



The 7th INTERNATIONAL SEMINAR ON TROPICAL ANIMAL PRODUCTION

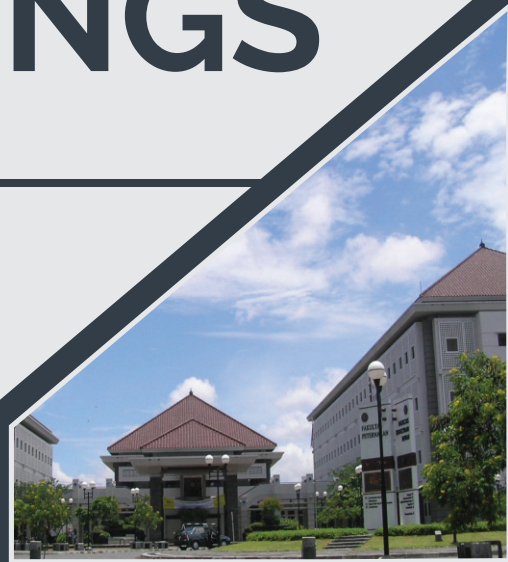
“Contribution of Livestock Production on Food Sovereignty in Tropical Countries”



PROCEEDINGS

September 12 – 14, 2017
Yogyakarta, Indonesia

ISBN: 978-979-1215-29-9



Organized by :
Faculty of Animal Science, Universitas Gadjah Mada Yogyakarta
Indonesian Society for Sustainable Tropical Animal Production [ISSTAP]
INDONESIA, 2017



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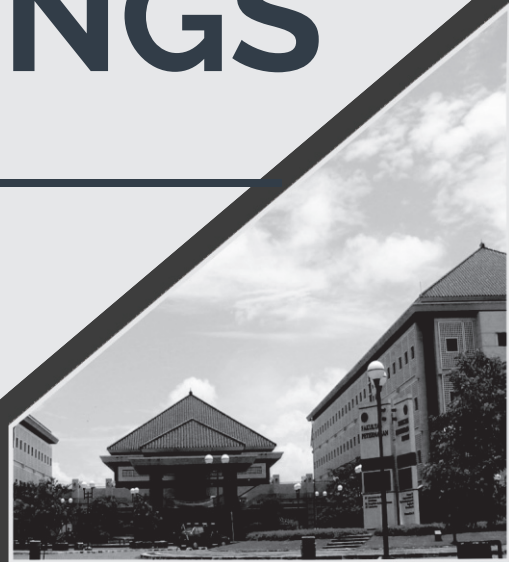
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PREFACE

On behalf of Faculty of Animal Science, Universitas Gadjah Mada, I am pleased to present you the 7th International Seminar on Tropical Animal Production (ISTAP) which is held on September 12-14, 2017 at Auditorium Drh. R. Soepardjo, Faculty of Animal Science UGM, Yogyakarta. Under the main theme “Contribution of Livestock Production on Food Sovereignty in Tropical Countries”, we expect that information and ideas on animal production systems in the tropics and its related problems will be shared among participants, thus we can elaborate an integrated approach in developing sustainable tropical animal production. I believe, this can be achieved since more than 200 animal scientists, researchers, students, and producers from more than 10 countries join this seminar.

In this moment, I have to address my great thanks to all people who have contributed for the success of this seminar. First, to all participants, thank you for your contributions, time, and efforts in participating in all sessions in this seminar. We also would like to extend our gratitude to the reviewers and editors for dedicate their expertise and precious time in reviewing and editing the papers. I deeply appreciate the hard work of all members of the Steering Committee, Organizing Committee, and students of Faculty of Animal Science UGM for making this seminar achieved a great success!

I hope all of you enjoy the seminar and Jogja as well!

Dr. Cuk Tri Noviandi

Editor in Chief

REPORT FROM ORGANIZING COMMITTEE

Dear all scientists, delegates, participants, ladies and gentlemen,

Praise to The Almighty for His Merciful and Beneficent to gather us in this memorable moment of scientists and delegates from all over the world who are interested in Tropical Animal Production field can meet up together.

On behalf of the Board of Committee, it is my great pleasure and honor to welcome all participants to attend the 7th ISTAP in Yogyakarta, the city where nature, culture and people live in harmony.

As a chair in this seminar, let me report that, today, we have distinguished participants from all over the continents in the world to present their paper with the theme of “Contribution of Livestock Production on Food Sovereignty in Tropical Countries”. There are around 250 scientists, delegates, and graduate students from 11 countries attending the seminar; and more than 170 research papers will be presented during these three days seminar. The great enthusiasm of all participants to share their research-based valuable information and knowledge on livestock production development in tropical areas as well as to contribute on developing human prosperity all over the world is expressed.

The 7th ISTAP programs are rich of scientific programs as well as social and cultural activities. The scientific programs offer six plenary sessions, eight parallel sessions (both oral and poster presentation) each day, and rural field trip. The social and cultural programs of the 7th ISTAP are also important as the scientific programs since the scientists’ interaction, intercultural exchange, friendship and future scientific or research collaboration are also central to this seminar. In the evening, participants will attend a warm invitation from the Dean of Faculty of Animal Science UGM in a Welcome Dinner that will give you the most impressive moment to attend. Rural field trip activity offers a wonderful experience to the rural livelihood surrounded by the spectacular natural landmark, Ancient Volcano in Yogyakarta where many smallholder farmers live in harmony. We will also accompany all participants to experience the ancient civilization by enjoying the beautiful of Prambanan temple. We do hope that participants will take part of these wonderful opportunities.

During the seminar, the 7th ISTAP committee also creates a competitive atmosphere among all participants by granting awards for those who have outstanding paper and poster. Participants are encouraged to share their precious works in research and knowledge dissemination in an attractive way. The awards will be given to the outstanding participants immediately after the last session of parallel presentations where the closing ceremony will also be held on September 13th, 2017 afternoon. I wish all of the participants enjoying activities that we have organized.

Finally, on behalf of 7th ISTAP Committee, let me express the high appreciation and acknowledgement to the Rector of Universitas Gadjah Mada and Dean of Faculty of Animal Science UGM for the advice and suggestion in organizing this international seminar. Recognition should go to the Steering Committee, Scientific Committee, Reviewers and Editorial Boards and All Technical Committee members who have worked extremely hard for the details of important aspects of the seminar programs.

Terima kasih (Thank you).

Sincerely Yours,

R. Ahmad Romadhoni Surya Putra, Ph.D
Chairman
The Organizing Committee of the 7th ISTAP

WELCOME ADDRESS

Selamat pagi, Good morning, and Assalamu'alaikum Wr. Wb.

The honorable Rector Universitas Gadjah Mada, Invited Speakers, all of delegates, distinguished guests, participants, ladies and gentlemen.

First of all, it is our great pleasure and honor to extend a warm welcome to all of you at The 7th International Seminar on Tropical Animal Production (ISTAP), which be held on September 12 - 14, 2017 at Auditorium Drh. R. Soepardjo, Universitas Gadjah Mada, Yogyakarta, Indonesia. This seminar is proudly organized by Faculty of Animal Science Universitas Gadjah Mada, every 4 years since 1994. But, since last two years (2017) ISTAP has been conducting for every two years in collaboration with the Indonesian Society for Sustainable Tropical Animal Production (ISSTAP). We consider due to the rapid development of science and technology in animal production and also the need for exchange knowledge and experiences among the stakeholders, this scientific event is conducted for every two years.

The contribution of this seminar to the development of national food security is truly significant for introducing of new scientific knowledge and equipment that is much needed in Indonesia to maintain a safe and secure environment and to look at more effective ways to meet and anticipate the future challenges. We can see great enthusiasm of the entire participant to present their latest research finding as well as to share valuable information and knowledge for human prosperity all over the world.

In these 3 days of seminar, we have invited some important distinguished speakers for the plenary session and invited papers relevant to the animal production challenges for sharing their valuable information and knowledge. Other participants from over 11 different countries and from research institute and/or universities can deliver their precious research through oral and poster presentations at concurrent sessions.

At this opportunity, we would like to express our special thank you to the Steering Committee, Scientific Committee, Reviewers and Editorial Boards for their great contribution to make the seminar a great success. Also, we would like to congratulate and deliver high appreciation to the Organizing Committee as the organizer for their great contribution and generous efforts to make the seminar successfully organized. We are really indebt to your valuable time, effort and sacrifice to the success of this seminar.

To all of the participants, I do hope this seminar will enrich you with the new perspective of recent knowledge and of course with new friends for possible future partnership and collaboration in fostering the advancement of animal science. Also, I wish to all of the participants having a great achievement of success and fulfill the expectation as well as enjoying the interaction with all participants. Surely, with all of our hospitality, we have been trying our best to make your brief visit to our country become a wonderful and memorable moments. We are looking forward to meeting you in the future event.

Finally, we wish you all a very pleasant and most enjoyable stay in Yogyakarta, Indonesia, beside you scientific journeys.

Thank you very much for your attention, *Terima kasih, Wassalamu'alaikum Wr. Wb.*

Yogyakarta, 12 September 2017

Sincerely yours,

Prof. Dr. Ali Agus
Dean Faculty of Animal Science UGM

OPENING REMARKS

Dear Excellencies, Distinguished Delegates, Ladies and Gentlemen,

It gives me great pleasure to extend you all a very warm welcome on behalf of Universitas Gadjah Mada. We highly appreciate your participation in joining the 7th International Seminar on Tropical Animal Production hosted by the Faculty of Animal Science Universitas Gadjah Mada in Yogyakarta from 12-14 September 2017.

The theme of this conference is Contribution of Livestock Production on Food Sovereignty in Tropical Countries. We hope that this seminar will provide a perspective and insight into tropical livestock production systems and sustainable local resources management contribution in food sovereignty, also give a forum in order to exchange information and ideas on livestock production systems in the tropics and its related problems.

Food Sovereignty is a comprehensive concept which involves not only guaranteed access to food, but also to define their own food compatible with local resource potentials which may ensure food appropriateness and sufficiency. In the Livestock Production, Indonesia and other tropical countries have a variety number of livestock genetic resources and animal biodiversity. Those can be potential assets and capital to gain advantages in domestic and global market. However, achieving food sovereignty need a synergy to work together among government, people, farmer, researcher, and academia. These three days seminar denote those synergy among stakeholders in food sovereignty. We believe that challenges to realize the food sovereignty in tropical countries will be discussed; and technical solution as well as recommendation will be provided to solve the existing problems in tropical animal production.

Finally, on behalf of Universitas Gadjah Mada, we would like to congratulate and appreciate to the Faculty of Animal Science, UGM as the organizer for their great efforts to make the seminar successfully organized. To all of participants, I wish all of you have a very fruitful, dynamic and constructive seminar also great discussion and interaction with other scientists participating in the seminar as well as enjoying your time in Yogyakarta.

Thank you

Rector of Universitas Gadjah Mada
Prof. Ir. Panut Mulyono, M.Eng.,D.Eng

24930- 50097- 3-SM	Sensitivity and Specificity of ELISA Using Excretory/Secretory of <i>Fasciola Gigantica</i> for Detection Fasciolosis in Cattle Ima Malawati, Made Sriasih and Djoko Kisworo	655-659
28130- 62398- 1-SM	The Performance of Characteristics Morphological from Murung Panggang Chicken Tatan Kostaman and Soni Sopiyan	660-664
24738- 49435- 1-SM	Association of GH <i>MspI</i> and GHRH <i>HaeIII</i> Genes with Milk Components of HF Dairy Cows under an Intensive Management in West Java Anggraeni, A, D. Widyaningrum, A.O. Rini and S.A. Asmarasari	665-669
24679- 49225- 1-SM	Phenotypic Characterization of Angus Grade - Black Cattle from Sragen District Adinata Y., Aryogi, N. H. Krishna, and L. Affandhy	670-674
24958- 50167- 1-SM	Phenotypic Characteristics of Doro Ncanga Swamp Buffalo Reared Extensively on the Native Savannah of Tambora Dompu Regency Husni, C. Arman, and Maskur	675-680
23709- 46662- 1-SM	Phylogenetic Tree Analysis for Ongole Grade (Kebumen cattle) Based on Partial SRY Gene Tety Hartatik, Dwi Nur Happy Hariyono, Galuh Adi Insani, Sumadi, Dyah Maharani, and Jafendi Hasoloan Purba Sidadolog	681-685
24634- 62402- 1-SP	Intercorrelation of Cow Length Pregnancy, Birth Weight and Sex Ratio of Calves in Madura Cattle Jauhari Efendy and Peni Wahyu Prihandini	686-690
24624- 62401- 1-SP	Identification Single Nucleotide Polimorphism of Melanocortin 4 Receptor Gene in Madura Cattle Prihandini P.W., Sumadi, I Gede Suparta BS and Dyah Maharani	691-695
27439- 59326- 1-SM	Proportion and Quality of X-Y Chromosome Bearing Sperm on Diluted Semen After Incubation in Different Time of Etawah Crossbreed Goat Nurcholidah Solihati, Siti Darodjah Rasad and Annisa Yusrina	696-701
24827- 49715- 1-SM	Genetic Variation of Muscovy Ducks MC1R Gene in a Different Feather Colors Population Ismoyowati, Purwantini D, Tugiyanti E, and Awalludin AN	702-707
24879- 49889- 1-SM	Effect of Parity and Lactation Stage on Physico-Chemical Properties of Anglo Nubian X Etawah Grade Goat Milk Lisa Praharani, Rantan Krisnan and Angga Ardhathi Rani Hapsari	708-713

Phenotypic Characteristics Of Doro Ncanga Swamp Buffalo Reared Extensively on the Native Savannah of Tambora Dompu Regency

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ABSTRACT

Phenotypic characteristics are important in breed identification and classification. This study was undertaken to characterized phenotypically Doro Ncanga swamp buffalo on the native savannah of Mt. Tambora. A total of 3 measurements, i.e. body length (BL), height at withers (HW) and heart girth (HG) were collected on 693 female and 279 male buffaloes kept extensively in Manggelewa, Kempo and Dompu District, Dompu Regency. The data were classified on the basis of age group and sex. The morphometric characteristics observed in the present study suggested that for female buffaloes: no significant different ($p>0.05$) of BL, HW and HG of calves in the three districts was observed. The BL of heifers in Dompu was longer ($p>0.05$) than that in Kempo. Similarly for cows, BL recorded in Manggelewa was longer ($p>0.05$) than that in Dompu. However, the differences in HW for cows reared in all districts were not significant ($p>0.05$). Except for HG, cows in Manggelewa were greater than that of Kempo and Dompu ($p<0.05$). Measurements of BL, HW, HG in both old and aged cows did not indicate any significant differences ($p>0.05$) among the three locations. For male buffaloes, the study recorded that BL and HW in calves were found to be non significant ($p>0.05$). Conversely, HG of calves in Dompu was greater ($p<0.05$) than that in Kempo and Manggelewa; the differences in HG in the two latter districts were also significant ($p<0.05$). In the case of young bulls, BL noted in Manggelewa was significantly ($p<0.05$) longer than in Dompu. The study also found higher ($p<0.05$) HW of young bulls in Kempo and Manggelewa than that in Dompu. In conclusion, the parameters examined varied both across the age groups and locations. It seems that the more age of the animals the greater their body size.

Keywords: Swamp buffalo, Characterization, Morphometric Measurements

INTRODUCTION

Doro Ncanga swamp buffalo plays an important role in the agricultural economy of Dompu Regency. This domestic buffalo raised by farmers in primarily for meat, while milk being of secondary importance. This breed is native and well adapted on the native savanna of mountainous Tambora in Sumbawa island, West Nusa Tenggara Province. Increasing meat production from Doro Ncanga swamp buffalo might be achieved by producing calves and increasing their growth performance. The first objective can be obtained by increasing dam productivity through regular calving rate, whereas the second one requires enhancement of the growth potential and survival of calves.

Potential growth performance of animals can be predicted through knowledge on phenotypic or morphometric characteristics of the body which is important in breed

identification and classification. In addition, body measurements have been used to evaluate breed performance and characterize various types of ruminants (Tariq *et al.*, 2013). Morphometric measurements are simple and easy to conduct, and allow estimating the animal's BW with reasonable accuracy (Sowande and Sobola, 2008). Although the technique is simple to perform, it is subjective and requires expertise; moreover, it is influenced by feeding regime and parity (Roche *et al.*, 2009). Tariq *et al.* (2013) reported that body weight (BW) of Nili-Ravi buffaloes can be predicted by reliable method using body measurements. While according to Franco *et al.* (2017), the main body measurements used to predict the weight of dairy cattle among others are heart girth, wither height, and body length.

There is no published data on the morphometric characteristics including body length (BL), height at withers (HW) and heart girth (HG) in Doro Ncanga swamp buffalo. Therefore, the objective of the present investigation was to obtain these linear body measurements in this breed.

MATERIALS AND METHODS

Data on Doro Ncanga swamp buffalo collected at three different district, namely Manggelewa, Kempo and Dompu District, Dompu Regency from from 16 July 2015 to 16 March 2016. This study was conducted using experimental and survey methods. This data included morphometric characteristics (BL, HW, and HG). Data which were available for analysis included 693 female and 279 male buffaloes. For females, data were divided into five age groups (0-6 months = G1; 7-12 months = G2; 13-24 months = G3; 25-36 months = G4; >36 months = G5). For males, data were divided into two age groups (0-6 months = G1; 7-12 months = G2).

A cloth tape measure was used for heart girth (HG) measurement. Body length (BL) and height at withers (HW) measurements were obtained with a metric measuring stick. The measurements were carried out on the animals in a 'forced station', with anterior and posterior members perpendicular on a flat floor, forming a rectangular parallelogram support base. Recorded data were subjected to simple arithmetic means analysis using the Statistical Package for Social Sciences version 17.0 (SPSS Inc. 2007).

RESULTS AND DISCUSSION

The means and standard deviations for BL, HW and HG of Doro Ncanga female buffaloes with different age groups are presented in Table 1. The morphometric characteristics observed in the present study suggested that no significant different ($p>0.05$) of BL, HW and HG in G1 in the three districts was observed. The BL of G2 in Dompu was longer ($p>0.05$; $130,25 \pm 2,63$ cm) than that in Kempo ($117,00 \pm 2,43$ cm). Similarly for G3, BL recorded in Manggelewa was longer ($p>0.05$; $130,73 \pm 1,04$ cm) than that in Dompu ($122,55 \pm 2,97$ cm).

However, the differences in HW for G3 reared in all districts were not significant ($p>0.05$). Except for HG, G3 in Manggelewa ($173,33 \pm 2,54$ cm) were greater than that of Kempo ($158,10 \pm 5,09$ cm) and Dompu ($122,55 \pm 2,97$ cm) ($p<0.05$). Measurements of BL, HW, HG in both G4 and G5 did not indicate any significant differences ($p>0.05$) among the three locations.

Table 1. Means with standard deviations ($\bar{x}\pm SD$) of different traits in Doro Ncanga female buffaloes with different age groups (N=693).

Age Group (month)	Traits (cm)	District			Regency
		Manggelewa	Kempo	Dompu	Dompu
0-6 / G1 n=165	BL	76,52 ±10,58	86,05 ±6,63	76,17 ±11,40	80,25 ±5,37
	HW	98,05 ±10,79	88,05 ±6,90	86,42 ±14,82	91,51 ±5,84
	HG	91,38 ±10,07	112,50 ±8,87	113,92 ±10,99	104,75 ±5,83
7-12 / G2 n=132	BL	123,84 ± 1,78	117,00 ± 2,43	130,25 ± 2,63	122,09 ± 1,45
	HW	125,44 ± 4,97	108,87 ± 3,66	107,50 ± 6,75	118,16 ± 3,35
	HG	151,12 ± 6,01	150,80 ± 7,81	171,00 ± 5,77	152,82 ± 4,38
13-24 / G3 n=243	BL	130,73 ± 1,04	126,10 ± 1,97	122,55 ± 2,97	127,51 ± 1,08
	HW	118,58 ± 1,03	113,86 ± 1,49	119,75 ± 5,05	117,64 ± 1,40
	HG	173,33 ± 2,54	158,10 ± 5,09	150,65 ± 5,05	163,78 ± 2,44
25-36 / G4 n=117	BL	132,14 ± 3,23	130,40 ± 2,52	121,50 ± 3,13	125,69 ± 2,08
	HW	114,86 ± 1,70	124,70 ± 5,84	128,45 ± 12,27	125,05 ± 7,05
	HG	170,86 ± 3,80	175,60 ± 3,39	155,45 ± 16,53	163,38 ± 9,41
>36 / G5 n=36	BL	133,67 ± 4,30	137,00 ± 5,13	131,00 ± 9,45	133,83 ± 3,14
	HW	117,50 ± 2,05	121,67 ± 2,40	126,33 ± 44,51	120,75 ± 9,62
	HG	170,00 ± 12,43	158,00 ± 29,55	126,33 ± 44,51	156,08 ± 13,92

Abbreviations:

BL=body length

HW=height at withers

HG=heart girth

The mean values of BL (125,69±2,08 cm), HW (125,05±7,05 cm) and HG (163,38±9,41) in Doro Ncanga female buffaloes aged 25-36 months noted in Dompu Regency are higher than mean values of 109,8±12,2, 110,6±10,1 cm and 139,1±17,2 cm reported for Nilli-Ravi buffaloes dairy aged 12-36 months, respectively (Tariq *et al.*, 2013). These differences in body measurements might have been due to differences in management, nutritional, animal numbers as well as in breed of the animals.

The means and standard deviations for BL, HW and HG of Doro Ncanga male buffaloes with different age groups are presented in Table 2. The study recorded that BL and HW in G1 were found to be non significant ($p>0.05$). Conversely, HG of G1 in Dompu (130,64 ± 5,56 cm) was greater ($p<0.05$) than that in Kempo (98,79 ± 3,22 cm) and Manggelewa (81,67 ± 2,43 cm); the differences in HG in the two latter districts were also significant ($p<0.05$). In the case of G2, BL noted in Manggelewa (115,13 ± 2,82 cm) was significantly ($p<0.05$) longer than in Dompu (99,00 ± 2,95 cm). The study also found higher ($p<0.05$) HW of G2 in Kempo (128,38 ± 7,32 cm) and Manggelewa (125,67 ± 4,86 cm) than that in Dompu (101,69 ± 2,90 cm).

In the present study live body measurements of BL, HW and HG for female calves (G1) tended to increase with ages until the cow reached >36 months (G5). Similar tendency was also revealed in male calves (G1) to young calves (G2). This reflected the increase in body muscles, size and skeleton of the animals during growth and development processes. In the current study, no Doro Ncanga male buffaloes was obtained beyond 12 months of age. This is likely that mature bulls were very rare, if not unavailable in the field to be used for natural mating to breeding females.

Table 2. Means with standard deviations ($\bar{x}\pm SD$) of different traits in Doro Ncanga male buffaloes with different age groups (N=279).

Age Group (month)	Traits (cm)	District			Regency
		Manggelewa	Kempo	Dompu	Dompu
0-6 / G1 n=144	BL	84,50 ± 3,94	88,00 ± 7,12	80,45 ± 2,11	84,96 ± 3,19
	HW	91,72 ± 5,30	86,84 ± 6,88	89,27 ± 4,01	89,23 ± 3,44
	HG	81,67 ± 2,43	98,79 ± 3,22	130,64 ± 5,56	99,67 ± 3,34
7-12 / G2 n=135	BL	115,13 ± 2,82	105,63 ± 3,91	99,00 ± 2,95	108,78 ± 2,12
	HW	125,67 ± 4,86	128,38 ± 7,32	101,69 ± 2,90	119,22 ± 3,41
	HG	150,67 ± 34,03	113,75 ± 7,67	118,92 ± 8,46	134,93 ± 18,35

CONCLUSIONS

In conclusion, the parameters (traits) examined in Doro Ncanga female and female swamp buffaloes varied both across the age groups and locations. It seems that the more age of the animals the greater their body size. Body measurements especially heart girth can be used to predict live body weight of female and male buffaloes.

ACKNOWLEDGMENTS

The authors thank all Livestock Services Office Dompu Regency staff especially to Mr. Jakaria, who has assisted in coordinating and preparing the experimental herds and in data collection.

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