Sustainable Livestock Production in the Perspective of

Food Security, Policy, Genetic Resources, and Climate Change

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SUSTAINABLE LIVESTOCK PRODUCTION IN THE PRESPECTIVE OF FOOD SECURITY, POLICY, GENETIC RESOURCES, AND CLIMATE CHANGE

PROCEEDINGS

FULL PAPERS

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The 16th AAAP Congress

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AAAP

Asian-Australasian Association of Animal Production Societies

✧ **Scope of AAAP**: AAAP is established to devote for the efficient animal production in the Asian-Australasian region through national, regional, international cooperation and academic conferences.

✧ **Brief History of AAAP**: AAAP was founded in 1980 with 8 charter members representing 8 countries-those are Australia, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines

of representative of each member society are members of the council. The council decides congress venue and many important agenda of AAAP

✧ **Office of AAAP:** Decided by the council to have the permanent office of AAAP in Korea. Currently # 909 Korea Sci &Tech Center Seoul 135-703, Korea

✧ **Official Journal of AAAP**: Asian-Australasian Journal of Animal Sciences (Asian-Aust. J. Anim. Sci. ISSN 1011-2367. http://www.ajas.info) is published monthly with its main office in Korea

✧ **Current 19 Member Societies of AAAP:**

ASAP(Australia)**, BAHA**(Bangladesh), **CAASVM**(China), **IAAP**(India), **ISAS**(Indonesia), **IAAS**(Iran), **JSAS**(Japan), **KSAST**(Korea), **MSAP**(Malaysia), **MLSBA**(Mongolia), **NASA**(Nepal), **NZSAP**(New Zealand), **PAHA**(Pakistan), **PNGSA**(Papua New Guinea), **PSAS**(Philippines), **SLAAP**(Sri Lanka), **CSAS**(Taiwan), **AHAT**(Thailand), **AHAV**(Vietnam).

✧ **Previous Venues of AAAP Animal Science Congress and AAAP Presidents**

I	1980	Malaysia	S. Jalaludin	II	1982	Philippines	V. G. Arganosa
III	1985	Korea	In Kyu Han	IV	1987	New Zealand	A. R. Sykes
V	1990	Taiwan	T. P. Yeh	VI	1992	Thailand	C. Chantalakhana
VII	1994	Indonesia	E. Soetirto	VIII	1996	Japan	T. Morichi
IX	2000	Australia	J. Ternouth	X	2002	India	P. N. Bhat
XI	2004	Malaysia	Z. A. Jelan	XII	2006	Korea	I. K. Paik
XIII	2008	Vietnam	N.V. Thien	XIV	2010	Taiwan	L.C. Hsia
XV	2012	Thailand	C.Kittayachaweng	XVI	2014	Indonesia	Yudi.Guntara.Noor

- AAAP is the equal opportunity organization
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Remark from Chairman of the 16th AAAP Congress

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

As the host of the 16th AAAP Animal Science Congress, we do impress, thankful, and present a high appreciation for your participation in joining the 16th AAAP Conference in Yogyakarta, Indonesia. We can see the very great enthusiasm of all the scientists to solve livestock problems as well as to share valuable information and knowledge for human prosperity all over the world.

A large numbers of representatives are participating in this conference, which indicates that the interest in the field of animal science is continuously increasing among member countries. We have invited some Plenary Speakers and Invited Papers who are qualified as scientists and bureaucrats in animal science field to share their valuable information and knowledge. Other participants can deliver their precious research through oral and poster presentations. This congress is also paralleled to symposium held by livestock organization and institution as well as some academic meetings.

The theme of the 16th AAAP Congress is "Sustainable Livestock Production in the perspective of Food security, Policy, Genetic Resources and Climate Change". We believe that animal production in Asia and Australasia has become important and strategic sector to provide high quality food, opening up job opportunities, as well as improving farmer's welfare. Animal science socities, therefore, have to support this growing interest by providing more appropriate and relevant technologies to improve efficiency of resources utilization to produce more animal protein food by member countries. Long term sustainable livestock production will, therefore, be significantly influenced by the national food policy, climate change issues, as well as conserved environments and genetic resources.

On behalf of 16th AAAP Committee and all associates, we wish all of the participants having a great achievement of success and fulfill the expectation as well as enjoying the interaction with all scientists participating the Congress.

High appreciation we may acknowledge to all of sectors, especially for His Majesty of Royal Palace of Yogyakarta, Sri Sultan Hamengku Buwono X, and Rector of Universitas Gadjah Mada, who have concerned to facilitate the Congress site host. Special thank to the Steering Committee, Scientific Committee, Reviewers and Editorial Boards for their great contribution to make the Congress successfully organized.

To you, your excellencies, invited guests and delegates, thank you for choosing to come to this conference and to Indonesia. We hope the arrangements we have put in place meet with your requirements. We wish you fruitful deliberations and an intellectually and socially rewarding stay in Yogyakarta.

We are looking forward to meeting you all in the future congress to continue.

Terimakasih (Thank you)

Budi Guntoro

Chairman of the 16th AAAP Congress

16th AAAP PRESIDENT'S REPORT

Selamat pagi!

Dear Ladies and Gentleman

Attendants of 16 AAAP congress:

It is my great pleasure and honor to welcome all of you at The 16th AAAP Congress on November 10 – 14, 2014 at Grha Sabha Pramana, Universitas Gadjah Mada, Yogyakarta Indonesia. This Congress is jointly organized by The Indonesian Society of Animal Science (ISAS), Indonesian Agency for Agricultural Research and Development, Indonesian Directorate General of Livestock and Animal Health Services-Ministry of Agriculture and Faculty of Animal Science Universitas Gadjah Mada. Universitas Gadjah Mada Campus is located in Yogyakarta, one of the Special Region in Indonesia where culture and tradition live in harmony with the modern nuance and educational spirit makes it a beautiful venue of this Congress.

The 16th AAAP Program consists of scientific and technical programs as well as social and cultural activities. The scientific and technical programs offer five plenary sessions, two satellite symposia, field trip, and many scientific sessions, both oral and poster presentations.

During this event distinguished scientists from all over the world will present plenary papers ranging from livestock policy, food security, local genetic resources, climate change, animal welfare, international trade, as well as global research agenda. I believe that around 1,200 scientists as well as livestock producers, companies, graduate and postgraduate students from 40 countries are attending the Congress and more than 770 research papers will be presented. The Congress also provides not only opportunities to discuss and exchange information and experience with scientists from different regions of the world, but also a good environment to build up friendship between nations is our ultimate goals for the Congress outcome. Moreover, this congress also keeps its tradition to be a forum of communication among researchers, academician, industries and related stakeholders among Asian-Australasian countries.

The social and cultural programs are specially desgined to be very important for the congress participants since the promotion of friendship and future scientific cooperation are also central to this AAAP Congress. The Opening Ceremony will offer you the Congress Program at a glance. In addition, participants will also join at a warm Welcome Dinner gathering at Keraton Yogyakarta. Sri Sultan Hamengku Buwono X, His Majesty of The Royal Palace of Yogyakarta will give you the most memorable moment during this event.

Moreover, cultural night offers us an opportunity to introduce significant culture from participants' countries and gives a spectacular performance to enjoy in order to strengthen

our friendship and future cooperation. Field trip, on the other hand, provides a wonderful sightseeing to the most valuable ancient heritage around Yogyakarta, such as Borobudur and Prambanan Temples, and more other interesting places to visit. I do hope that you enjoy your stay in Yogyakarta and not miss all of these spectacular opportunities.

Closing Ceremony will be held on November 14, 2014 immediately after the last session of presentation. During this great moment we will welcome the next host of the 17th AAAP Congress to deliver a brief message. The AAAP Congress Award will provide and announce some participant who receive appreciation for their valuable research.

With all of our hospitability, we will try our best to make your brief visit to Yogyakarta and our beautiful country Indonesia, become a wonderful experience and memorable moments.

I wish you all a very pleasant and most enjoyable stay in Yogyakarta, Indonesia.

Terima kasih (Thank you).

Sincerely Yours

Mr. Yudi Guntara Noor

President

The 16th AAAP Congress

PREFACE

The proceedings of the 16th Congress of the Asian-Australasian Association of Animal Production Societies (AAAP) held on 10-14 November 2014 at Grha Sabha Pramana, Universitas Gadjah Mada, Yogyakarta, Indonesia, consist of two volumes. Those are Volume I of Plenary and Invited Papers and Volume II of Abstracts Contributed Papers. This is the second volume of the proceedings that contains a total of 754 abstracts, consist of 368 papers for oral presentation and 386 papers for poster. Papers were categorized into various disciplines, such as Nutrition and Feed Technology; Genetics and Reproduction; Physiology, Animal Welfare and Health Management; Product Technology and Food Safety; Waste and Environmental issues; Forage Agrostology; as well as Agribusiness, Marketing, Extension and Community Development. The scientific committee has initially received a total of 1,028 abstracts from 42 countries. After reviews have been made, 60 of them were rejected and 74 were cancelled by the authors. The reviewers consist of 4 international and 71 internal reviewers from 6 universities and 1 research institute in Indonesia. In the interest of time limitation for proceedings publication, we apologize for not including 140 submitted abstracts in the proceedings since they were not being followed up with full manuscripts until the extended due date we offered.

The scientific committee would like to thank all the reviewers and appreciate their effort to make significant contribution in reviewing the full manuscripts. Similarly, we would also like to thank supporting staffs at the secretariat office of the Faculty of Animal Science, Universitas Gadjah Mada as well as of the Indonesian Center for Animal Research and Development who have helped in the preparation of the proceedings. Finally, we would like to thank all the authors for their valuable contribution to the congress and make it useful for our societies.

Editorial Team

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Large Ruminant

Development of technology production of frozen of swamp buffalo (*bubalus bubalis*) in the kampar regency

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ABSTRACT

The objective of this study was improve the quality of Kampar buffalo spermatozoa during the cryopreservation process. The diluters were Tris yolk standards, commercial thinners concentrate (Triladyl®), and plant-based commercial diluent, soybean lecithin (Andromed®). Sperm was collected from artificial vagina. The parameters observed were the motility, live spermatozoa, plasma membrane integrity (PMI) pre and post-freezing after incubation. The treatments consisted of four doses of semen ($10x10^6$ sperm/ml, $15x10^6$ sperm/ml; $20x10^6$ sperm/m, and $25x10^6$ sperm/ml), each consisted of three replications. The data were analysed by analisa of variance 3x4x4 factorial. The result showed that the Male buffalo in Kampar regency has a decent semen for semen freezing. Motility, percentage of live sperm and PMI on the use of Andromed® as a diluent in different buffalo sperm concentration is better when compared with Triladyl® and Tris yolk standards. The use of after equilibration semen diluent Andromed® in frozen semen of mud buffalo gave higher PMI when compared to Triladyl® and Egg Yolk Tris. Kampar buffalo semen motility post-tired at all three different types of diluent was not different while the live percentage and PMI frozen buffalo semen post-tired on the use of diluent Andromed® was higher than the use of diluent Triladyl® and Tris Egg Yolk. However Andromed® is a diluent which is superior in providing protection to the sperm during the freezing process.

Keywords : kampar buffalo, equilibration, cryopreservation

INTRODUCTION

Application of Artificial Insemination (AI) with frozen-thawed semen has been reported at limited scale in buffalo, because of poor freezability and fertility of buffalo bull spermatozoa as compared to cattle bull spermatozoa (Nazier, 2001; Ahmad et al., 2003; Kumaresan et al., 2005). Although AI has been practiced for the past 50 years, fertility rate with this technology is less and unpredictable in buffaloes (Agarwal and Tomer, 2003). Semen extenders used in these trials contained egg yolk, which carries a certain hygiene risk (Hartmann et al., 1998; Mu¨ller-Schlo¨sser et al., 2001). Some researchers adopted from the international literature and the other developed at regional and local level (Vale, 2010). The main aim of this study was to evaluate formula for semen diluent in the processing and manufacture of frozen semen of Kampar regency's mud buffalo through in vitro assays and to compare the protective power (cryoprotectivity) of egg yolk-based diluent to a diluent which is not based on egg yolk as materials for frozen buffalo semen of Kampar regency's mud buffalo through in vitro assays..

MATERIALS AND METHODS

Experimental animals used as a source of semen were three adult male buffaloes, placed in individual cages belonged to the farmers. Natural grass around the farm was given. Additional feed given were bran and concentrate. The drink was given by *ad libitum*. This research was using a completely randomized design with 3 x 3 factorial and thrice replication. The factors were the type of Tris-egg yolk diluent conventional standards, commercial thinners concentrate (Triladyl®), and plant-based commercial diluent, soybean lecithin (Andromed®). The treatments consisted of four doses of semen ($10x10^6$ sperm/ml, $15x10^6$ sperm/ml; $20x10^6$ sperm/m, and $25x10^6$ sperm/ml), each consisted of three replications. The data is analyzed by using variation of investigation. The difference between the average among the three diluents were compared by using ANOVA (the General Linear Models Procedure/GLM for the least square means of SPSS 10) (Steel and Torrie, 1991). The Variables measured were motility, live spermatozoa, plasma membrane integrity (PMI) pre and post-freezing after incubation.

The diluent was prepared 1 day prior to the shelter. Semen accommodating was made using an artificial vagina which was filled hot water (40-45°C) using a teaser (angler). Each buffalo was scheduled for semen accommodating 2 times per week at the same interval (Monday and Thursday) in the morning (6:00 to 8:00 pm). Each buffalo left to serve artificial vagina once per accommodating in 5 minutes after false mount. Accommodated semen in the glass was immediately taken to the laboratory for semen processing and stored in a water bath (37°C) for further testing or assessments carried out a variety of motility and other semen characteristics (macroscopic and microscopic examination).

RESULTS AND DISCUSSION

Quality of Fresh Sperms. The average of motility percentage at the first ejaculation of the three males was 75% (Table 1). Semen volume varied among the three males buffaloes with an average range of 1.5 to 2.5 cc in the first and the second ejaculate. The results showed that the number of spermatozoa ranged between 900 and 1,500 with an average $1,200x10^6$ cells per ml. The average motility of semen in the third study males was higher than the first and second study. These results are not much different from Kustono (1992) who did the accommodating semen of Murrah buffaloes in Manila. The results of this study wass higher compared to Mukesh et al. (2010) who obtained buffalo semen motility of 71.42%, 58.2% and 44.62±0.02-47.08±0.05. This difference is thought to be caused by several factors such as season, stress and the study (Narinder, 2005). Concentration of Swamp buffalo in Kampar regency still within the range of research results of Kustono (1992) in Murrah buffaloes.

Quality of the Sperms After Freezing. The average of motility, percentage of live sperm and PMI on various types of diluent in different sperm concentrations can be seen in Table 2. The use of frozen semen diluent Andromed® in frozen semen of mud buffalo gave higher PMI when compared to Triladyl® and Egg Yolk Tris (Table 3). Motility, percentage of live sperm and PMI are the parameters used to determine the effect of experimental procedures on the storage of buffalo bull semen (Akhter et al., 2008, Andrabi et al., 2008). It is well recognized that sperm motility is affected by the properties of diluting media (Andrabi, 2009). In our study motility, percentage of live sperm and PMI on the use of Andromed® as a diluent in different buffalo sperm concentration is better when compared with Triladyl® and Tris yolk standards. This is probably caused by the content of soybean lecithin in Andromed® with low high-density lipoprotein (HDL) and is not like the yolk that inhibits respiration and

spermatozoa motility (Moussa et al., 2002). Motility, percentage of live spermatozoa and the PMI in this study differ from Triwulanningsih et al. (2011) which states that the use of standards with the addition of tris glutathionin further enhance sperm motility and percentage live in mud buffalo and Kustono (1992) who stated that the thinners tris egg the most efficient yolk keeping motility of Murrah buffalo's spermatozoa.

Motility, Percentage of Life and PMI Buffalo Semen after Equilibration

Motility and live percentage of buffalo semen after equilibration did not show different results in all three types of diluent (Tris, Triladyl® and Andromed®)(Table 3). The low value of motility, percentage of live spermatozoa and semen PMI after equilibration on the use of diluent Triladyl® and Tris Egg Yolk compared Andromed® allegedly because Andromed® contains steroid hormones and precursors (Hartmann et al., 1998). These hormones can cause a decrease in quality (Mu¨ller-Schlo¨sser et al., 2001). Motility and percentage live semen of buffalo in Kampar regency after equilibration higher than the African buffalo semen collected from the epididymis by using a diluent Triladyl® and Andromed® at several different times of equilibration (Herold et al., 2006). This difference is probably caused by different types of water buffalo and the different way of semen collection (Hafez, 2000).

Motility, Live Percentage and PMI of Buffalo Semen Post-Fatique

Post-fatique at all three different types of diluent was not different while the live percentage and PMI frozen buffalo semen post-tired on the use of diluent Andromed® was higher than the use of diluent Triladyl® and Tris Egg Yolk (Table 4). The similarity values of all three types of motility is due to the composition of the diluent buffers, nutrients (fructose) and egg yolk as an anti-cold shock as well as glycerol is almost the same. However Andromed® is a diluent which is superior in providing protection to the sperm during the freezing process (Arifiantini and Yusuf, 2004). Andromed is recommended to use in diluting and freezing buffalo semen. It needs to test frozen semen that has been made in female buffalo in the Kampar regency.

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The authors are very grateful to research and development center of Ministry of Agriculture of the Republic of Indonesia, Projec 2011.

Table 1. The average volume; sperm motility and concentration of Swamp Buffalo.

Stud	Accommodating	Volume of ejaculate (ml)		Motility (%)		Concentration (10^6/ml)	
1	1	1.5	1.5	1.5	70	70	900
	2	1.5	1.5	1.5	70	70	970
	3	1.5	1.5	1.5	70	70	890
	4	2	2.5	2.5	75	70	970
	5	2	2	2	75	70	960
	6	2	2	2	75	70	1000
2	1	2	2	2	75	75	1300
	2	2.5	2.5	2.5	75	75	1270
	3	2	2.5	2.5	75	75	1450
	4	2	2.5	2.5	75	75	1200
	5	2.5	2.5	2.5	75	75	1300
	6	2.5	2.5	2.5	75	75	1300
3	1	2	2	2	70	70	980
	2	1.5	2.5	2.5	70	70	1500

3	2	2	2	70	70	1500
4	2.5	2.5	2.5	70	70	1450
5	2.5	2.5	2.5	70	75	1500
6	2.5	2.5	2.5	75	75	1500

Table 2. Semen quality in various stages of dilution and spermatozoa concentration

Parameters	Type of Diluent	Spermatozoa Concentration x 10^6 cells/ml			
		10	15	20	25
Motilitas	Standard Egg Yolk Tris	71^a	72^a	70^a	70^a
	Triladyl®	71^a	70^a	71^a	71^a
	Andromed®	74^b	74^b	74^b	75^b
Percentage of Live Spermatozoa	Standard Egg Yolk Tris	76^a	76^a	76^a	77^a
	Triladyl®	76^a	76^a	76^a	76^a
	Andromed®	77^b	77^b	77^b	78^b
PMI	Standard Egg Yolk Tris	78^a	78^a	78^a	78^a
	Triladyl®	78^a	78^a	79^a	78^a
	Andromed®	80^b	80^b	80^b	80^b

Table 3. Semen quality in various stages of dilution and the concentration of spermatozoa after equilibrasi

Parameters	Type of Diluent	Spermatozoa Concentration x 10^6 cells/ml			
		10	15	20	25
Motility	Standard Egg Yolk Tris	68^a	68^a	68^a	68^a
	Triladyl®	68^a	68^a	68^a	69^a
	Andromed®	71^b	71^b	71^b	71^b
Percentage of Live Spermatozoa	Standard Egg Yolk Tris	71^a	71^a	71^a	71^a
	Triladyl®	72^a	71^a	71^a	71^a
	Andromed®	73^b	74^b	74^b	74^b
PMI	Standard Egg Yolk Tris	71^a	71^a	71^a	71^a
	Triladyl®	72^b	72^b	72^b	72^b
	Andromed®	73^c	73^c	73^c	73^c

Table 4. Semen quality in various stages of dilution and concentration of sperm after post-fatigue

Parameters	Type of Diluent	Spermatozoa Concentration x 10^6 sperma/ml			
		10	15	20	25
Motility	Standard Egg Yolk Tris	53^a	54^a	54^a	54^a
	Triladyl®	54^a	54^a	54^a	53^a
	Andromed®	55^a	55^a	55^a	54^a
Percentage of Live Spermatozoa	Standard Egg Yolk Tris	63^a	64^a	64^a	64^a
	Triladyl®	64^a	63^a	66^a	65^a

	Andromed®	67[b]	67[b]	67[b]	67[b]
PMI	Standard Egg Yolk Tris	61[a]	61[a]	61[a]	62[a]
	Triladyl®	63[b]	63[b]	63[b]	63[b]
	Andromed®	65[c]	66[c]	67[c]	67[c]

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