandry and Animal Health, Indonesian Ministry of Agriculture, cases of toxoplasmosis were reported in several provinces in Indonesia.

In the perspective of Indonesian animal quarantine, toxoplasmosis is not designated as Quarantine Pests and Diseases for Animals (HPHK), i.e. all animal pests and diseases that are stipulated by the government to be prevented from being entering into, spreading within, and leaving from the territory of the Republic of Indonesia. Therefore, *Toxoplasma gondii*-carrying media which transported were not treated as a subject for specific quarantine measures that aims to prevent the entry, spread, and exit of *Toxoplasma gondii*. This causes the efforts to prevent toxoplasmosis, whether carried out by the government, practitioners, academics, and the general public are not fully implemented.

MATERIALS AND METHODS

The material and method of writing is literature study which was supplemented by the author's knowledge and experience from working in the Indonesian Agricultural Quarantine Agency, Ministry of Agriculture of the Republic of Indonesia.

RESULT AND DISCUSSION

A number of animal diseases have serious negative impacts so that their prevention, control, and countermeasure are specifically regulated by the government. In Law No. 16/1992 concerning Animal, Fish and Plant Quarantine, the term Quarantine Pests and Diseases for Animals (HPHK) means all animal pests and diseases that are stipulated by the government to be prevented from being entering into, spreading within, and leaving from the territory of the Republic of Indonesia.

Government Regulation (PP) No. 82/2000 on Animal Quarantine defines HPHK in more detail, i.e. all pests and diseases affecting national socioeconomic and international trade, and also causing veterinary public health problems that can be classified according to its risk level. Article 75 Paragraph (1) of Government Regulation No. 82 /2000 states that HPHK is classified into HPHK Class I and HPHK Class II based on their epidemicity and pathogenicity, socioeconomic impact, and its status and situation in an area or territory of Republic of Indonesia. The definition of HPHK class I is HPHK that have the potential for very serious and rapid spread, its treatment is not known yet, have not been found in an area or territory of the Republic of Indonesia, whereas

HPHK class II is HPHK whose potential spread is closely related to the traffic of disease-carrying media, its treatment is already known, and have been declared to exist in an area or territory of the Republic of Indonesia.

Based on Government Regulation No. 82/2000 on Animal Quarantine and the Decree of the Minister of Agriculture No. 3238/Kpts/PD.630/9/2009 on Classification of Quarantine Pests and Diseases for Animals, Classification of HPHK-Carrying Media, there are six parameters used to evaluate an animal disease to be classified as HPHK, whether as HPHK class I or HPHK class II. These parameters can be seen in Table 1 below.

Table 1. The parameters of HPHK

No	Parameters	Value
1	The nature and potency for spreading	rapid and serious/ not rapid and serious
2	The treatment is already known	Not yet/yes
3	Harmful for human health	Yes/no
4	Social impacts that concerning the public	Yes/no
5	High economic losses	Yes/no
6	Exist in an area or territory of the Republic of Indonesia	Yes/no

The nature and potency for spreading. The first parameter relates to epidemicity and pathogenicity. In the explanation of Article 75 paragraph (1) of Government Regulation No. 82/2000, the epidemicity is the ability of disease to spread while the pathogenicity is the ability of a pathogen to produce disease. *Toxoplasma gondii* can be transmitted either by congenital (from the mother to fetus) or acquired (consuming food containing tissue cysts or the infective oocysts stage in the environment). These methods of transmission need a certain period of time and do not take place quickly. *Toxoplasma gondii* often does not cause specific and severe clinical manifestations. Signs that can be observed in cats include fever, general weakness, and inflammation of the eye. Goats and sheeps are intermediary host that were reported for pregnancy problems due to toxoplasmosis, whereas signs in the majority of other hosts are subclinical. Therefore, it can be concluded that toxoplasmosis does not have the potential to spread the disease seriously and rapidly.

Knowledge for treatment. Animals and humans who are diagnosed with toxoplasmosis can be treated with a combination of sulfonamides and pyrimethamine. All sulfonamides that can diffuse across the host cell membranes such as sulfadiazine, sulfamethazine, and sulfamerazine. They have been shown to be effective for therapy. Vaccines to prevent toxoplasmosis are also commercially available. An active vaccine containing tissue culture of tachyzoite stadium of *Toxoplasma gondii* can be used to prevent toxoplasmosis in sheep in some European and New Zealand countries. Therefore, it can be concluded that the treatment for toxoplasmosis has already been known.

Harmful for human health. Toxoplasmosis is a zoonosis, a disease that can be transmitted from animals to humans. Human infections most often occur through the consumption of meat, especially mutton, lamb, and pork which contaminated by *Toxoplasma gondii* tissue cysts. Transmission through oosysts from cats is less commonly reported but the infective oocysts released by cats that are in the acute phase of toxoplasmosis remains a potential source of transmission. The oocysts may pollute the environment including water which will be used as a source of drinking water for humans. Clinical symptoms of toxoplasmosis are relatively unknown in humans who have a good immune system. Toxoplasmosis may pose a danger to pregnant women and to individuals with low immunity, such as people with AIDS, cancer patients, and organ transplant patients. If a mother is infected with *Toxoplasma gondii* for the first time while pregnant, the baby in the womb is at risk for health problems, ranging from infection of the eyes, brain infection, and even death. Therefore, it can be concluded that toxoplasmosis is harmful for human health.

Social impacts. The parameter for social impacts tend to be more difficult to measure than other parameters. As a zoonosis that has the potential to cause health problems in pregnant women and fetus, toxoplasmosis has gained attention from the public, especially for pregnant women and women planning for pregnancy. Several hospitals and health facilities have provided TORCH testing (*Toxoplasma*, *Rubella*, *Cytomegalovirus*, and *Herpesvirus*) to detect diseases that may cause pregnancy problems. Therefore, it can be concluded that toxoplasmosis may inflicting social impacts that concerning the public.

High economic losses. Animal diseases that causing high economic losses are typically diseases of livestock that resulting death and/or large production declines. High economic losses may also happen if the government provide a budget specifically for controlling and countermeasuring the disease. Toxoplasmosis is not a major disease in livestock and the government did not spend large funds specifically for this disease. Therefore, it can be concluded that toxoplasmosis does not cause a high economic losses.

Exist in an area or territory of the Republic of Indonesia. Various studies have reported the presence of toxoplasmosis in

Indonesia either in animals or humans. The findings were not only based on serological tests that detect antibodies in the blood serum, but also managed to find the *Toxoplasma gondii* parasite based on microscopic examination and molecular based technique. Therefore, it can be concluded that toxoplasmosis has been present in an area within the territory of Indonesia.

Based on the criteria of HPHK as discussed above, toxoplasmosis is an animal disease that doesn't have the potency for serious and rapid spread, its treatment is already known, it is harmful for human health, it may arising social impacts that concerning the public, it does not cause a high economic losses, and already present in an area within the territory of the Republic of Indonesia. Toxoplasmosis fulfill some of the parameters so it needs to be considered by the government to be designated as one of the HPHK.

Article 75 paragraph (2) of Government Regulation No. 82/2000 on Animal Quarantine states that classification of HPHK class I and class II and the determination of susceptible animal species, mode of transmission, incubation period, observation period, quarantine period, standard testsing, and treatment shall be stipulated by the Minister. If toxoplasmosis is within the HPHK list, the details of the disease may be described in Table 2 below.

Table 2. The details of toxoplasmosis as HPHK

No	Details	Description
1	Name of disease	Toxoplasmosis
2	Etiology	*Toxoplasma gondii*
3	Susceptible animals	All mammals and birds (transmitting animal: cats and other felids)
4	Incubation period	3-18 days (taken from prepatent period)
5	Method of transmission	Vertical (congenital), direct contact with infective oocysts, eating contaminated foods, drinking contaminated water
6	Standard testing	Microscopic examination, SFDT, LA, DAT, IHA, CFT, IFAT, ELISA, PCR
7	Observation period	18 days
8	Other information	Zoonotic disease

If toxoplasmosis is included in HPHK list, its characteristics are in accordance with the definition of HPHK Class II on Article (1) number 16 in Government Regulation No. 82/2000 concerning Animal Quarantine. Toxoplasmosis is a HPHK whose distribution potential is closely related to the traffic of disease-carrying media (cats), the treatment is already known (drug therapy) and has been declared to exist in an area or territory of the Republic of Indonesia (confirmed cases with laboratory testing).

CONCLUSION

Toxoplasmosis is a zoonotic disease that fulfill some of the parameters of Quarantine Pests and Diseases for Animals (HPHK). The latest regulation that classifying HPHK is The Decree of the Minister of Agriculture No. 3238/Kpts/PD. 630/9/2009 which has been used for nine years. If the government is planning to update this decree, they should consider putting toxoplasmosis into the HPHK list.

REFERENCES

[1] Nurcahyo, R.W. 2012. Toksoplasmosis pada Hewan dan Manusia. Yogyakarta: Samudra Biru.

[2] Dubey, J.P. 2010. Toxoplasmosis of Animals and Humans, second edition. New York: CRC Press.

[3] Weiss, L.M. dan Kim, K. 2007. Toxoplasma gondii: The Model Apicomplexan. New York: Academic Press.

[4] Gandahusada, S. 1991. Study on the Prevalence of Toxoplasmosis in Indonesia: A Review. Asian J. of Trop. Med. and Pub. Health 22:93-98.