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PROCEEDING

International Seminar And Workshop

BITING FLIES AS VECTORS OF TRYPANOSOMES AND THE ROLE OF ONE HEALTH IN ANIMAL HEALTH

Yogyakarta, May 19th-25th, 2014



Coordinated by:
Graduate Program - Faculty of Veterinary Medicine
Gadjah Mada University

**International Seminar and workshop on
Biting Flies as vectors of Trypanosomes and
the Role of One Health in Animal Health
Yogyakarta, Indonesia, May 19th - 25th, 2014**

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Opening Remarks
Vice Rector for Research and Community Services
Gadjah Mada University

The Honorable
Speakers of this seminar
And all the participants

Welcome to the international seminar and workshop on Trypanosoma, Vector and The role of One-Health for Animal Health, which will be held from 19th up to 24th (of) May, 2014 in Gadjah Mada University.

I fully support this program, which is initiated by the Faculty of Medicine of Gadjah Mada University as part of the celebration of its 67th Dies Natalis. I fully support all of the efforts in eradicating animal disease and in preventing its spread, particularly parasitic disease. As it is known, Indonesia has approximately 14.000 islands with a wide variety of flora and fauna, the second largest in the world after Brazil. And it makes Indonesia vulnerable to disease spread between animals and humans. This is a challenge for all of us to maintain our good health. That is why the role of One Health to maintain our health is highly required of all parties involved in the cooperation, from multi-disciplines.

Ladies and Gentlemen,

Gadjah Mada University was founded in 1949 in this city of culture and education, Yogyakarta. This is the biggest university in Indonesia, and ranks best in some categories. Since it was first established, Gadjah Mada University has been a great place for students from many different places in Indonesia to study. These students bring with them their own local culture and language. Gradually, along with the

establishment of international programs in this campus, more and more foreign students come to Gadjah Mada University to study. Not only do we offer dual-degree program in corporation with top universities from all over the world, we also offer the foreign students a lot of programs and activities. The presence of both local and international students makes the learning environment in this campus feel “glocal” (global/local).

Gadjah Mada University offers many different programs or disciplines that the students can choose to take. It allows them to enrich their knowledge, experience in doing research, and conduct an interdisciplinary approach for their research. Not only for students, researchers, and lecturers, a number of institutions that work with Gadjah Mada University also find the disciplines offered by this campus complete. In addition, Gadjah Mada University has 230 programs and more than 28 centers of study. Our wide-range of experiences in building the network with educational institutions, research institutions, government, non-government institutions and industries enable us to facilitate an intensive cooperation.

The comfortable situation and the complete facilities in this campus are enhanced by the conducive environment. Located in Yogyakarta which is a student city rich with relic of history and cultural heritage, the students, researchers, and visiting professors can gain not only knowledge but also experience. Except Yogyakarta Palace, the location of this campus is not too far from two famous temples, that is, Borobudur Temple and Prambanan Temple.

In this occasion, I would like to thank all parties for the support that helps succeed this international program. To Prof. Sathaporn from Kasetsart University as the chief of steering committee of GREASE and Dr Marc Desquesnes from CIRAD/IRD, France as the coordinator as well as the speaker for the Workshop, I would like to send all my thanks and gratitude. Also, for Gadjah Mada University, thank you for the total support and help.

Finally, on behalf of the Rector of Gadjah Mada University, I officially open the International Seminar and Workshop on Trypanosoma, Vector and The role of One Health in Animal Health today.

Thank you.

May God Shower us with his blessings for this program.

Vice rector for Research and Community Service of Gadjah Mada University

Prof. Dr. Suratman, MSc.



Welcome speech from the Chair of Committee
International Seminar and Workshop on Trypanosoma, Vector and the Role of One
Health in Animal Health, Yogyakarta, 19-24 May 2014

The Honorable

Vice Rector for Research and Community Service of Gadjah Mada University

The speakers of this international seminar

The participants of the workshop,

Ladies and gentlemen,

All praise be unto God that has made it possible for us to gather in this international seminar on Trypanosoma, Vector and The role of One-Health for Animal health today, 19th (of) May 2014. The seminar will be followed by a Workshop on Identifying Biting Flies and Trypanosoma Diagnosis on 20th up to 24th (of) May 2014. This program is part of GREASE networking, a cooperation among UGM, Kasetsart University, CIRAD, IRD and a support from French Ministry of Foreign Affairs.

The topic of this international seminar ranges from the variety of parasites, Trypanosoma, Vector up to the Role of One-Health in Animal Health. The seminar will be divided into 2 groups. Group A will talk about Trypanosoma and Vector. Group B will talk about the role of One-Health for Animal Health. The key speakers for these topics are Prof. Sathaporn from Kasetsart University, Dr. Marc Desquesnes from CIRAD, Dr. Stephane Helder from CIRAD/IRD, Dr. Auriele Binot from GREASE, Dr. Jumnonjit Phasuk from Kasetsart University, Dr. Chandra from VRI Malaysia, Dr. Alan Dargantes and Prof. Escarlos from the Philippines, Dr. Phung Quoc Chuong and Dr Do Thi Thu Thuy and NVRI Vietnam. They will explain the importance of trypanosome and vector in ASEAN and the world. Speakers from Indonesia are Dr. April Wardana from Balitvet Bogor, Dr. Fajar Satria, Dr. Umi from IPB Bogor, the representatives from Disease Investigation Center in Medan, Bukittinggi, Lampung, Subang, Wates, Banjarbaru, Maros, Denpasar and Waingapu Department of Livestock Services, Sumba, NTT. They will explain the importance of parasites in world

health for animals and human. Meanwhile, Group B will talk about various topics concerning human and animal within One-Health framework.

Ladies and Gentlemen,

We have invited a number of universities, research institutions, and disease Investigation center from all over Indonesia and the world to join this international seminar and workshop which will be held for one week in Gadjah Mada University. For the workshop on trypanosome and vector, there will be a practicum and field visit to dairy farm in Kaliurang, beef cattle breeding in Pandansimo Bantul to see various biting flies that suck the blood of the cattle and will be continued by identification process at the lab.

In this occasion, I would like to thank UGM for providing the facilities, vehicles, and labs. Also, thanks to GREASE, CIRAD for the shared-funding for accommodation and transportation. Thanks to UIN Yogyakarta for the equipment, Faculty of Agriculture, and Faculty of Biology for the support to this program. Also, thanks to the speakers from Malaysia, the Philippines, Vietnam, Thailand for your participation in this program. To BALITVET and Disease Investigation Center for sending their representatives proving their support to this program.

I would like to thank the Faculty and the committee for making this program possible and for all the support to succeed this. I do apologize if there is any drawback and faults that you may find during the program.

Last but not least, I send my gratitude to the Vice Rector of Gadjah Mada University for attending the opening session of both the international seminar and workshop. And for this, we would welcome Prof. Suratman to officially open the program.

Chair of Committee

TABLE OF CONTENT

Organisation	i
Opening remarks : Vice Rectorfor Research and Community Service	ii
Welcome speech from the Chair of Committee.....	iii
Table of contents.....	iv
Seminar schedule	v
Agung B., Nugraha E.M., Yekho S. THE EFFECT OF BODY CONDITION SCORE (BCS) ON THE EPIDIDYMICAL BULL SPERM WHICH COLLECTED BY IN VITRO METHOD	1
Agustina Dwi Wijayanti, Ridha Chalifah, Wihandoyo THE EFFECT OF DOXYCYCLINE APPLICATION ON WATER AND FEED TO THE RESIDUE LEVEL ON BROILER BRAIN	9
Bambang Sutrisno and Ana Sahara MORPHOLOGY AND PATHOLOGICAL FEATURE OF <i>PARATANAISIA BRAGAI</i> FOUND IN PIGEON	19
Chandrawathani P.,Masrin A., Jamnah O., Premaalatha B., Erwanas A.I., Lily R., and Ramlan M. SURRA IN MALAYSIA	27
Devita Anggraeni, Hartiningsih, Retno Murwanti HE ROLE OF TAMOXIFEN ON LIPID AND LEPTIN PROFILE IN OVARIECTOMIZED RAT	29
Fadjar Satrija, Yuliana Fatie , Sri Murtini PRELIMINARY STUDY ON PORCINE CYCTICERCOSIS IN SORONG AREA OF WEST PAPUA PROVINCE, INDONESIA.....	38
Fadjar Sumping Tjatur Rasa, Khadjadatun, Ari Puspita Dewi, Rochmadiyanto TRYPANOSOMIASIS IN CATTLE AND BUFFALO IN THE SERVICE AREA OF DISEASE INVESTIGATION CENTRE WATES YOGYAKARTA.....	46
Lucia Tri Suwanti and Mufasirin WILD RATS TRYPANOSOMIASIS IN SURABAYA	55
Marc Desquesnes, Frédéric Baldacchino, Theeraphap Charoenwiryapaph, Gérard Duvallet, Sathaporn Jittapalapong. BITING INSECTS AS MECHANICAL VECTORS.....	61
Maxs Urias Ebenhaizar Sanam, Widya Asmara, Agnesia Endang Tri Hastuti Wahyuni, Michael Haryadi Wibowo, Sidna Artanto DESIGNING OF SPECIFIC PRIMERS TO CHARACTERIZE THE DOMAIN 1 OF <i>pagA</i> GENE OF <i>Bacillus anthracis</i> IN INDONESIA.....	64
Miftahul Fikar, Rudi Barmara, Ali Rifa'i, Riyan Afrizal, Surya Amanu DETECTION OF <i>EDWARDSIELLA TARDA</i> FROM AFRICAN CATFISH (<i>Clarias garipienus</i>) BY AGAR GEL PRECIPITATION (AGP) METHOD IN JAMBI.....	74
Mitra Slipranata and SitiIsrina Oktavia Salasia CLONING OF GENE ENCODING MURAMIDASE RELEASED PROTEIN (<i>mrp gene 188 bp</i>) AS A BASIC DETECTION FOR <i>Streptococcus suis</i> SEROTYPE 2 INFECTION*	81

Yunus, M POTENCY OF PRECOCIOUS LINES OF <i>EIMERIA TENELLA</i> IN INCREASING PROTECTION AND RESISTANCE OF CHICKEN TO PARENT STRAIN OF <i>EIMERIA TENELLA</i> INFECTION.....	89
Muhammad Tauhid Nursalim, DVM., Wisnu Nurcahyo, Dr., DVM. PARASITES INFECTION AMONG WILD SUMATRAN ELEPHANT (<i>Elephas maximus sumatranus</i>) IN BUKIT TIGAPULUH ECOSYSTEM-JAMBI : IDENTIFICATION AND PREVALENCE.....	99
Slamet Raharjo, Soedarmanto Indarjulianto, Ng Yeong Sheng, Boo Biing Jye and Daryl Lum Mun Yoong HEMOLITIC EFFECT OF VENOM <i>Trimeresurus puniceus</i> ON RED BLOOD CELL OF DOG.....	111
Slamet Raharjo, Sri Hartati and Hary Purnamaningsih STUDY OF TOXOPLASMOSIS SEROLOGICALLY AND HISTOPATOLOGICALLY IN LOCAL DUCK	117
Susi Soviana, U.K. Hadi, Sugiarto, M. Chalidaputra, BEDBUGS (<i>Cimex hemipterus</i>) INFESTATION AT STUDENTS'S DORMITORY	128
Trini Susmiati, Rini Widayanti, Pamungkas Bagus Satriyo GENETIC DIVERSITY STUDY OF NATIVE AND KEDU CHICKENS USING RAPD- PCR METHODE	135
Vembriarto Jati Pramono, Alfarisa Nururrozi EFFECT OF KERSEN FRUIT EXTRACT (<i>Muntingia calabura</i>) ON BLOOD GLUCOSE LEVELS AND HISTOPATHOLOGICAL FEATURE MICES OF PANCREAS (<i>Micetusnovergicus</i>) INDUCED BY STREPTOZOTOCIN	147
Widi Nugroho, Natalya Ruff, Siti Isrina Oktavia Salasia CLASSICAL SWINE FEVER AND <i>STREPTOCOCCUS SUIS</i> IN TRADITIONAL PIGGERIES IN TIMIKA REGION, PAPUA PROVINCE, INDONESIA: CLINICAL DIAGNOSIS AND CONTROL	165
B.P. Widiarso and J. Daryatmo THE EFFECT OF BAMBOO LEAVES INFUSION ON MOTILITY OF BULLS SPERMATOZOA.....	172
Wisnu Nurcahyo ZONOSIS PARASITE IN INDONESIA.....	183
Yuli P. Kristianingrum, Ekowati Handharyani, Dondin Sajuthi, Erni Sulistiawati POTENCY OF TESTOSTERONE HORMONE THERAPY IN THE GUINEA PIG (<i>Cavia porcellus</i>) AS A MODEL ALZHEIMER'S DISEASE WITH STEROID HORMONE DEPLETION	194
Yuriadi THE EFFICACY OF ABAMECTIN, OXFENDAZOLE, PIPERAZINE, AND PYRANTEL PAMOATE AGAINST GASTROINTESTINAL WORMS IN HORSES IN YOGYAKARTA SPECIAL REGION	210

WILD RATS TRYPANOSOMIASIS IN SURABAYA

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ABSTRACT

The present case of trypanosomiasis in wild rats in Surabaya city. A total of 89 wild rats captured in Surabaya city from May 2011 up to April 2014. Blood was collected via heart and added anticoagulant. Rat blood was examined by observation native and blood smear using Giemsa staining. The result showed that seven samples of eighty nine rats infected *Trypanosoma sp.*

Keywords: *Trypanosoma sp.*, Wild Rat, Surabaya.

INTRODUCTION

Trypanosoma (Herpetosoma) lewisi was first reported by Kent in 1880 and subsequently by Laveran and Mesnil in 1901. It is a trypanosome of the sub-genus *Herpetosoma* (*Stercoraria* section). A parasite of rats (*Rattus rattus* and *Rattus norvegicus*), that is transmitted by fleas: *Nosopsyllus fasciatus*. This species occurs quite commonly in the black rat, Norway rat, and other members of the genus *Rattus* throughout the world. It is not normally transmissible to mice (Levine, 1985). In Indonesia, especially in the city of Surabaya, trypanosomiasis in rat has not been reported. Rats infected by eating infected fleas or flea feces. *Trypanosoma lewisi* is nonpathogenic but more cases of humans infected with *T. lewisi* have been reported around the world (Tang *et al.*, 2012). In the city of Surabaya, wild rats are a serious problem. The issues related to public health, particularly rat-borne diseases. Rats live in sewers, trash, traditional

markets , farm, slaughterhouses, and other dirty places. Habits of the people who kill rats and throw on the road aggravate health problems. Some rat-borne disease among others toxoplasmosis and leptospirosis, and the possibility of other agents that are transmitted through a vector in rat . In Thailand , reported trypanosomiasis in humans and the agents are molecularly similar to *T. lewisi* although have *T.evansi* like morphology (Sarataphan *et al.*, 2007). Another danger is some rat fleas infect dogs and cats and otherwise, so that the possibility can be transmitted to humans. Climate in Indonesia, including Surabaya which tend to support the development of wet rat fleas which followed the development of diseases, including trypanosomiasis in rat.

MATERIAL AND METHODS

During a rat-toxoplasmosis survey for epidemiological surveillance in Surabaya city, East Java, Indonesia, 89 *Rattus* sp were trapped around dumps at the margins and surroundings of Surabaya city, from March 2011 to April 2014. Rats were euthanized by ether and blood from the heart. Identification of the trypanosomes was performed by microscopic observation of fresh rat blood and stained blood smears with Giemsa. Identification was based on the morphological features of the parasites. Prevalence rate are presented descriptively.

RESULT AND DISCUSSION

In Surabaya, Indonesia, Trypanosomiasis in wild rat has not been reported. So far as we know, this is the first report of Trypanosomiasis in wild rats in Surabaya. The result showed that 7.9% (7/89) of rat infected with *Trypanosoma* sp.

Trypanosoma species have not been identified, but based on the morphological features of the parasites, we was tentatively identified as a member of the subgenus *Herpetosoma*, resembling *Trypanosoma lewisi* (Figure 1). According to Desquesnes et al (2002) The posterior end of *T lewisi* is very thin, long and rigid with a sub terminal ovale kinetoplast, the nucleus is in the anterior part of the body, and free flagellum. Average parasite length in this study was 18.5 μm and weight 1.6 μm , its smaller then study by Verma et al. (2011) with average length 30.8 μm and width 1.9 μm , but appropriate with study by Karbowski et al (2009) that body length *T. lewisi* ranged from 15.45-23.64 μm and width from 1.3-2.32 μm .

The overall cases of rat trypanosomiasis in the present study (7.9%) is lower than that for any other country such as in Chile 15.8% (Franjola *et al.*, 1995), Brazil 21.9% (Rinaldi and Botelho, 2002), and Mexico 21.7% (Solis-Franco *et al.* 1997). These difference prevalences could be attributed to ecological and behavioral factors. But this result is similar to a study conducted Tang *et al* (2012). They detected *T. lewisi* from 238 wild rats (*Rattus norvegicus*) collected from the field in Huadu, Guangdong province, China and reported that infection rates of their samples detected by blood smear (diagnosis by microscopy) was 6.7% (16/238).

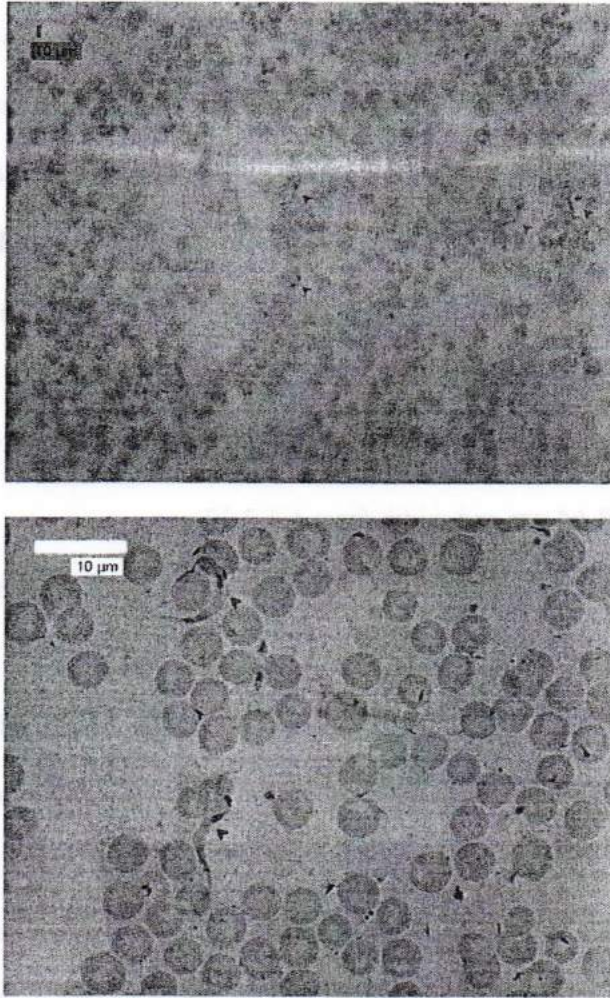


Figure 1. *Trypanosoma lewisi* in rat (400x and 1000X)

The amount of cases trypanosomiasis influenced by several factors. The main factor is the vector that plays a role in disease transmission from rat to rat one another. Dirty environment in the gutter is a good place for vector development. The warm weather in Surabaya is a high humidity environment that supports the development of fleas. Linardi and Botelho (2002) reported that the rainy season with warm temperatures (months of October to March) the prevalence is higher than in other months. This was confirmed by Linardi *et al.* (1985a), the fleas showed the highest indices of infestation in the warm-rainy season (October to March) while the

infestation by the lice was more prevalent in the dry-cool season. The climatic factors most related with the hosts' infestation were, in decreasing order, rainfall, temperature and relative humidity. Fleas and lice preferentially infested male rodents, being infestation by *X. cheopis* highly significant. In Brazil, the end of winter is the most prevalence *X. cheopis* with a prevalence of 99.2%, so that time is the right time to insectisida parasite elimination (Linardi *et al.*, 1985b). Confirmation of species using PCR needed to ensure *Trypanosoma lewisi*. These results may provide information to policy makers to control the spread of disease through a wild rat.

Although *T. lewisi* has widely been considered as a non-pathogenic rat trypanosome, however, more cases of humans infected with *T. lewisi* have been reported around the world (Tang *et al.*, 2012). Guerrero *et al.* (1997) demonstrated that *T. lewisi* infection increases *Toxoplasma gondii* multiplication in white rats. So, with the discovery of cases of rat trypanosomiasis in Surabaya, to watch out for the possibility of transmission to humans.

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