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PROCEEDING



THE THIRD INTERNATIONAL SEMINAR ON ANIMAL INDUSTRY **“Sustainable Animal Production for Better Human Welfare and Environment”**

September, 17-18 2015
IPB International Convention Center
Bogor-Indonesia



Organized by:



Sponsored by:



FACULTY OF ANIMAL SCIENCE
BOGOR AGRICULTURAL UNIVERSITY
2015

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Proceeding of the 3rd International Seminar on Animal Industry,
Bogor, 17-18 September 2015

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FOREWORD FROM CHAIRPERSON OF ORGANIZING COMMITTEE

Distinguished,

Rector of Bogor Agricultural University, Prof. Dr.Ir. Herry Suhardiyanto, M.Sc.

Director General of Livestock Services and Animal Health, Ministry of Agriculture, Republic of Indonesia, Prof. Dr. Ir. Muladno, MSA.

Dean of Animal Science Faculty, Bogor Agricultural University, Prof Dr Luki Abdullah M.Agr.Sc.

All participants of the International Seminar on Animal Industry 2015

Good morning ladies and gentlemen,

It is my great pleasure to welcome you all, distinguished guests, speakers and participants, to the Third International Seminar on Animal Industry (ISAI 3rd, 2015) held at the IPB International Convention Center, Bogor Indonesia. This seminar with the theme **“Sustainable Animal Production for Better Human Welfare and Environment”** is organized by Faculty of Animal Science, Bogor Agricultural University in collaboration with Association of Indonesia Animal Scientists.

Following the recommendations from Isai 1 and Isai 2, which were held in Indonesia in 2009 and 2012, the strategic issues of Isai 3rd is emphasized on animal production systems and technology and the use of natural resources in relation with environmental aspects, toward a sustainable animal production. There will be 97 papers presented during the two days seminar; 9 by invited speakers, 69 for oral and 28 for posters presentations. The speakers came from different countries including Australia, Egypt, France, Korea, German, Netherland, Indonesia, Malaysia, Nigeria, Pakistan, Thailand, USA.

This is a great opportunity for scientists, researchers, private sectors and policy makers to discuss, share information and experiences on interesting topics in animal production in a broad sense, including good farming practices, recent technologies and save animal products. I believe, there is an open window for initiating and strengthening collaboration among scientists and institutions during and after the seminar.

On behalf of the Organizing Committee, I would like to express my sincere appreciation and thanks to IPB, and some units within, including Institute of Research and Community Empowerment, Faculty of Animal Science, Department of Animal Production and Technology, Department of Nutrition and Feed Technology, Diploma Program, Management and Business Program for all advice and funding support.

The success of this seminar could only be achieved with all the valuable supports and sponsorship from some recognized institutions in this country. In this regards, I would like to address my grateful thanks to Directorate General of Livestock Services and Animal Health-Indonesia Ministry of Agriculture for funding support, and Infovet and Trobos, Green TV as promotion agency. To: Sierad Produce, Kaltim Prima Coal, BRIngin Life, Adaro Indonesia, Trouw Nutrition Indonesia, Nutricell Pasific, Sweni Transfer Indonesia, Charoen Phokphand, Wide & Pin, Pupuk Kujang, and ANTAM thank you so much with big appreciation, for having being part of this important event and such enormous contributions.

My recognition and gratitude are also forwarded to the Steering Committee for advice and assistanship, to international and national reviewers and the Scientific Committee for hard working and such great contribution. Last but not least, to all my dear colleagues of the Organizing Committee members, who have been working smartly and full of dedication and passion, to make this seminar a great successful event.

To all participants, hopefully, the two days seminar may bring fresh ideas, and enhancing collaborations for future success toward sustainable animal production. Big apologies for any inconveniences during the seminar, wish you all having good times, and fruitful discussions.

During your short stay, please enjoy the surrounding of Bogor city, the Museum of Presidential Palace a Historical Botanical Garden of Bogor.

Bogor, September 17th, 2015

The Isai 3rd 2015,

Chairperson of Oraganizing Committee

Asnath M. Fuah

REMARKS FROM DEAN OF ANIMAL SCIENCE FACULTY

Prof. Dr. Muladno, MSA

Director General of Livestock and Animal Health-Ministry of Agriculture Republic of Indonesia,

Prof. Dr. Ir. Herry Suhardiyanto, M.Sc.

Rector of IPB

Dr. Ir. Asnath Maria Fuah

Chairperson, The 3rd International Seminar on Animal Industry

Our Colleagues from Indonesian universities and research institutes,

Distinguished foreign participants and speakers,

Representative of livestock services officers of local government from all over Indonesia,

Distinguished guests, ladies and gentlemen.

Assalamu'alaikum warahmatullaahi wabarakatuh,

I am pleased to welcome you all to Bogor city for attending "The 3rd International Seminar on Animal Industry 2015" held at Faculty of Animal Science, Bogor Agricultural University (IPB). As the Dean of Faculty, I am also really honored to host this conference.

First, let me introduce briefly about Bogor city. Bogor is one of the major scientific and educational centers in Indonesia. A significant part of academic and research base was laid in the period of Dutch colonization. In particular, since the beginning of the 19th century there were established laboratories and professional schools focused primarily on improving the efficiency of the colonial agriculture. Similar to the prevailing profile of research and academic activity was retained in Bogor after gaining independence. As in the second half of 20th century, and in the 2000s strongest areas were Agricultural sciences, Biology, Animal and Veterinary Sciences. The main educational and scientific center with the utmost national importance is the Bogor Agricultural University (IPB). It is therefore the city regularly hosted various international events, such as international seminars and conferences.

I would like to express my gratitude to IPB for supporting us to hold this conference, and also to the organizing committee of the present conference for their hard work and persistence. I convey my sincere gratitude to all the parties which is supporting this event, such as Directorate General of Livestock and Animal Health-Ministry of Agriculture Republic of Indonesia, Infovet Trobos, Agrina, Green TV as promotion agency and Sierad Produce, Kaltim Prima Coal, BRIngin Life, Adaro Indonesia, Trouw Nutrition Indonesia, Nutricell Pasific, Sweni Transfer Indonesia, Charoen Phokphand, Wide & Pin, Pupuk Kujang, and ANTAM thank you so much with big appreciation, for having being part of this important event and such enormous contributions. I am very pleased to see here the delegates from various foreign countries as well as representatives from many domestic institutions.

I hope you find this conference and the city, both interesting and stimulating and that you enjoy meeting up with your professional colleagues as well as having pleasure time during your stay in Bogor.

Thank you very much and

Wassalamu'alaikum warahmatullaahi wabarakaatuhu.

Bogor, 17 September 2015

Prof. Dr. Ir. Luki Abdullah, MSc.Agr

DEAN

SEMINAR PROGRAM

Conference Program

Thursday, September 17, 2015

Time Slot	Activity	Organizer / Speaker
08.00-09.00	Registration	Committee
09.00-09.05	Opening Ceremony	Master of Ceremony
09.05-09.15	Report from Organizing Committee	Dr. Ir. Asnath M.Fuah, MS
09.15-09.25	Welcome Address from Dean Faculty of Animal Science	Prof. Dr. Ir. Luki Abdullah, M.Sc.Agr.
09.25-09.35	Welcome Address from Rector of Bogor Agricultural University	Prof. Dr. Ir. Herry Suhardiyanto, M.Sc
09.35-10.00	Opening and Keynote Speech by Ministry of Agriculture / Directorate General of Livestock and Health Services	Prof. Dr. Ir. Muladno, MSA
10.00-10.05	Appreciation for Keynote Speakers from Dean Faculty of Animal Science	Prof. Dr. Ir. Luki Abdullah, M.Sc.Agr.
10.05-10.20	Sponsorship Appreciation from Chairman of Organizing Committee	Dr. Ir. Asnath M.Fuah, MS.
10.20-10.25	Photo session	Photographer
10.25-10.40	Coffee break	
	Plenary Session 1 <i>Moderator: Prof. Dr. Ir. Komang G. Wiryawan</i>	
10.40-11.00	Invited speaker 1	Prof. Dr. Ir. Bas. Kemp Preserving Health, Welfare and Productivity in a Challenging Environment
11.00-11.20	Invited speaker 2	Dr. Jean Pierre Bidanel Genomic Selection for More Sustainable Livestock Production
11.20-11.40	Invited speaker 3	Ir. Yunus Triyonggo, MM Building Human Resources Competency Model in Poultry Industry
11.40-12.00	Discussion	
12.00-12.05	Invited Speaker Appreciation from Scientific Committee	Prof. Dr. Ir. Dewi Apri Astuti, MS.
12.05-12.15	Sponsorship Appreciation from Vice Dean Faculty of Animal Science	Dr. Ir. Moh. Yamin, M.Agr.Sc.
12.15-12.25	Student Plenary	
12.25-13.20	Lunch	
13.20-13.50	Poster session	

Time	Room A (Theme D)	Room B (Theme B and C)
Session 1	Moderator : Dr. Rajesh Jha	Moderator : Ummi Noorhakimah
14.00-14.10	Thongsuk Jetana Rain Tree Pod in Livestock Feeds: Opportunity, Challenges and Possibility	Yeni Widiawati Fermentation Kinetics Of Palm Oil Plantation By-Product Based Diet
14.10-14.20	Supriyati Kompiani Effect of Different Protein and Energy Levels in Concentrate Diets on Performances of Anglo-Nubian Goat During Pregnancy and Lactation Periods	Ainissya Fitri Utilization Of Haylage Of Local Agro- Industry By product Pretreated With Afex Method
14.20-14.30	Rusdi Evaluation of Eleutherine (<i>Eleutherine americana</i>) as Feed Additive for Poultry	H. A. Sukria Physical Quality And Storage Time Pellet Indigofera Spleaves
14.30-14.40	Discussion	Discussion
Session 2	Moderator : Thongsuk Jetana	Moderator : Imana Martaguri
14.45-14.55	Utsav Prakash Tiwari Nutrient Profile And In Vitro Digestibility Of Fresh And Ensiled Cassava In Swine	Moh Ali Hamdan Potential Of Dwarf Elephant Grass (<i>Pennisetum Purpureum</i> Schum. Cv. Mott) In Dry Land Areas Of Bojonegoro As Forage- Based Feed Sustainability
14.55-15.05	Alif Putri Effect of Combination Silkworm Pupae Meal and Garlic Meal on Blood Profiles, Visceral Organs and Carcass Broiler	Rido Pande Pardede Development Of Indigofera Zoolingeriana And Pueraria Javanica On Dry Land Integrated With Teak Forest In Bojonegoro
15.05-15.15	Burhanudin Sundu The effect of NaOH Concentrations and Polysaccharides Extract of Palm Kernel Meal on Performance of 4 Weeks Old-Broiler Chickens	Malcky Telleng Growth and Productivity of Different Sorghum Varieties Cultivated with Indigofera in Intercropping System
15.15-15.25	Discussion	Discussion
15.25-15.40	Coffee break	
Session 3	Moderator : Anis Muktiani	Moderator : Lisa T. Praharani
15.40-15.50	Muhamad Nasir Rofiq Combination Effect of Nutritech Feed Additive Containing Saponin, Tanin and Eugenol Essential oils on In Vivo Rumen Methane Production in Dairy Cattle Using Open Circuit Respiration Chamber Technique	Imana Martaguri Carbon Storage Capacity of Forage Native Grasses Growing in Palm Plantation at Transformation Forest Ecosystem in Jambi
15.50-16.00	Dwi Yulistiani Nitrogen Utilization and Ruminant Fermentation of Five Breed of Sheep Fed Concentrate Containing Different Levels of Rumen Undegradable Protein	I Gusti Ngurah Jelantik Herbage Production and Nutritive Value of Some Forage Legumes as Calf Feed Supplement
16.00-16.10	Sutresniwati A Willingness to Pay Evaluation for Silage Implementation for Small Dairy Farmers	Riesi Sriagtula Evaluation of Growth and Production of Sorghum Lines (Sorghum Brown Midrib) at Different of Harvest Time as Feed
16.10-16.20	Discussion	Discussion
Session 4	Moderator : Rusdi	Moderator: Veronica
16.25-16.35	Anita S. Tjakradidjaja Fermentability and Digestibility of Rice Straw - Concentrate Base Ration Added with Probiotic	Nur Rochmah Kumalasari Modelling of Forage Availability Response to Landuse Exchange in Bogor

Time	Topic (Theme D)	Topic (Theme E and F)
16.35-16.45	Gusti A. Gultom Effects of Solid or Liquid Probiotic Supplementation on Rumen Microbial Population and Enzyme Activity	Khalil The Diversity and Quality of Forages Used for Feeding of Goat in Payakumbuh of West Sumatra
16.45-16.55	Eissa M. M Effect Of Ammoniated Straw On Methane Production In An In Vitro System And On Growth Performance	P.D.M.H. Karti The Addition of Arbuscular mycorrhizal Fungi in Enhancing Productivity and Drought Tolerance Mechanisms of <i>Indigofera zollingeriana</i>
16.55-17.05	Discussion	Discussion

Session 1	<i>Moderator : Iis Arifiantini</i>
14.00-14.10	Fuah A.M Beef Cattle Production, Constraints and Opportunities for Small Farmers in South Central Timor Regency West Timor
14.10-14.20	S.N. Sirajuddin The Application of Tesang Sharing System at Cattle Farms in Indonesia
14.20-14.30	Niken Ulupi Production Performance of Laying Hen in Cage System with Different Housing Temperature
14.30-14.40	Lucia Cyrilla Evaluation of Good Dairy Farming Practice Implementation in Dairy Goat Farm
14.40-14.50	Discussion
Session 2	<i>Moderator : Prof. Cece Sumantri</i>
14.55-15.05	Lindawati Doloksaribu Constraints to, Challenges of, and Opportunities for Rearing Goats in Bali Province. A case study: Rearing Kids in Karangasem Regency
15.05-15.15	Hearty Salatnaya Trigona Spppropolis, Pollen, And Honey Production In Two Different Agroecosystem
15.15-15.25	Prabowo, S Distribution of Thermal Body Surface Ettawah Grade in Different Tropic Microclimates
15.25-15.35	Bram Brahmantiyo Hycole and Hyla Rabbits Performance were Raised in Indonesia
15.35-15.45	Discussion
15.45-16.00	Coffee break

Welcoming dinner. Venue ICC Ballroom

18.20-19.00	Registration and Dinner (Instrument from Gentra)
19.00-19.05	Opening by Master of Ceremony
19.05-19.15	Speech from Chairman of Committee
19.15-19.25	Speech from Dean of Animal Science Faculty
19.25-20.00	Gentra Kaheman
20.00-20.20	Prof. Singer
20.20-21.20	Spontaneity from Country Representative
21.20	Closing

Time	Event	Speaker
8.00-8.30	Registration	Committee
8.30-8.35	Opening Ceremony	Master of Ceremony
Plenary Session 2 <i>Moderator: Dr. Jean Pierre Bidanel</i>		
8.35-8.55	Invited speaker 1	Prof. Wayne Pitchford Outcomes of Selection for Residual Feed Intake in Australian Beef Cattle
8.55-9.15	Invited speaker 2	Prof. Myunggi Baik Molecular Mechanisms Regulating Beef Quality in Korean Cattle
9.15-9.35	Invited speaker 3	Prof. I Wayan Teguh W. Vaccination and Subclinical Manifestation of Avian Influenza in Indonesia
9.35-9.50	Discussion	
9.50-10.00	Appreciation to Invited Speaker	Prof. Luki Abdullah
10.00-10.10	Coffee Break	
Plenary Session 3 <i>Moderator: Prof. Wayne Pitchford</i>		
10.10-10.30	Invited speaker 1	Dr. Kai J. Kuehlmann The Role of Feed Additive in Animal Industry under Tropical Condition
10.30-10.50	Invited speaker 2	Dr. Anjas Asmara Samsudin Recent Advances in Gut Microbiology Research in Relation to Animal Nutrition
10.50-11.10	Invited speaker 3	Prof. Bustanul Arifin Social Economic and Policy in Animal Industry
11.10-11.25	Discussion	
11.25-11.30	Appreciation for Invited Speaker	Prof. Dr. Ir. Sumiati, M.Sc.
11.30-13.20	Lunch and Prayer	
13.20-13.50	Poster session	

Time	Room A (Theme D and C)	Room B (Theme E and D)
Session 5	Moderator: Sutresniwati	
13.50-14.00	Sumiati Effect of drinking gambir extract (<i>Uncaria gambir Roxb</i>) as Antioxidant on Performance of 40-43 Weeks Old of Laying Hens	Rudi Afnan Weight Loss And Mortality Of Broiler During Transportation From Different Distances To Slaughterhouse
14.00-14.10	Muktiani, A Live Weight Gain of Beef Cattle Fed on Complete Feed Silage of Water Hyacinth Supplemented with Mineral Zinc-Proteinate	Hajrawati Meat Quality Of Marica Goat (<i>Capra Hircus</i>) Meat Fed Different Protein Level
14.10-14.20	Putri O. N The Effect of Adding Fermented Waste Cabbage in Calf Starter Pellets on Total Lactic Acid Bacteria And <i>Escherichia coli</i>	Suharyanto Skim Milk Powder Substitution With Soymilk Powder Could Improve Physical Properties Of Beef Surimi-Based Sausage
14.20-14.30	Discussion	Discussion
Session 6	Moderator : Prof. Khalil.	
14.35-14.45	Ninasari Ra Substitution of Fish Meal by Cricket or Indigofera Shoot Leaf Meal on Japanese Quail (<i>Coturnix japonica</i>) Performance	Lilis Suryaningsih Effects Of Local Flour Types On Physical Properties And Acceptability Of Beef Sausage

Time	Room A (Theme D and G)	Room B (Theme F and J)
14.45-14.55	Tresia G.E Benefit of Kemuning Leaves Meal (<i>Murraya paniculata</i> [L.] Jack) Addition in Ration Containing Date Fruit Waste to Suppress Gastrointestinal Parasites Infestation of PE Goat	Soenarno Ms Characteristic Of Lactic Acid Bacteria Isolated From Dangke From Sinjai, South Sulawesi
14.55-15.10	Sri Suharti Rumen Microbe, Protein Microbial Synthesis, Cellulase Activity and Nutrient Digestibility of Bali Cattle Rumen with the Addition of Calcium Soap-Soybean Oil In vitro	M. Aman Yaman Increase on Commercial Weight, Carcass Quality and Economic Benefit of Selected Local Meat Chicken Fed on Fermented Diet Contained Digestive Enzymes and Probiotics
15.10-15.15	Discussion	Discussion
15.15-15.30	Coffee break	
Session 7	Moderator : Dr. Lindawati Doloksaribu	Moderator : Dr. Asnath Maria Fuah
15.30-15.40	G. F. Bira Incremental Level Of Chromolaena Odorata In Complete Diet Does Not Impair Intake, Rumen Fermentation And Microbial Protein Synthesis Efficiency In Cattle	Salina A.B An Analysis Of Cattle Traders Practices On Animal Traceability In Malaysia
15.40-15.50	Arini NMJ Substitution Of Fish Meal By Cricket Or Indigoferasp Shoot Leaf Meal To Evaluate Protein Balance Of Japanese Quail (<i>Coturnix Japonica</i>)	Hotnida C H Siregar Effect Of Moisture Reduction Method, Storage Period And Temperature On Honey Quality
15.50-16.00	Mokhamad Faesal R. Hakim Feeding Ecology of Sumatran Orangutan (<i>Pongo abelii</i> , Lesson 1827) in West Batang Toru Forest Block, North Sumatra	Iman Rahayu Biodiversity Based On Fatty Acid And Amino Acid Profile Of Indonesian Local Chickens
16.00-16.10	Discussion	Discussion
Session 8	Moderator : Mokhamad Faesal Rakhman Khakim	Moderator : Dr. Burhanudin Sundu
16.15-16.25	D. Latipudin Level Of Malondialdehyde (Mda), Uric Acid And Lymphocyte: Neutrophil Ratio Of Laying Hen In The Different Temperature Humidity Index (Thi)	I M. A. Sudarma Weight Loss Of Inter-Island Transported Cattle From Kupang Is Reduced By Feeding High Protein-Mineral Mix Block During Quarantine And Sea Transportation
16.25-16.35	Windi Al Zahra The Using Of Thermograph As Non-Invasive Method To Observe Subclinical Mastitis In Tropical Dairy Cattle	Ummi Noorhakimah Abdullah Cattle Importation And The Trend Of Fmd Occurrence In Peninsular Malaysia From 2000-2010
16.35-16.45	A. Sudarman Physiological Responses And Blood Profiles Of Sheep Fed Cassava Leaves Silage (<i>Manihot Esculenta</i> Sp.) Reared Traditionally In Petir Village	Moh Yamin Harmony Between Livestock Behaviors: Birth Time and Sites Selection Behaviors in Sheep and Goats
16.45-17.00	Discussion	Erika B Laconi Strategy of Beef Cattle Development Based on Agricultural Product in Kuningan District, West Java
17.00-17.10		Discussion

Time	Ballroom (Theme V and J)
Session 5	Moderator : Anneke Anggraeni
13.50-14.00	Surya Nur Rahmatullah Phenotypic Variation In Male Local Chicken At Tapin Regency Using Significant Analysis
14.00-14.10	Parsaoran Silalahi Effects Of Selection On The Efficiency And Variability Of Sow Reproduction And Maternal Abilities
14.10-14.20	Oktora Dwi Putranti Effect Of Caffeine On Morfology Of Epididymis Spermatozoa Of Bali Bull
14.20-14.30	Discussion
Season 6	Moderator : Ir Anita S.T. MRur.Sc
14.35-14.45	Lisa Praharani Comparisson of Anglo Nubian X Etawah Grade Goats And Saanen X Etawah Grade Goats For Some Reproductive Traits
14.45-15.00	Maria Haryulin Astuti Service Per Conception In Beef Cattle With Artificial Insemination In Kapuas Basarang District of Central Kalimantan
15.00-15.10	Anneke Anggraeni Association Of Growth Hormone (Gh MspI) And Growth Hormone Releasing Hormone (Ghrh HaeIII) Genes With Milk Components Of Hf Cows Under Small Farmers In Lembang, West Java
15.10-15.20	Discussion
15.20-15.30	Coffee break
Season 7	Moderator : Dr. Epi Taufik
15.30-15.40	R.Iis Arifiantini Hypoosmotic Test In Rabbit Spermatozoa
15.40-15.50	Nalley Wmm Effect Of Freezing On Bovine Sperm Morphology
15.50-16.00	Tuty L Yusuf Determination of Soy Extract Concentration In Tris Buffer of Frisian Holstein Chilled Semen
16.00-16.10	Discussion
Season 8	Moderator : Surya Nur Rahmatullah
16.15-16.25	S. Rusdiana Estimated Value of Live Buffalo Prices In The Economic Analysis Of The Income of Farmers In The Village
16.25-16.35	Aslina Asnawi Financing Preferences For Cattle Farmers In Bone Regency South Sulawesi
16.35-16.45	Sumarti T Women, Gender Equality In Livestock Development: Case Study From Papua and Central Java
16.45-16.55	Discussion

Closing Ceremony, Venue ICC Ballroom

Time Slot	
17.10-17.15	Opening
17.15-17.25	The Best Presenter (Oral and Poster) Announcement
17.25-17.35	Presence of Presents
17.35-17.45	Speech from Representative Invited Speaker: Prof. Wayne Pitchford
17.45-17.55	Speech from Representative Invited Speaker: Thongsuk Jetana
17.55-18.05	Closing Speech from Dean of Animal Science Faculty

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Effect of Freezing on Bovine Sperm Morphology

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Abstract

The evaluation of sperm morphology is an important component of the spermio-gramme and therefore of the andrological evaluation. Cryopreservation processes will reduce sperm motility, acrosome intact, viability as well as sperm morphology. This research aimed to study the effect of cryopreservation to bovine sperm morphology. Six bull consist of two Friesian Holstein (FH), two Simmental and two Limousine belong to Lembang artificial insemination centre were used as a semen source. Semen was collected and processed according to artificial insemination center protocol. Primary sperm morphology evaluate by using bright-field microscopy of carbolfuchsin eosin stained dry-mount semen smears and secondary sperm morphology by phase contrast microscopy of wet-mount semen 'fixed' in isotonic formol-saline. Result demonstrated that Limousine had a lower primary and high secondary sperm abnormality ($p < 0.05$) of raw semen compare to FH and Simmental bulls. Cryopreservation processed increase primary sperm abnormality of Simmental bull and secondary sperm abnormality of FH bull. In total the increasing of sperm abnormal morphology during cryopreservation of three breed were between 1.14 to 1.31%. This research concluded that the cryopreservation processed in Artificial insemination center did not affected on the sperm morphology.

Keywords: frozen semen, morphology, raw semen, sperm abnormality

Introduction

The evaluation of sperm morphology is an important component of the spermio-gramme and therefore of the andrological evaluation (Al-Makhzoomi *et al.*, 2007). Sperm abnormalites were classified as being primary (head abnormalites) or secondary (tail abnormalities), with the underlying assumptions that primary abnormal (considered to be caused during spermatogenesis) were more serious than secondaries (caused after sperm realese from tubuli seminiferi). Morphologically abnormal sperm can reduce rates of fertilization and embryonic development. It has been generally accepted that bull semen classified as satisfactory should contain at least 80% morphologically normal sperm, with no more than 20% of sperm with an abnormal head. Morphologically abnormal sperm can reduce rates of fertilization and embryonic development (Sarder 2004).

Cryopreservation of semen is routinely used in farm animals, this processes will reduce sperm motility, acrosome intact, viability as well as sperm morphology (O'Connell *et al.* 2002). In Human sperm, O'Connell *et al.* (2002) reported freezing did not significant change in the morphologies of head, midpiece and acrosome in general, except morphologic abnormalities of the tail increased significantly. Apu *et al.* (2012) reported a decrease of total sperm abnormality after freezing in goat semen from from 9.14 ± 0.13 to $13.87 \pm 0.38\%$. Since Indonesia has 15 Artificial insemination centre, this research aims to study the effect of cryopreservation to bovine sperm morphology at one of artificial insemination centre in Indonesia.

Materials and Methods

Six bull consist of two Friesian Holstein (FH), two Simmental and two Limousine belong to Lembang artificial insemination centre were used as a semen source. Semen was collected and processed according to artificial insemination center protocol. Primary sperm morphology of fresh and after freezing evaluate by using bright-field microscopy of carbolfuchsin eosin stained dry-mount semen smears and secondary sperm morphology by phase contrast microscopy of wet-mount semen 'fixed' in isotonic formol-saline.

Comparison morphology before and after freezing was analyzed by one tailed Students T test using statistical software. Data are presented as means and standart deviation, $P < 0.05$ was considered significant.

Results and Discussion

In this research nine type of primary sperm abnormality were found in all bulls ie narrow, tapered, pear shaped, abnormal contour, knobbed acrosome (KA) defect, round head, macrocephalus, microcephalus, and detached headin different number of each bulls. About eight secondary sperm abnormality were detected such as distal midpiece reflect (DMPR) abnormality, bowed midpiece, segmental aplasia (SA) mitochondrial, bent principal piece (bent pp), coiled principal piece (coiled pp), abaxial tail, double tail and teratoid forms.

Raw semen (before freezing) of FH bull demonstated $7.09 \pm 1.08\%$ sperm abnormalities, and after freezing secondary sperm abnormalities increased 1.4%, but no deferences was found between raw dan after freezing on the primary sperm abnormalities (Table 1)

Table 1. Sperm abnormalities before and after freezing of FH bull (means \pm SD)

Sperm abnormalities	Before freezing	After freezing
Primary	3.53 ± 0.86	3.66 ± 2.23
Secondary	3.43 ± 1.20^a	4.83 ± 0.59^b
Total abnormalities	7.09 ± 1.08	8.36 ± 0.22
Total normal sperm	92.91 ± 1.87	91.64 ± 2.17

Note: different lower case letters in superscript in the same raw demonstrate significant differences ($P < 0.05$)

Before freezing, Simmental bull demonstated $6.02 \pm 0.61\%$ of sperm abnormalities, and after freezing $7.33 \pm 0.19\%$. Primary sperm abnormalities increased 0.87%, but no deferences was found between raw dan after freezing on the secondary sperm abnormalities (Table 2). The type of primary sperm abnormalities was abnormal countour, this can also caused by staining technique.

Table 2. Sperm abnormalities before and after freezing of Simmental bull (means \pm SD)

Sperm abnormalities	Before freezing	After freezing
Primary	$3.06 \pm 0.62a$	$3.93 \pm 0.74b$
Secondary	2.96 ± 0.69	3.40 ± 0.28
Total abnormalities	6.02 ± 0.61	7.33 ± 0.19
Total normal sperm	93.98 ± 0.84	92.67 ± 0.75

Note: different lower case letters in superscript in the same raw demonstrate significant differences ($P < 0.05$).

No significant diferences found in Limmousine bull before freezing and after freezing with total abnormalities after freezing $8.43 \pm 1.08\%$ (Table 3).

Table 3. Sperm abnormalities before and after freezing of Limmousine bull (means \pm SD)

Sperm abnormalities	Before freezing	After freezing
Primary	2.33 ± 0.60	3.17 ± 1.02
Secondary	4.96 ± 0.63	5.26 ± 0.96
Total abnormalities	7.29 ± 0.79	8.43 ± 1.08
Total normal sperm	92.71 ± 1.04	91.57 ± 1.24

Our results demonstrate that overall the sperm morphologies of FH, Simmental and Limousine before and after freezing catagories as an excellent morphologies. Perhaps all bull included to a concept of 'good freezers', as postulated by Watson (1995). This is an extremely important issue, as many artificial insemination centre in Indonesia routinely cryopreserve bull semen. This research prove that aproprite extender and freezing technique at Lembang artificial Insemination center did not effect on sperm abnormalities. Since there are about 15 artificial insemination centre in Indonesia, with different variation of freezing technique

or choice of extender and sperm abnormalities affected the fertility, further study needed to evaluate the sperm morphology before after freezing in all artificial insemination centre.

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