

ISBN 978-602-96530-3-8



Proceeding

The 2nd Asian-Australasian Dairy Goat Conference

April 25-27th, 2014

IPB International Convention Centre Bogor, Indonesia

**THE ROLE OF DAIRY GOAT INDUSTRY IN FOOD SECURITY,
SUSTAINABLE AGRICULTURE PRODUCTION,
AND ECONOMIC COMMUNITIES**



AADGN

Organized by:

**Faculty of Animal Science,
Bogor Agricultural University**

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Foreword from Chairperson of Organizing Committee

Distinguished,

Director General of Livestock Services and Animal Health, Ministry of Agriculture, Republic of Indonesia, Ir Syukur Iwantoro, MS, MBA

Rector of Bogor Agricultural University, Prof Dr Heri Suhardianto

President of Asian-Australasian Dairy Goat Network, Dr JB Liang

Mayor of Bogor City, Dr Bima Arya

All participants of Asian-Australasian Dairy Goat Conference 2014

Good morning ladies and gentlemen, and Assalamualaikum wr wb.,

It is my pleasure to welcome you here for attending the Second Asian-Australasian Dairy Goat Conference at IPB International Convention Center, Bogor Indonesia. The theme of this conference is **“The role of dairy goat industry in food security, sustainable agriculture production and economic community”** which is organized by Bogor Agricultural University in collaboration with Asian Australasian Dairy Goat Network and Directorate General of Livestock Services and Animal Health, Ministry of Agriculture, Republic of Indonesia.

From the success of The First Asia Dairy Goat Conference on 9-12 April 2012 in Kuala Lumpur Malaysia, and to express the mission and the objective of Asian-Australasian Dairy Goat Network, it is necessary to continue the biannual dairy goat meeting in Bogor Indonesia. The primary objective of the second AADGC-2014 is to provide a platform for all stakeholders including researchers, academicians, policy makers, farmers, investors and other dairy industries to share experiences and networking to promote dairy goat farming in the Asian-Australasian region and beyond.

With saying Alhamdulillah, around 90 researchers from 16 countries around the world, 12 top universities and 4 research institutes in Indonesia have contributed some interesting topics to be discussed. The very important persons from 40 government livestock services officers in Indonesia, and more than 30 the best dairy goat farmers and companies from ASEAN countries are also with us here to make a forum group discussion in order to improve dairy goat production and markets. I have to stated here that all papers have been reviewed by the experienced international reviewers.

On behalf of the organizing committee we would like to welcome to all delegates from Malaysia, Thailand, India, Japan, Philippine, Vietnam, Iran, Pakistan, Australia, United Kingdom, Hungary, Egypt, Nigeria, Sudan and also from some provinces in Indonesia. To government livestock services officers and farmers from ASEAN countries and from east, middle and west

Java, and also some potential business companies, welcome and have a nice discussion. I hope this conference and network activities during 3 days will bring you new idea how to improve dairy goat for our lives and get more benefits for all participants.

We cannot make this event success without your contributions. In this occasion, I would like to express my great gratitude and thanks to FAO, AADGN, IPB, Directorate General of Livestock Services and Animal Health, Ministry of Agriculture, Republic of Indonesia, Ministry Coordinating Economic Affairs, Bank BRI, Mayor of Bogor City, PT Napindo, PT Chiel Jedang, PT Nutreco, and PT Yummi Indonesia that support and sponsor this conference.

Thank you very much to all VIP reviewers from international advisory and scientific committee, and also for hard working of all organizing committee.

Please enjoy the beauty of Bogor City with the legend of Bogor presidential palace and botanical garden.

Wassalamualaikum wr.wb.

Prof. Dr. Dewi Apri Astuti, MS
Chairperson
The 2nd AADGC 2014

Foreword from President of Asian-Australasian Dairy Goat Network (AADGN)

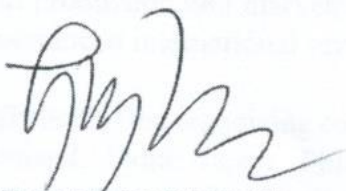
25 April 2014

Ladies and Gentlemen,

The Asian-Australasian Dairy Goat Network (AADGN) was formed by a group of researchers and producers with common interest in dairy goat production during the *First Asian Dairy Goat Conference* held in Kuala Lumpur, Malaysia in April 2012. The main objective of the network is to facilitate contact among scientists, extension workers, farmers and other stakeholders in the dairy goat industry. In addition, the network hopes to enhance information exchange, provide technical support, and promote dairy goat farming in Asian-Australasian countries and beyond. The secretariat of the network is currently located at the Institute of Tropical Agriculture, Universiti Putra Malaysia (<http://aadgn.upm.edu.my/aadgn/>) and technically supported by an International Steering Committee and representatives from partner countries, currently made up of Australia, China, India, Indonesia, Iran, Iraq, Japan, Malaysia, Pakistan, the Philippines, Thailand and Vietnam.

One of the activities of AADGN is to organize regular conferences focusing on all aspects of dairy goat research and farming. On behalf of AADGN, I congratulate the Organizing Committee, chaired by Professor Dewi Apri Astuti, for successfully organized the AADGC2014. I was informed that one of the highlights of this conference is the active participation of local dairy goat farmers and producers. It is often reported that the robustness of goats to produce in harsh climatic environment with low quality roughages plays a vital role in food security and poverty alleviation in smallholder farmers in Asia and recently, there is also a growing interest in dairy goat farming as business enterprise in South-east Asia countries including Indonesia to meet the rapid increased demands for goats milk and its products. I trust this conference will provide a good opportunity for exchange of information and experience between the researchers and producers.

Yours sincerely



DR JUAN BOO LIANG
President AADGN

Remarks from Rector of Bogor Agricultural University

Prof. Dr. Juan Boo Liang,
President, Asian-Australasian Dairy Goat Network (AADGN),

Ir. Syukur Iwantoro, MBA
Director General of Livestock and Animal Health-Ministry of Agriculture
Republic of Indonesia,

Dr. Bima Arya
Mayor of Bogor City

Distinguished foreign participants and speakers,

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

Dairy goat farmer and businessman,

Colleagues,

Ladies and gentlemen,

Assalamu'alaikum warahmatullaahi wabarakaatuhu,

A very pleasant and good morning to everyone, thank you very much for joining us at the 2nd Asian-Australasian Dairy Goat Conference (AADGC) 2014. I bid you a very warm welcome to Bogor Agricultural University (IPB) as well as to Bogor City, West Java Province.

I was informed that FAO joined with the University Putra Malaysia (UPM) and the International Dairy Federation (IDF) have organized the First Asia Dairy Goat Conference in Kuala Lumpur, Malaysia from 9 to 12 April 2012. At the same time the Asian-Australian Dairy Goat Network was established. That network is one of the successful indicators of the first conference apart from its important conclusions and recommendations. That conference has also recommended Indonesia to be the host of the Second Asian-Australasian Dairy Goat Conference (AADGC) 2014 with Prof. Dr. Dewi Apri Astuti, one of IPB professors from Faculty of Animal Science to be the country coordinator. We are indeed honored to have you now here with us at IPB. We have about 150 participants from 15 countries gathered here today, making our conference a truly international one.

According to FAO Statistics (2012), Indonesia is ranked 6th in Asia and 10th in the world for total goat population. FAO also reported that Indonesia produced 282,000 ton of fresh goat milk in 2012. Yet, we have no valid data on the number of dairy goat population among the total goat population. Dairy goat farming in Indonesia has been growing fast since about 10 years ago.

The development of dairy goat farming in our country is unique, because it started from community initiative and spread across the nation through their network. The increasing demand of milk and milk products is likely one of the driving force for dairy goat farmer to develop.

If we take our national population as denominator, our milk consumption per capita per year is still very low, it is only 12 liter/capita/year. However, the consumption level in big cities is quite high, that's why our milk and milk products demand is increasing about 8% per year. Although the major portion of the demand is from cow milk, goat milk and milk products demand is also increase year by year.

As the present conference theme is **“The Role of Dairy Goat Industry in Food Security, Sustainable Agriculture Production nd Economic Community”** it is imperative to discuss alternative solutions to the above challenges by all participants as you are coming from different backgrounds. We have with us today representatives from research centers, universities, businessmen, government officers, students, farmers, and other interested persons. The conference will be more interesting as the organizing committee has set up special session for panel discussion between and among dairy goat farmers, local government livestock services officers, businessman and representative from Directorate General of Livestock and Animal Health, apart from scientific session.

I would like to take this opportunity to express my gratitude the Local Organizing Committee, chaired by Professor Dewi Apri Astuti, and the Dean of Faculty of Animal Science, for their hard work and effort in planning and coordinating this event. I would also like to thank the Directorate General of Livestock and Animal Health, Ministry of Agriculture Republic of Indonesia, Asian-Australasian Dairy Goat Network (AADGN), Food and Agriculture Organization (FAO-RAP), Mayor of Bogor City and Indonesia Association for Sheep and Goat Farmers for their support in making this conference possible.

The challenges made by the Conference are significant, but I am confident that you will succeed in your objectives. I wish you a very pleasant stay here in the IPB and in Bogor, and a productive and successful meeting.

By saying “Bismillaahirrahmaanirraahim...” I declare the Conference open.

Thank you and Wassalamu’alaikum Warahmatullaahi Wabarakaatuhu.

PROF. DR. IR. HERRY SUHARDIYANTO, MSc.
RECTOR, BOGOR AGRICULTURAL UNIVERSITY

Individual Variation on the Sperm Freezing Capability of Etawah Grade

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Abstract This research aims to evaluate the individual variation in the freezing capability sperms of Etawah Grade bucks at Lembang Artificial Insemination Center (LAIC). Five sexually mature Etawah Grade bucks were used as sperms sources. The semen was collected using artificial vagina and was evaluated macro- and microscopically. The semen was diluted with andromed and frozen according to LAIC standard procedure. The result of the experiment indicated there was no significant difference ($P>0.05$) in raw semen quality, except for sperm motility. The recovery rate of sperms obtained from Efrat buck was significantly higher ($P<0.05$) than the other bucks. This research concluded that there was an individual variation in freezing capability of sperm in Etawah Grade bucks.

Keywords Freezing capability, Etawah Grade bucks, Recovery rate

1. Introduction

Artificial insemination using frozen semen is now the most widespread tool employed nationwide for improving the genetic potential of livestock [1]. Although semen cryopreservation has been applied successfully in a few species, considerable variations in post-thaw semen viability are still exist. Independent of sperm quality before freezing, the semen of certain individuals will consistently freeze badly, resulting in poor motility, disrupted acrosome and plasma membrane, and thus reduced fertilizing ability, indicating the existence of variation in membrane properties within individual [2]. This research aims to evaluate the individual variation on the freezing capability sperms of Etawah Grade bucks at Lembang Artificial Insemination Center.

2. Materials and Methods

2.1. Source of semen

Five sexually mature Etawah Grade bucks age 3-4 years, body weigh 70 to 80 kg belong to Lembang Artificial Insemination Center were used as sperms sources with a total of 58 ejaculates. The bucks were kept under natural light and maintained under a uniform and constant nutrition regiment with each buck being fed on a daily diet of 1 kg concentrate, 8 kg of grass, 1 kg of legume, salt lick, and water was provided *ad libitum*.

2.2. Extender preparation

A commercially available diluent Andromed® (Minitube, Germany) was used in this experiment.

This extender contains soybean extract with antibiotics (lincomycin, spectinomycin, tylosin, gentamycin) and glycerol (7%). One part of andromed was diluted with 4 parts of aqubidest, warmed up at 37°C at Water bath.

2.3. Semen collection and evaluation

The semen was collected from the bucks with the aid of an artificial vagina, twice a week. Immediately after collection, the semen was evaluated macro- and microscopically including semen volume, pH, consistency, and color, mass movement, motility, and sperm concentration according to [3].

2.4. Semen processing

Qualified semen samples having volume of > 2 mL, sperm concentration > 2.000x10⁶ and progressive sperm motility of > 70% were selected for cryopreservation. The semen was diluted with diluent to a final concentration of 200x10⁶ sperm/ml. Diluted semen was loaded into 0.25 ml straws (Minitube Germany) using automatic filling and sealing machine (Combo System, Minitube Germany), equilibrated at 4°C for 3 hours and was frozen at automatic freezing machine (Digitcool 5300 ZB 250, IMV Prancis) for 9 minutes and the straws were then plunged into the liquid nitrogen and stored until thawing.

2.5. Evaluation of post-thawing quality

After storage for a period of 24 hours, the semen straws were thawed in a water bath (at 37°C for 30 second) for microscopic semen evaluation immediately after thawing. Sperm motility was assessed using a phase-contrast microscope (Olympus BX 53) X 200 magnification with a warm stage maintained at 37°C. A wet semen mount was made by using 5 µL semen placed directly on a microscope slide and covered by a cover slip. Motility estimations were performed from three different microscopic fields in each sample. The post-thawing quality criterion were < 40% was bad, 40-50% was moderate, and >50% was good.

2.6. Statistical analysis

The study was repeated 9 times and the results were expressed as the mean ± SEM. One way analysis of variance (ANOVA) with a subsequent Duncan test was used to compare the mean values resulting from the various individual at a significance level of P<0.05. All analyses were carried out using the SPSS 18 for Windows statistical software package.

3. Results and Discussion

3.1. Raw semen quality

All ejaculates were collected from sexually mature bucks that were of proven fertility and were undergoing regular semen collection for artificial inseminations. Therefore, it was expected that semen quality before freezing would be of a high standard. Semen quality was assessed before freezing with volume > 2 ml, normal in color and consistency, mass activity > 2, with percentage of sperm motility > 70%, and sperm concentration > 2000x10⁶. There were

no difference among parameters, except for sperm motility, Efrat buck demonstrated the lower motility as compared to others (Table 1).

Table 1. Raw semen quality of Etawah Grade bucks at Lembang Artificial Insemination Centre (mean±SEM)

Parameter	Buck Name				
	Ebony	Efrat	Enquiry	Equity	Evory
Volume (ml)	2.78±0.24 ^a	2.79±0.31 ^a	2.46±0.24 ^a	2.28±0.07 ^a	3.28±0.28 ^a
pH	6.72±0.05 ^a	6.76±0.06 ^a	6.66±0.06 ^a	6.08±0.71 ^a	6.64±0.06 ^a
Colour	----- Creamy white to yellow -----				
Concistency	----- Moderate to tick -----				
Mass activity	2.23±0.16 ^a	2.08±0.13 ^a	2.42±0.14 ^a	2.00±0.00 ^a	2.11±0.11 ^a
Sperm motility (%)	81.54±2.49 ^a	70.38±5.67 ^b	83.33±1.66 ^a	74.44±1.54 ^{ab}	80.00±0.74 ^a
Sperm concentration (x10 ⁶)	2344.62±98.55 ^a	2030.00±158.24 ^a	2375.00±61.11 ^a	2020.00±107.24 ^a	2113.33±58.62 ^a

Mass activity scoring (0-3); 0 no mass activity, 1 poor, 2 moderate and 3 good
Different superscripts within the same row are statistically different at P<0.05

3.2. Frozen semen quality of Etawah Grade bucks

Overall, the quality of post-thawing motility of sperms obtained from Etawah Grade bucks demonstrated a moderate quality (41.67±0.83 to 46.25±1.09%). Sperm motilities during pre-freezing period were between 62.22±1.21 to 65.00±1.23% and no significant different among individual bucks. Freeze-thawing procedure decreased the sperm motility between 32.08 to 39.17% (Table 2).

Table 2. Recovery rate of Etawah Grade bucks of sperms after freezing (mean± SEM)

Buck name	Motility (%)			Recovery rate (%)
	Raw	Pre freezing	Post thawing	
Ebony	81.54±2.49 ^a	64.17±0.83 ^a	43.33±0.71 ^{ab}	53.48±2.38 ^a
Efrat	70.38±5.67 ^b	62.92±1.29 ^a	43.75±0.89 ^{ab}	57.86±1.90 ^b
Enquiry	83.33±1.66 ^a	63.75±1.39 ^a	43.75±1.39 ^{ab}	52.03±1.38 ^a
Equity	74.44±1.54 ^{ab}	62.22±1.21 ^a	41.67±0.83 ^a	56.01±0.94 ^{ab}
Evory	80.00±0.74 ^a	65.00±1.23 ^a	46.25±1.09 ^b	56.99±0.80 ^{ab}

Different superscripts within the same columns are statistically different at P<0.05

Variability among individual bucks was detected for post-thaw sperm motility. Evory buck demonstrated the highest post-thawing motility (46.25±1.09%) than the other bucks. The indicator for freezing capability of sperm is not only post-thawing motility. The successful of freezing can also be seen by assessing its recovery rate (RR), by comparing the sperm motility of raw semen with post-thawing semen. According to RR, Efrat buck showed the best freezing capability with 57.86 ± 1.90% sperm recovered after freezing, even though he sperm motility of raw semen only 70.38±5.67% but the post-thawing motility was 43.75±0.89. This value


was not different from Ebony buck having $81.54 \pm 2.49\%$ sperm motility of raw semen (Table 2). Individual differences in sperm cryo-survival were not exclusive to goat, because they have also been observed in stallion [4], ram [5,6], and boar [2]. The reason for goat individual variability in cryo-survival of sperm is unknown at present, although it may have a genetic origin. Differences in specific DNA sequences have been identified between boars in which post-thaw sperm quality was classified as poor or good [2].

4. Conclusion

There was an individual variation on freezing capability of sperms in Etawah Grade bucks.

5. References

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