

PROCEEDINGS



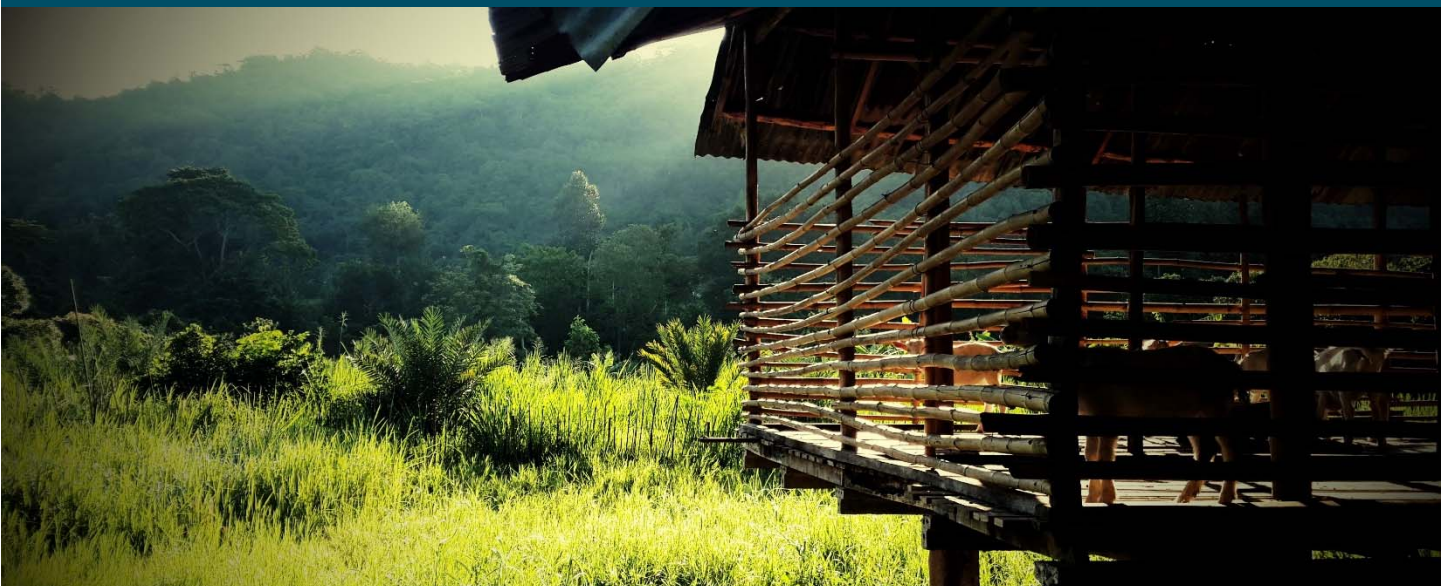
5<sup>th</sup>

SAADC 2015

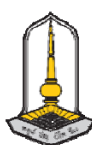
The 5<sup>th</sup> International Conference on  
**Sustainable Animal Agriculture for Developing Countries**

**“CLIMATE SMART SUSTAINABLE ANIMAL AGRICULTURE FOR FOOD SECURITY  
AND LIVELIHOOD IMPROVEMENT IN THE DEVELOPING COUNTRIES”**

October 27-30, 2015, Dusit Thani Pattaya Hotel, THAILAND



Jointly organized by



**PROCEEDINGS**  
*of*  
***The 5<sup>th</sup> International Conference on***  
**Sustainable Animal Agriculture for Developing Countries**  
**(SAADC 2015)**  
**October 27-30, 2015**  
**Dusit Thani Pattaya Hotel, Thailand**

**Jointly Organized by:**



Faculty of Sciences and Liberal Arts, Rajamangala University of Technology Isan



Institute of Agricultural Technology, Suranaree University of Technology



Faculty of Technology, Mahasarakham University



Faculty of Veterinary Medicine, Mahanakorn University of Technology



Faculty of Animal Sciences and Agricultural Technology, Silpakorn University Phetchaburi IT Campus



Faculty of Science and Technology, Nakhon Ratchasima Rajabhat University



Faculty of Technology, Udon Thani Rajabhat University



Tropical Feed Resources Research and Development Center (TROPREC)



Department of Livestock Development  
Thailand



The Animal Husbandry Association of Thailand under the Royal Patronage of  
H.R.H. Princess Maha Chakri Sirindhorn

## **INTERNATIONAL ADVISORY COMMITTEE:**

### **Chairman:**

Prof. Dr. Liang Juan Boo (Malaysia)

### **Committee Members:**

Prof. Dr. Peter Wynn (Australia)

Dr. Hiroyuki Konuma (FAORAP)

Prof. Dr. Harinder Makkar (FAO)

Prof. Dr. Long Ruijin (China)

Assist. Prof. Dr. Chalermpon Yuangklang (Thailand)

Prof. Dr. Liang Chou Hsia (Taiwan, ROC)

Prof. Dr. Pietro Celi (Australia)

Prof. Dr. Junichi Takahashi (Japan)

Dr. Vo Thi Lam Thanh (Vietnam)

Assoc. Prof. Dr. Pramote Paengkoum (Thailand)

Dr. Elizabeth Wina (Indonesia)

## **ORGANIZING COMMITTEE:**

### **Advisors:**

Assist. Prof. Dr. Viroj Limkaisang (President of RMUTI)

Prof. Dr. Charan Chantalakhana

Prof. Dr. Metha Wanapat

President of the Animal Husbandry Association of Thailand under the Royal Patronage of H.R.H. Princess Maha Chakri Sirindhorn

### **Chairperson:**

Assist. Prof. Dr. Chalermpon Yuangklang

### **Vice chairperson:**

Assoc. Prof. Dr. Pramote Paengkoum

### **Secretary:**

Dr. Benya Saenmahayak

### **Fund raising committee:**

Chairperson: Assist. Prof. Dr. Sasiphan Wongsuthavas

Secretary: Dr. Siwaporn Paengkoum

### **Public Relations:**

Dr. Weerawat Namanusart

### **Social Culture:**

Assoc. Prof. Dr. Opart Pimpa

Dr. Siwaporn Paengkoum

**International Scientific Committee:**

Chairman: Assist. Prof. Dr. Kraisit Vasupen (Thailand)

Co-Chairman: Dr. Vincenzo Tufarelli (Italy)

Secretary: Assist. Prof. Dr. Smerjai Bureenok (Thailand)

**Members:**

Publishing Advisor: Dr. Chris Anderson (Australia)

Assoc. Prof. Dr. Songsak Chumpawadee (Thailand)

Prof. Dr. Pietro Celi (Australia)

Prof. Dr. Ermias Kebreab (USA)

Prof. Dr. Mohd Ariff Omar (Malaysia)

Prof. Dr. Norhani Abdullah (Malaysia)

Prof. Dr. Ariff Omar (Malaysia)

Prof. Dr. Christopher McSweeney (Australia)

Prof. Dr. Peter Daniels (Australia)

Dr. Elizabeth Wina (Indonesia)

Prof. Joaquim Balcells (Spain)

Dr. James Chin (Australia)

Prof. Dr. Thomas J. Schonewille (The Netherlands)

**Registration:**

Dr. Siwaporn Paengkoum

Dr. Nittaya Pitiwittayakul

Dr. Totsapron Srisaphoomi

**Financial/Treasurer:**

Mrs. Ekarat Vasupen

**Website:**

Mr. Ekkachai Sae-jueng

Mr. Ekkalak Chimjarn

Mr. Thanin Rabiabpho

Mrs. Chonlada Chimjarn

Mr. Soravit T.Siriwattana

## List of Reviewers:

Prof. Dr. Yangqing Lu  
Prof. Dr. Kazuaki Takehara  
Prof. Dr. Anton C. Beynen  
Prof. Dr. Kawamoto Yasuhiro  
Prof. Dr. Wahid Haron  
Dr. Jothi Panandam  
Dr. Chen Wei Li  
Dr. Tomoyuki Suzuki  
Dr. Eko Widodo  
Dr. Abdoreza Soleimani  
Dr. Awis Q. Sazili  
Assoc. Prof. Dr. Boonlom Cheva-Isarakul  
Assoc. Prof. Dr. Chalong Wachirapakorn  
Assoc. Prof. Dr. Songsak Chumpawadee  
Assoc. Prof. Dr. Jatuporn Kajaysri  
Assist. Prof. Dr. Araya Seubkhamphet  
Assist. Prof. Dr. Jamlong Mitchaothai  
Assist. Prof. Dr. Sakchai Reunphet  
Assist. Prof. Dr. Walaiporn Tonpitak  
Assist. Prof. Rachakris Lertpatarakomol  
Assist. Prof. Dr. Pattaraporn Poommarin  
Assist. Prof. Dr. Skorn Koonawootrittriron  
Dr. Wittawat Molee  
Dr. Danai Sangthong  
Dr. Darsaniya Punyadarsaniya  
Dr. Grisada Khumpool  
Dr. Pannigan Chaichanasak  
Dr. Sunisa Sirimongkolvorakul  
Dr. Sunpetch Sophon  
Dr. Thuchadaporn Chaikhun-Marcou  
Dr. Umaporn Rungroekrit  
Mr. Patipan Jaipeng  
Mr. Pichai Jirawatthanapong  
Mrs. Kornkamon Padiporn  
Dr. Khanitta Ruangwittayanusorn  
Dr. Atra Chaimongkol  
Dr. Daranee Sookying  
Dr. Chatchawan Singhapol  
Dr. Narin Preyavichyapugdee  
Dr. Nittaya Pitiwittayakul  
Mr. Pichet Sriboonyoung  
Dr. Juan Boo Liang  
Prof. Dr. Thomas J. Schonewille  
Prof. Dr. Eric A. Decker  
Prof. Dr. Pietro Celi  
Prof. Dr. Peter Wynn  
Dr. Hassan Sadri  
Dr. Devika Saddul  
Dr. Tan Hui Yin  
Dr. Irfan H. Djunaidi  
Dr. Mohd Ariff Omar  
Dr. Elizabeth Wina  
Assoc. Prof. Dr. Surintorn Boonanuntanasarn  
Assoc. Prof. Dr. Anut Chantiratikul  
Assoc. Prof. Dr. Opart Pimpa  
Assoc. Prof. Dr. Pantipa Na Chiangmai  
Assoc. Prof. Dr. Pramote Paengkoum  
Assist. Prof. Dr. Chalermpon Yuangklang  
Assist. Prof. Dr. Kraisit Vasupen  
Assist. Prof. Dr. Smerjai Bureenok  
Assist. Prof. Dr. Sasiphan Wongsuthavas  
Assist. Prof. Dr. Charunee Kasornpikul  
Assist. Prof. Dr. Sutisa Khampaka  
Assist. Prof. Dr. Chaweng Sarnklong  
Dr. Chakrapong Chaikong  
Dr. Seksan Wongsiri  
Dr. Kanok-on Nugboon  
Dr. Benya Saenmahayak  
Dr. Totsapron Srisaphoomi  
Dr. Weerawat Namanusart  
Miss Sirinun Lasrichan  
Dr. Pornpan Saenphoom  
Dr. Chaowadee Laosutthipong  
Dr. Wantanee Polviset  
Dr. Peerapot Nitipot  
Dr. Huang Xiaodam  
Dr. Anan Chaokaur  
Dr. Suphavadee Chimtong  
Dr. Janjira Sittiya  
Dr. Nattiya Chumnanka  
Dr. Chomphoonuch Khongla  
Dr. Saowaluck Yammeun-art

## Breeding Soundness Evaluation in Garut Ram

Arifiantini, I<sup>1</sup>, D. Sudradjat<sup>2</sup> & W.M. Nalley<sup>3</sup>

<sup>1</sup>Department of Veterinary Clinic, Reproduction and Pathology, Faculty of Veterinary Medicine, Bogor Agricultural University, Bogor 16680, Indonesia. <sup>2</sup>Department of Animal Science, Faculty of Agricultural, University of Djuanda, Bogor Indonesia. <sup>3</sup>Faculty of Animal Science, University of Nusa Cendana Kupang 85148, Indonesia

### Abstract

Breeding soundness evaluation of the male offers predictive information on expected performance that may enhance overall herd productivity. The aim of this study was to examine breeding soundness evaluation in Garut rams. Twenty four rams with aged of 10 month to 3 years were examined at Faculty of Animals Science, Bogor Agricultural University (IPB). Clinical examination was performed with each ram. External genitalia was examined by visual assessment and palpation for testicular tone. Scrotal circumference was measured using a metal scrotal tape. Semen was collected using artificial vagina and assessed on the basis of progressive motility, sperm concentration and sperm morphology. Result demonstrated that the average body weight of the 24 rams were  $29.85 \pm 3.13$  kg (range of 24-36 kg), scrotal circumference were  $25.35 \pm 2.10$  cm (range of 22-28 cm). Around 33.3% (8/24) rams producing semen with a progressive motility more than 75%, 54.16% (13/24) rams ranges from 60 to 70% and less than 12.5% (3/12) demonstrated < 60% motility. Four rams demonstrated the sperm concentration >  $4000 \times 10^6$  cell per ml, 13 rams ranges from 2000-4000  $\times 10^6$  cell per ml and only 1 ram demonstrate less than 2000  $\times 10^6$  cell per ml. All rams produced an excellent morphologically normal spermatozoa  $> 93.82 \pm 2.03\%$ .

*Keyword: Breeding soundness evaluation, Garut ram*

*\* Corresponding author: iis.arifiantinipurna@gmail.com*

### Introduction

Garut is one of local Indonesian germplasm sheep that is often used for competition and for general consumption. The National demand for Garut rams were quite high, thus an effort to meet that demand through increasing in population and quality should be done immediately. Improving in Garut rams quality can be done with selection of good quality and cross breeding rams. Breeding program require rams with good physic and provide healthy spermatozoa for female rams in estruses period. Thus, an evaluation for ram's performance has to be done before initiate the breeding program. One of the methods to evaluate the ram's performance is with *breeding soundness evaluation* (BSE). BSE is an evaluation method to decide the performance excellences of the male by observing the physic and reproduction performance. BSE method has been tested on several livestock such as bull (Leamaster & Duponte, 2007), buck (Bagley, 1997) and rams (Pezzanite et al., 2004). The BSE method evaluate scrotal circumference and semen quality such as motility, concentration and spermatozoa morphology (Leamaster & Duponte, 2007). The aims of this study was to examine breeding soundness evaluation in Garut rams.

## Materials and Methods

### *Animals*

Twenty four Garut rams with age ranging from 10 months to 3 years, were examined at Faculty of Animals Science, Bogor Agricultural University (IPB).

### *Clinical examination*

Clinical examination was performed with each ram. External genitalia was examined by visual assessment and palpation for testicular tones. Scrotal circumference was measured using a metal scrotal tape.

### *Semen collection and evaluation*

The semen was collected from the ram with the aid of an artificial vagina. Immediately after collection, the semen was evaluated for progressive motility, sperm concentration and sperm morphology. Progressive sperm motility (%) was performed by placing 10  $\mu$ L semen on a object glass and covered by cover slip pre-heated to 37 C and analyze the sample subjectively under light microscopy at 200 $\times$ –400 $\times$  magnification. Sperm concentration was measured using improved Neubauer hemocytometer by diluting the semen to 1:500 ratio with formal-saline on test tube and gently mix well the solution. After mixing, one drop of solution were placed in a clean and dry hemacytometer covered by cover slip and counted the sperm dispersed in the middle square and the four corner squares of the 25 squares in the grid. Number of spermatozoa was counted in 100 squares with the help of manual counter. The number of spermatozoa from 5 square covered by cover slips were multiplied by 25 x 10<sup>6</sup> (Arifiantini 2012). Sperm morphology was evaluated using eosin nigrosin, 100  $\mu$ l eosin nigrosin well-mixed with 10  $\mu$ l semen, smeared at object glass by sliding with a clean another object glass. The smears were air dried and examined directly. Two smears were made from each sample. Sperm were assessed with a light microscope (Olympus CH 20) at 400x magnification. At least 200 sperms were evaluated on each smear.

## Result and Discussion

Result demonstrated that the average body weight of the 24 rams was 29.85  $\pm$  3.13 kg (range 24-36 kg). Around 62.5% rams had body weight of 30.9  $\pm$  3.28 kg and this weight was reached when rams age were 1.5 years (Tabel 1). The average of scrotal circumference of garut rams were 25.35 $\pm$ 2.10 cm (range of 22-28 cm). After rams reached one year, the scrotal circumference seems to be stable.

Table 1. Age, body weight and scrotal circumference of garut rams.

Age (years)	Number (head )	Body weight (kg)	Scrotal circumference (cm)
<1	1	28.0 $\pm$ 0.00	22 $\pm$ 0.00
1-1.5	15	30.9 $\pm$ 3.28	25.50 $\pm$ 1.92
>1.5-2	4	32.5 $\pm$ 2.08	25.63 $\pm$ 2.56
>2-3	4	28.5 $\pm$ 2.65	25.38 $\pm$ 2.5

Sperm motility is the indicator of sperm fertility. Around 33.3% (8/24) garut rams produced semen with a progressive motility more than 75%, 54.16% (13/24) rams ranges from 60 to 70% and less than 12.5% (3/12) demonstrated < 60% motility.

Table 2. Progresif sperm motility distribution of garut rams.

Sperm motility (%)	Number (head)	Percentage (%)
>75	8	33.3
>60-75	13	54.16
< 60	3	12.5
Total	24	100

Sperm concentration were defined as the number of sperm in 1 ml semen volume. The 75% (18/24) of rams demonstrated sperm concentration range from 2000 to 4000 x10<sup>6</sup> cell per ml and four rams demonstrated sperm concentration of > 4000 x10<sup>6</sup> cell per ml, only 1 ram demonstrate less than 2000 x10<sup>6</sup> cell per ml.

Table 3. Sperm concentration distribution of Garut rams.

Sperm concentration (x10 <sup>6</sup> /ml)	Number (head)	Percentage (%)
1000-2000	1	4.16
2000-3000	13	54.16
3000-4000	5	20.8
>4000	4	16.6
Total	24	100

All rams showed an excellent normal sperm morphology. The average of normal sperm morphology was > 93.82%±2.03% range from 86.76% to 96.35%. According to Bagley (1997), ram with the age of > 14 months with the scrotal circumference <33 cm were categorized as questionable. In this study, the maximum scrotal circumference was 28 cm with the average of 25 – 35±2.10 cm. When we perform BSE according to Bagley (1997), all rams were failed to pass the test. The BSE for local ram must be adapted to the average of the rams. Garut rams more than 1 year were categorized as satisfactory if the scrotal circumference > 25 cm and categorized as questionable when less than < 25 cm. Based on semen evaluation, rams that demonstrated > 75% sperm motility were categorized as excellent, 60-75% as satisfactory and <60 % as questionable. Garut rams sperm concentration were categorized as excellent if the sperm concentration > 4000x10<sup>6</sup> /ml, satisfactory if > 2000 - <4000x10<sup>6</sup> /ml and questionable if < 2000x10<sup>6</sup> /ml categories as questionable. Since the sperm morphology demonstrated high number of normal sperm, we were categorized garut ram with sperm morphology of > 86.76 % as satisfactory and < 86.76 % as questionable.

Based on this finding the categorization of BSE as excellent, satisfactory or questionable should be done specifically based on the breed.

## References

- Arifiantini, R.I., 2012. Tehcnique of semen collection and evaluation. IPB press. Bogor Indonesia.
- Leamaster, B.R., and M.W. Duponte, 2007. Bull Power : Examination of Beef Cattle for Breeding Soundness. Cooperative Extension Service. College of tropical Agriculture and Human Resources. University of Hawai'i at Manoa.
- Bagley, C.V., 1997. Breeding soundness in rams: How to do it and how to intepret it. [http://extension.usu.edu/files/publications/factsheet/AH\\_Sheep\\_13.pdf](http://extension.usu.edu/files/publications/factsheet/AH_Sheep_13.pdf). [23 August 2011].
- Pezzanite, L., A. Bridges, M. Nearly, and T. Hutchens, 2004. Breeding soundness examinations of rams and bucks. <http://www.extension.purdue.edu/extmedia/AS/AS-599-W.pdf>. [23 August 2011].