

Prevalensi Trypanosomiasis Tikus (*Rattus sp.*) Liar di Banyuwangi

Prevalence of Trypanosomiasis of Wild Rats (*Rattus sp.*) in Banyuwangi

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Abstract

The aim of this research was to investigate the number of prevalence of Trypanosomiasis of wild rats in Banyuwangi. Sixty wild rats were trapped from human residence, markets and rice fields in Banyuwangi. Rat's blood smear was stained by Giemsa. The result show that one (1.67%) of 60 blood sample was appear *Trypanosoma sp.*. The prevalence of Trypanosomiasis of wild rats in Banyuwangi was 1.67%.

Keywords : Banyuwangi, prevalence, *Trypanosoma sp.*, trypanosomiasis, wild rat,

Introduction

Wild rat has become serious problems which related to public health and rodent-borne diseases. Wild rats can play role as a vector of some diseases, mainly zoonotic diseases. More than 60 zoonotic diseases were transmitted to human *et al.* (2015)

Many rodent borne diseases that have ever been recorded in the world according to Nurisa and Ristiyanto (2005). There are 14 diseases that caused by protozoa. One of rodent borne diseases is Trypanosomiasis, which mostly happened in the tropical area of the world and possibly transmitted to human. Trypanosomiasis is a disease which has important role in human and veterinary medicine. This disease caused by *Trypanosoma sp.*, a protozoan parasite which has flagella on their body (Dobigny *et al.*, 2010).

In Thailand, Trypanosomes which have quite similar morphological parameters with *T. lewisi* were found from an infant with fever, cough, also anorexia (Sarataphan *et al.*, 2007). As mentioned by Shegokar *et al.*, (2006) in India *T. evansi* was found for the first time in human around 2004. The main host of *T. lewisi* is rat and rat also can infect with *T. evansi*.

Study on prevalence of Trypanosomiasis in wild rats caused by *T. lewisi* has been done in many countries since mid-20th century, first was conducted in New Zealand, USA, and more infection has been reported from African and Asian countries, South America also have reports in Chile and Brazil (Linardi and Botelho, 2002).

In Indonesia, Trypanosomiasis mostly found in livestock, which infecting cattle. According to Suwanti and Mufasirin (2014), 7 (7.9%) of 89 wild rats in Surabaya. were infected *Trypanosoma sp.*

Banyuwangi District is one area that also has potential to conducted Trypanosomiasis detection in wild rats. Because Banyuwangi District is known as one of the endemic area of Trypanosomiasis in accordance with the research of Sawitri *et al.*, (2015), which had been taking the isolate of Trypanosomiasis from some areas in Indonesia to represent the endemic area, including Banyuwangi. It has been decades since Trypanosomiasis or Surra had entered to Banyuwangi District.

Banyuwangi District has tropic condition which is relatable to the occurrence of Trypanosomiasis, mostly happen in tropical area. Viewing the terms of territory and epidemiological conditions, it has the potential Trypanosomiasis attack wild rats.

Material and Method

Material that use for this research are 60 blood samples of wild rats in Banyuwangi District. Sixty wild rats were trapped from human residence, markets and rice fields in Banyuwangi. Blood was taken by cardiac puncture and collected in tube contain EDTA. Blood was smeared to microscopic slide and blood smear was stained by Giemsa., Slide was viewed under oil immersion with a 100x objective of microscope and captured by Opti Lab camera.

Result and discussion

One of 60 blood samples was positive, the number of prevalence was 1.67% as seen in the table 1 and figure 1. It is lower from Surabaya, which had 7.9% according to Suwanti and Mufasirin (2014). They detected 89 wild rats in Surabaya started from 2011 until 2014.

Table 1 Number of Prevalence of Trypanosomiasis of Wild Rats in Banyuwangi

Result	Number of Samples	Percentage (%)
Positive	1	1.67
Negative	59	98.33
Total of Sample	60	100

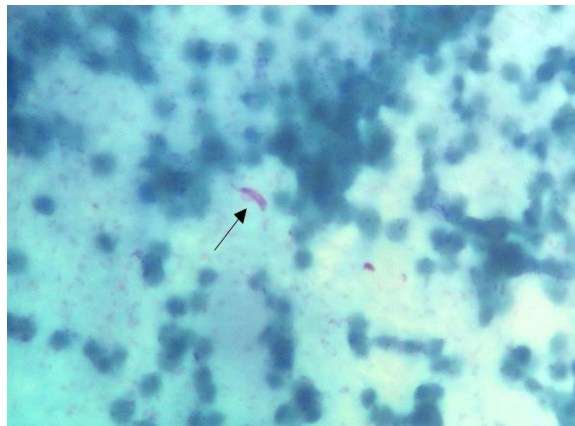


Figure 1 *Trypanosoma* sp. in smeared blood wild rat. Giemsa staining. Magnification 1000x

The number of prevalence shown that in different area or region, the result will be out differently. It shows that the prevalence of Trypanosomiasis of wild rats is not only affected by the species or individual factors, but also external factors such as vector development, habitat conditions, include temperature and humidity. Linardi and Botelho (2002) have mentioned in their research that rats showed higher prevalences of Trypanosomiasis infection in rainy season which commonly occur in October to March, than in dry season during April to September. Thus, the prevalence of this research showing low prevalence because the wild rats were collected in March to June. The climate condition also affected the flea development, *Xenopsilla cheopis* which transmitted the disease to wild rats. The results of this survey according to Jittapalapong *et al.* (2009), established that habitats significantly affect the prevalence of *Trypanosoma* sp.

The trypanosome that was found in this study has large body. It was different with *T. lewisi*. According to the morphology appearance in Desquesnes *et al.* (2003), *T. lewisi* has long thin posterior end with sub-terminal ovale kinetoplast, nucleus was located in the anterior part of the body with free flagellum. But, it might be present in intermediate or it was another species. Further observation by advanced methods, such as molecular, is necessary to determine species of *Trypanosoma*.

According to the result, *Trypanosoma* sp. might still potential to cause outbreak, especially in cattle because Banyuwangi District is known as the endemic area of Trypanosomiasis or Surra in cattle. It also possible to infect human since it was found in human residence area. It was potentially become the source infection in human. Because the positive sample was found in human residence area. Trypanosomiasis in human happened in several countries. Studies have been done in several Asia countries about Human Trypanosomiasis. In Thailand, Sarataphan *et al.* (2007) mentioned that *T. lewisi*-like were found from an infant, same thing also happened in India in 2004, according to Shegokar *et al.*, (2006) *T. evansi* was found for the first time in human. In 2010 also found *T. lewisi* infection in a 37-days old infant in India (Verma *et al.*, 2011). Truc *et al.* (2013) also mentioned, that Trypanosomiasis in human has occurred at Malaysia in 1933, Sri Lanka in 1999, and mentioned that most of the records were come from India.

Study about the infection of Trypanosomiasis of wild rats has not been done oftenly in Indonesia and it was the first time to be done in Banyuwangi District. This should become a warning that the infection of Trypanosomiasis in wild rats has a potential to infect human.

Conclusions

The number of prevalence of Trypanosomiasis in Banyuwangi was 1.67%. This should become a warning that the infection of Trypanosomiasis in wild rats has a potential to infect human.

References

- Blasdel, K., F. Bordes, K. Chaisiri, Y. Chaval, J. Claude, J.F. Cosson, A. Latinne, J. Michaux, S. Morand, M. Pages and A. Tran. 2015. Progress on Research on Rodents and Rodent-borne Zoonoses in South-east Asia. Journal Compilation CSIRO. 42: 98-107.

- Desquesnes, M. and M.L. Dia. 2003. Mechanical Transmission of *Trypanosoma congolense* in Cattle by the African Tabanid *Atylotus agrestis*. *Experimental Parasitology Journal*. 2003(105): 226-231.
- Desquesnes, M., P. Holzmüller, D.H. Lai, A. Dargantes, Z.R. Lun and S. Jittapalapong. 2013. *Trypanosoma evansi* and Surra: A Review and Perspective on Origin, History, Distribution, Taxonomy, Morphology, Hosts, and Pathogenic Effects. *BioMed Research International*. 2013: 1-22.
- Desquesnes, M., A. Dargantes, D.H. Lai, Z.R. Lun, P. Holzmüller and S. Jittapalapong. 2013. *Trypanosoma evansi* and Surra: A Review and Perspective on Transmission, Epidemiology, and Control, Impact, and Zoonotic Aspects. *BioMed Research International*. 2013: 1-20.
- Desquesnes, M., Yangtara, S., Kunphukhieo, P., Jittapalapong, S. and Herder, S. 2016. Zoonotic Trypanosomes in South East Asia: Attempts to Control *Trypanosoma lewisi* Using Human and Animal Trypanocidal Drugs. *Experimental Parasitology Journal* 165(2016): 35-42.
- Dobigny, G., P. Poirier, K. Hima, O. Cabaret, P. Gauthier, C. Tatar, J.M. Costa and S. Bretagne. 2010. Molecular Survey of Rodent-Borne *Trypanosoma* in Niger with Special Emphasis on *T. lewisi* Imported by Invasive Black Rats. *Acta Tropica Journal*. 2011(117): 183-188.
- Jittapalapong, S., V. Herbreteau, J.P. Hugof, P. Arreesrisom, A. Karnchanabanthoeng, W. Rerkamnuaychoke and S. Morand. 2009. Relationship of Parasites and Pathogens Diversity to Rodents in Thailand. *Kasetrat Journal of Natural Science*. 43: 106-117.
- Linardi, P.M. and J.R. Botelho. 2002. Prevalence of *Trypanosoma lewisi* in *Rattus norvegicus* from Belo Horizonte, State of Minas Gerais, Brazil. *Mem Inst Oswaldo Cruz*. 97(3): 411-414.
- Meerburg, B.G., G.R. Singleton and A. Kijlstra. 2009. Rodent-borne Diseases and Their Risk for Public Health. *Critical Reviews in Microbiology*. 35(3): 221-270.
- Nurisa, I. and Ristiyanto. 2005. Penyakit Bersumber Rodensia (Tikus dan Mencit) di Indonesia.
- Pumhom, P., D. Pognon, S. Yangtara, N. Thapraphorn, C. Milocco, B. Douangboupouha, S. Herder, Y. Chaval, S. Morand, S. Jittapalapong and M. Desquesnes. 2013. Molecular Prevalence of *Trypanosoma* spp. in Wild Rodents of Southeast Asia: Influence of Human Settlement Habitat. *Epidemiology Infection*. 142(2014): 1221-1230.
- Sarataphan, N., M. Vongpakorn, B. Nuansrichay, N. Autarkool, T. Keowkarnkah, P. Rodtian, R.W. Stich and S. Jittapalapong. 2007. Diagnosis of a *Trypanosoma lewisi*-like (*Hepertosome*) Infection in A Sick Infant from Thailand. *Journal of Medical Microbiology*. 56(2007): 1118-1121.
- Sawitri, D.H., A.H. Wardhana, H. Wibowo, M. Sadikin, F. Ekawasti. 2015. Molecular Identification Technique of *Trypanosoma evansi* by Multiplex Polymerase Chain Reaction. *Indonesian Journal of Animal and Veterinary Sciences*. 20(4): 297-307.
- Shegokar, V.R., R.M. Powar, P.P. Joshi, A. Bhargava, V.S. Dani, R. Katti, V.R. Zare, V.D. Khanande, J. Jannin and P. Truc. 2006. Short Report: Human Trypanosomiasis Caused by *Trypanosoma evansi* in A Village in India: Preliminary Serologic Survey of The Local Population. *American Journal Tropical Medicine and Hygiene*. 75(5): 869-870.
- Sim, S.T., V. Wiwanitkit. 2015. Emerging Human Trypanosomiasis in Southeast Asia: A Coming New Threat. *Journal of Nature and Science*. 1(1): 1-2.
- Siti Shafiyah, C.O., I. Jamaiah, M. Rohela, Y.L. Lau and F. Siti Aminah. 2012. Prevalence of Intestinal and Blood Parasites among Wild Rats in Kuala Lumpur, Malaysia. *Tropical Biomedicine*. 29(4): 544-550.
- Suwanti, L.T. and Mufasirin. 2014. Proceeding International Seminar and Workshop Biting Flies as Vector Trypanosomiasis and the Role of One Health in Animal Health. Yogyakarta: Indonesia.

Truc, P., P. Buscher, G. Cuny, M.I. Gonzatti, J. Jannin, P. Joshi, P. Juyal, Z.R. Lun, R. Mattioli, E. Pays, P.P. Simarro, M. Maria, G. Teixeira, L. Touratier, P. Vincendeau and M. Desquesnes. 2013. Human Infection by Animal Trypanosomes. PLOS Neglected Tropical Diseases.

Verma, A., S. Manchanda, N. Kumar, A. Sharma, M. Goel, P.S. Banerjee, R. Garg, B.P. Singh,

F. Balharbi, V. Lejon, S. Deborggraeve, U.V.S. Rana, J. Puliyeel. 2011. Case Report: *Trypanosoma lewisi* or *T. lewisi*-like infection in a 37-Day-Old India Infant. American Journal Tropical Medicine and Hygiene. 85(2): 221-224.