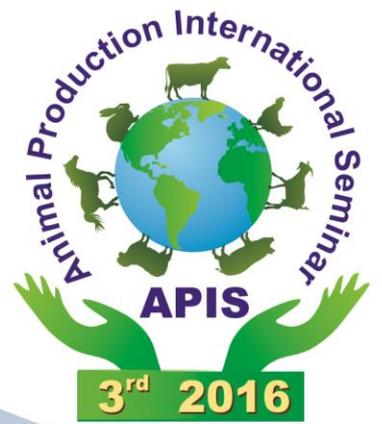


PROCEEDING



The 3rd Animal Production International Seminar
The 3rd ASEAN Regional Conference on Animal Production
3rd APIS & 3rd ARCAP – 2016

Enhancing Synergistic Roles of Stakeholders
for Development of Sustainable Livestock Production



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RECTOR SPEECH

Assalamualaikum warohmatullahi wabarakatuh
Distinguished Guests and Delegates, Ladies and Gentlemen,

It gives me great privilege and pleasure to extend to you all a very warm welcome on behalf of Brawijaya University and to say how grateful we are to the organizing committee of The Third Animal Production International Seminar (3rd APIS) and The Third ASEAN Regional Conference on Animal Production (3rd ARCAP) who made this important event happening from today onward. Your attendance in this conference will not be enough before exploring the serendipity of Batu city which has attracted so many visitors in the recent years. It offers you many attractive places to visit varying from leisure facilities to smallholder dairy farms that relevant to the topic of this conference.

The issues of livestock production and food security have been a hot topic of debates all over the world to challenge our capability to feed human population living on earth that is believed will reach 25 billion people by the middle of this millennium. The global call on quality human resources especially in developing countries may not be achieved without adequate supply of animal protein. This has urged animal scientists to make significant effort to increase animal production by inventing new technologies and approaches but have no negative impact on our natural resources because the majority of smallholder farmers face with scarcity of cultivable land to produce adequate quantity and quality fodder for their animals. The practice of uncontrolled fodder scavenging from forest and open land may provoke a serious natural disaster such as landslide, flood and loss of water resources for human beings. Through this stage I would like to extend my concern to all distinguished guests and delegates to pay more attention on sustainable development of animal production that assures our young generation lives on earth safely and happily.

As the rector of Brawijaya University, I am also delighted to welcome you in our green campus sometime in the middle of the conference to hasten mutual collaboration between Brawijaya University and either national or international partners. We are fully aware that in a modern life higher education quality should be built on the basis of collaboration for many reasons. Brawijaya University has 14 faculties that can be grouped into four science trees, that is engineering, humanity, economics, and life sciences. They have been growing significantly not only in the number of student enrollements but many prestigious achievement on research findings, student competitions and administrative transparency are our flagships in the last ten years. Nevertheless, we also realize that first and foremost constraint for any institution is the limit of resources and thereby underpinning the importance of establishing mutual collaboration. It is our opportunities to meet delegates from varying places of origin that open initial discussion for further networking on relevant topics of interests concordance to the main topic of this conference and beyond.

To conclude my address, once again I would like to express my sincere gratitude to all delegates, partners and conference committee who have made this important international conference occurs. I do hope that your stay and participation in these seminar and conference will be fruitful and unforgettable.

By the name of Almighty Allah Swt. I declare that The Third Animal Production International Seminar (3rd APIS) and The Third ASEAN Regional Conference on Animal Production (3rd ARCAP) are officially open.

Thank you very much
Wassalamualaikum warohmatullahi wabarokatuh.

Batu, 19 October 2016
Brawijaya University
Rector

Prof.Dr.Ir. Mohammad Bisri, MS.

Assalaamu'alaikum wr. wb.

Praise be to Allah, that the International Seminar 3rd-APIS could be held this year. This seminar is a routine agenda of the Faculty of Animal Husbandry UB held every three years, and this time held on October 19 to 21, 2016.

For participants come from outside the city of Malang, I proudly would like to say Welcome to the city of Malang and also on the beautiful campus of the University of Brawijaya, especially in the Faculty of Animal Husbandry. I'm sure the cool atmosphere of Malang and Batu, the participants will be able to feel a distinct impression and more enthusiastic in participating in the seminar

When we viewed from a trip APIS, we note that there is significant progress in every APIS's event. It can be noted by increasing the number of participants who submit their abstract / full paper and spread of country or university / institution they came from. This shows that the APIS is increasingly recognized by the researchers or academics community, and but on the other hand might be the number of researchers who want to publish scientific work is also increased.

Now, APIS not only belong to the Faculty of Animal Husbandry University of Brawijaya, but also belong to the universities and researchers in the world who require publish their qualified scientific paper immediately.

APIS is a very effective medium to introduce each other between researchers, as well as a very efficient medium for the information and experiences exchange among the participants. Through the APIS we can know the topics of research being conducted by other researchers in different regions or countries, so that we can develop our future research directions and topic. We can also use APIS meeting as a medium for constructing the research collaboration and networking with researchers from other institutions for strengthening our research foundation. By APIS meeting, some information about new and important problems in the livestock farming and their solutions in the field can be summarized, so it is be expected to be able to overcome some of the problems of animal farming. I am sure, that the scientific information presented in APIS are very important way out of various scientific problems and in practical condition. So that by referring to the new findings of the researchers stated in their scientific works will be able to immediately increase the efficiency of farm businesses and increase in profits for farmers.

Finally, we congratulate to have nice conference and wish all participants having good days for a better future.

Thank you,
Malang, October 13, 2016

Dean of the Faculty of Animal Husbandry
University of Brawijaya

Prof. Dr.sc.agr. Ir. Suyadi, MS.

WELCOME MESSAGE

Following the success of the First and Second Animal Production International Seminar (1st and 2nd APIS) held in 2010 and 2013, respectively, and based on the proposition during the International Representatives Steering Committee Meeting, The ASEAN Regional Conference on Animal Production (ARCAP) Committee, and Malaysian Society of Animal Production (MSAP), hence, it will be held Collaborative Seminar of The Third Animal Production International Seminar (3rd APIS) and The Third ASEAN Regional Conference on Animal Production (3rd ARCAP) at Shining Batu city, East Java Province, Indonesia from 19 to 21 October 2016 with the theme of Improving the Synergistic Roles of Stakeholders for Development of Sustainable Livestock Production.

Sustainable development has become globally interesting issue in the last decades, since the environmentally failure of green revolution in agriculture and in some other aspects of development. The developments have been blamed to result in environmental degradation and global climate change (global warming) that dangers for the sustainability of life. Hence, the concept of sustainable developments that are environmentally, economically, socially and finally lively friendly must be practiced in all aspects of development, and as a never ending process to result in the most promising outputs for either the present or the future sustainable lifes.

Livestock production is very well known to have very important and strategic roles for human life as well as the environment. Livestock production is as important source of high quality foods for human, where its requirement must continuously increase and cannot be stopped due to the continuous increase of the human population. Livestock production provides income for most of small farmers in the villages and industries. Livestock also functions as traction, fertilizer, investment or saving, social prides, wool, and fur. However, livestock production has recently been blamed for its contributions to the land degradation and the global climate changes. Livestock production has been blamed to degrade 70% of rain forest area in Amazon, contributes 18% of green house gas, and competing in the use of potential materials either for human food or renewable fuel.

Thus, to improve the important and strategic functions and contributions of livestock production, it is our great honors and pleasures to invite stakeholders in livestock production including scientists, practitioners, decision makers as well as farmers and industries to attend This 3rd Animal Production International Seminar (3rd APIS) and The Third ASEAN Regional Conference on Animal Production (3rd ARCAP) held in the most interesting agriculture complex and exotic tourism city of Shining Batu, East Java Province, Indonesia from 19 to 21 October 2016. The Shining Batu city that is located in the valley of nonactive volcanoes complex, is also known as the oldest dairy cattle production center in Indonesia and also as livestock production center where small, medium, and large scale of livestock production and industries present including dairy cattle, beef cattle, goat, sheep, poultry, pigs, and rabbits.

The seminar is supposed to be a chance for the participants to discuss and exchange the newest information on animal science and technology for improving the prospects and coping the challenges in animal production for its sustainable development. In addition, the seminar will be as a site in establishing and refreshing contacts among animal scientists as well as practitioners for the development of sustainable livestock production.

We strongly expect your active support and participation for the success of the seminar. Finally, we are looking forward to seeing you all in the most interesting city of Shining Batu and enjoying our wonderful traditions, cultures, cuisines, and scenery.

Bismillahirrohmaanirrohiim

Assalamualaikum wa rohmatullahi wa barokaatuh

Our sincerely Rector of Brawijaya University, Dean of Faculty of Animal Husbandry Brawijaya University, very important invited person, keynote speakers, and all of the participants,

In this opportunity, on behalf of the Organizing Committee, I would like to express my deeply thanks and welcoming all of you to attend this Third Animal Production International Seminar and The Third ASEAN Regional Conference on Animal Production (APIS & ARCAP-2016).

The theme of this seminar is **Improving the Synergistic Roles of Stakeholders for Development of Sustainable Livestock Production**. As all of us are aware that sustainable development in all of aspects of our live are very-very important to create a better live not only for ourselves generation but also more importantly for our next-next-next generations. Especially for the development of livestock production, it is not only targeted for the production of sufficient quantity of good quality foods including meat, milk, and egg but also to minimize its contribution to the degradation of environment. As it is very well known that livestock production is not only produce many fruitful functions our live but also has been blamed to cause land degradation, water and air pollution, and to contribute to the global climate change.

For those from this seminar we would like to expect that we can give and share our knowledge, technology, and experiences to give our contribution for the development of sustainable livestock production.

As I got the data from our secretary that this seminar is attended by not less than 300 participants from many different countries including Sudan, Iran, Sri Lanka, India, Thailand, Taiwan, Malaysia, Australia, and of course from all over Indonesia from North Sumatera to West Papua; from different discipline of livestock production including livestock production systems, feeds and nutrition, genetic, breeding, and conservation reproduction, environment and waste management, products processing and food safety, socio-economic and agribusiness of livestock, and veterinary and health care; and from different types of stakeholder including scientists, practitioners, decision makers as well as farmers and industries. For those, I would like again to express my deeply thanks to all of the participants. Please, enjoy our seminar and our most interesting city of Shining Batu and enjoying our wonderful traditions, cultures, cuisines, and scenery.

And finally, last but not least, I wish to thank to all sponsors who have contributed for financial support, to our partner institutions and especially to the organizing committee member who have been working very hard to prepare and ensure the success of this international seminar.

Good Luck and Wassalamualaikum wa rohmatullahi wa barokaatuh.

Chairman

Dr.Ir. Marjuki, M.Sc.

WELCOME SPEECH FROM MSAP PRESIDENT

Welcome Speech From MSAP President

It is indeed my pleasure to welcome you to the 3rd ARCAP (Asean Regional Conference on Animal Production) to be held in the Shining City of Batu, Malang from 19th – 22th October 2016. Malaysian Society of Animal Production is proud to be a co-organizer of this conference. ARCAP was mooted by the then president of MSAP Dr Abu Hassan Muhammad Ali, in 2013 and the first ARCAP conference was held in Kuching, Sarawak in June 2014. Representatives from Malaysia, Indonesia, Thailand, The Phillipines, Vietnam, Singapore, Laos and Myanmar were among the invited speakers. Brunei and Cambodia has yet to name their representatives. ARCAP was originally planned to be held every two years in different Asean countries but initially this system was not practical as some member countries were not represented during earlier meetings. The formation of ARCAP was to develop a network within the Asean region, providing a platform where scientists and livestock stakeholders can discuss, collaborate and exchange ideas and information on animal production specific to this region. At present ARCAP is somewhat a loose organization of societies of animal production in the Asean region and therefore look forward to receiving voluntary members to be actively involved. MSAP organized the first and second ARCAP conferences, and fortunately the Faculty of Animal Husbandry, Universitas Brawijaya, has volunteered to organize the 3rd ARCAP conference in Batu, Indonesia in conjunction with their 3rd APIS. It is hoped that future ARCAP conferences will be will be hosted by other member countries.

Before I end, I would like to thank the organizing committee, and all those involved, for their hard work to make this joint conference a success. Thanks are due to Faculty of Animal Husbandry, Universitas Brawijaya, for providing all the necessary facilities and support for the success of this conference.

Last but not least, I would like to thank all participants of this conference for your support and enthusiasm and hope that you have a fruitful and enjoyable conference.

Prof Dr Abd Wahid Haron

President MSAP 2016/2017

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Estimating Yield Grade by Using Body Measurements and Body Condition Score in Thin-Tailed Sheep

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Abstract

This research was aimed to determine the relationship between body measurements (chest girth, body length, height of shoulder) and body condition score (BCS) with yield grade on 73 Thin-tailed sheep aged about 0-2 years. The results revealed a moderate correlation between chest girth ($y = 0.0028x + 0.2997$; $r = 0.5041$), body length ($y = 0.0027x + 0.3326$; $r = 0.4693$) and height of shoulder ($y = 0.0028x + 0.3120$; $r = 0.4219$) with yield grade. The relationship between BCS with yield grade also resulted moderate correlation coefficient ($y = 0.0597x + 0.3204$; $r = 0.4123$). Estimating yield grade by using body measurements and BCS could therefore be a tool for production improvement without slaughter the sheep. Chest girth measurements would be the best to estimate yield grade value in Thin-tailed sheep.

Keywords: *body measurements, body condition score, yield grade, Thin-tailed sheep*

Introduction

Thin-tailed sheep are a local sheep that used as an important part of farming, especially by a traditional farmer because of low-cost maintenance and prolific characteristic. The farmer and livestock market usually determine live weight on management or marketing system. Properly measure of this trait is often difficult because of unavailability of weighing scale (Bello and Adama, 2012). In addition, body measurements could be used to predict live weight fairly well in the situation where weighing scale is not available (Afolayan *et al.*, 2006).

Carcass weight has positive correlation with live weight and could be estimated by carcass percentage. Male Thin-tailed sheep fed by soybean curd waste had carcass percentage about 43.85-49.81% of live weight (Rianto *et al.*, 2014). Higher live and carcass weights, higher yield grade value (Adeyinka and Mohammed, 2006). Yield grades reflect the quantity of retail cuts that can be expected from a carcass. Lower yield grade value, higher the amount of retail cuts from the leg, loin, rib and shoulder (Burson and Donae, 1983). The yield grade is important to producers because it can affect animal value and the overall economic returns from the animal (Holland and Loveday, 2013). Yield grade could be calculated by measuring fat thickness between the 12th and 13th ribs over both ribeyes at the midpoint of the ribeye (Burson and Donae, 1983). But, this estimation of yield grade needs some stages of calculation and only can be applied in dead sheep. Alternatively, body measurements could be used to reach carcass quality target without slaughter the sheep.

Body measurements and body weight for a ewe from a large breed may be identical to that of a ewe from a small breed, but the level of body fatness will be very different. So, body condition score (BCS) is a useful tool of comparing one sheep to another (Fernandez, 2012) based on a simple indicator closely associated with the body composition (Nsoso, 2003).

Therefore, the objective of the present study was to determine the relationship between body measurements (chest girth, body length, shoulder height) and body condition score with yield grade in Thin-tailed sheep.

Methodology

The data for this study were obtained from 73 female Thin-tailed sheep aged about 0-2 years in Bustaman slaughterhouse, Semarang, Indonesia. Instruments used in this study were a metric tape rule, measuring stick, labeled tie and a caliper.

Sample data were collected by incidental sampling, where all of female Thin-tailed sheep recorded as the data. Labeled tie was set on right back leg of the sheep for identification. Chest girth was measured by wrapping metric tape rule in the back of the scapula. Body length was measured by placing measuring stick start from tuber ischii until tuberosus humeri. Height of shoulder was measured by placing a measuring stick at the top of the shoulder straight to the ground. Body condition score (BCS) was determined by feeling the muscle and fat along the backbone between the last rib and the front of the hip bones (Fernandez, 2012). BCS was rated in 5-point scale (ranging from 1 for skinny to 5 for fatty, representing emaciated, poor, acceptable, fat or obese animals, respectively) (Yakubu *et al.*, 2013). Measured fat thickness by using a caliper between the 12th and 13th ribs. Yield grade was calculated by using the formula (Burson and Donae, 1983): $0.4 + (10 \times \text{adjusted fat thickness in inch})$. The data were analyzed by correlating body measurements (chest girth, body length, height of shoulder) and BCS with yield grade. The formula was equated as $Y = ax + b$, where every increment of x will increase Y as much as a . Based on Sugiyono (2014) interpretation correlation coefficient are very low (0.000-0.199); low (0.200-0.399); moderate (0.400-0.599); strong (0.600-0.799) and very strong (0.800-1.000).

Results and Discussions

The data distribution of chest girth, body length, height of shoulder, BCS and yield grade from 73 female Thin-tailed sheep are summarized in Table 1.

Table 1. Data Distribution of Chest Girth, Body Length, Height of shoulder, BCS and Yield Grade of Thin-tailed Sheep

Parameter	Range	Mean	Standard Deviation	CV (%)
N	73			
Chest girth (cm)	43.00-72.00	56.05	5.99	10.69
Body length (cm)	33.00-62.00	45.67	5.74	12.57
Height of shoulder (cm)	42.00-68.00	51.99	5.04	9.69
BCS	1.70-3.10	2.30	0.23	10.00
Yield grade	0.44-0.56	0.46	0.03	6.52

The data above show that body length had the highest coefficient varian (12.57), followed by chest girth (10.69), BCS (10.00), height of shoulder (9.69) and yield grade (6.52). All the coefficient varian were less than 15%, so the animals used in this study were similar.

Correlation between body measurements and yield grade

Correlation between body measurements (chest girth, body length, height of shoulder) and yield grade is shown in Figure 1. Chest girth had the highest correlation coefficient ($r = 0.5041$; $y = 0.0028x + 0.2997$; $R^2 = 0.2541$), followed by body length ($r = 0.4693$; $y = 0.0027x + 0.3326$; $R^2 = 0.2203$) and height of shoulder ($r = 0.4219$; $y = 0.0028x + 0.312$; $R^2 = 0.1780$).

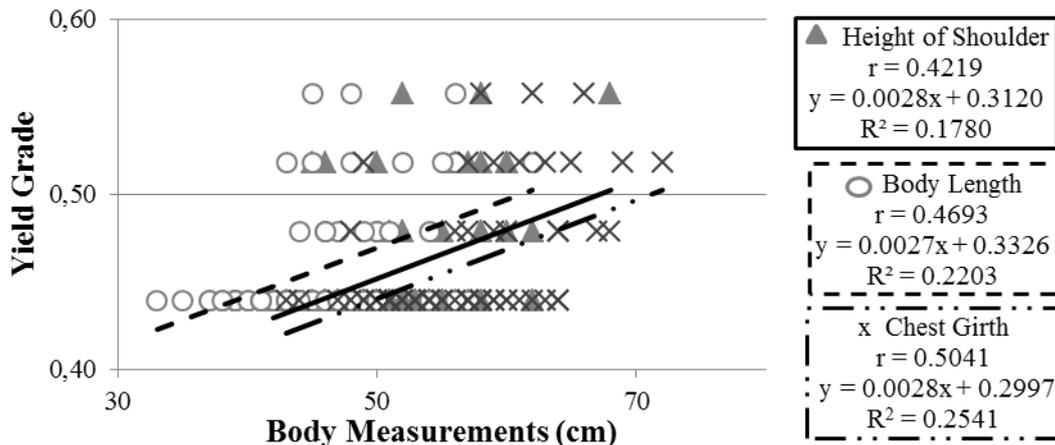


Figure 1. Correlation Between Body Measurements (cm) and Yield Grade

Increment of body measurements will increase live weight, carcass weight and fat thickness that could represent yield grade value. High feed consumption causes higher live weight and bigger fat deposition (Purbowati *et al.*, 2007). When the nutrition are fulfilled, excess protein and energy would be deposited as fat. High concentrate feeding would lead fat deposition especially subcutan fat. Long time fattening also give real impact to the fat thickness because of accumulation of fat deposition would increase time by time (Khasrad *et al.*, 2005).

Chest girth and yield grade became the best correlation because chest girth could figure sheep's body volume. Chest girth as the best predictor in small ruminant also been reported by Bello and Adama (2012) in Savanah Brown goats; Adeyinka and Mohammed (2006) in Nigerian red Sokoto goats.

Correlation between BCS and yield grade

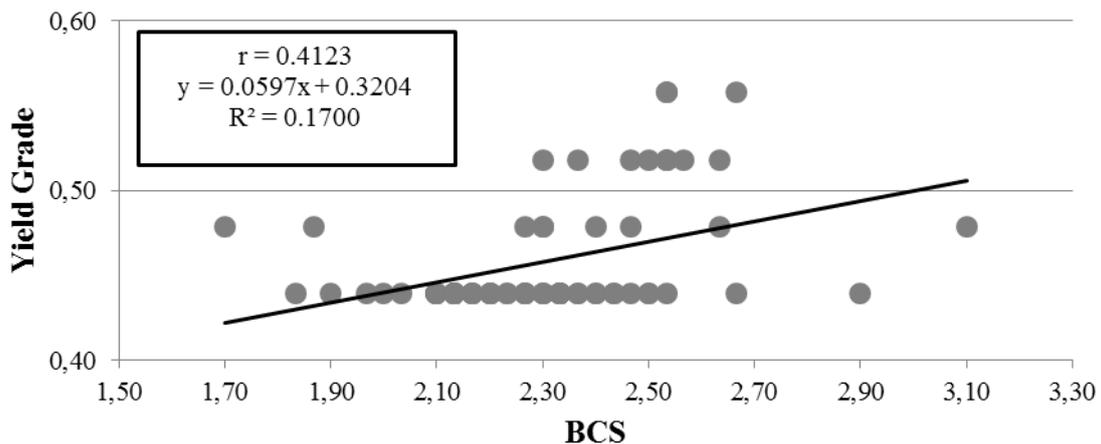


Figure 2. Correlation Between BCS and Yield Grade

Figure 2 shows correlation between BCS and yield grade ($r = 0.4123$; $y = 0.0597x + 0.3204$; $R^2 = 0.1700$). BCS could be used to estimate yield grade because it had moderate coefficient correlation. BCS is a potential tool to increase production efficiency and more accurate than a simple eye appraisal. BCS is based on feeling the level of muscling and fat deposition over and around the vertebrae in the loin region. (Thompson and Meyer, 1994).

BCS is correlated with the proportion of fat or a direct measurement of backfat depth. It is providing a better estimation result rather than body weight alone (Yakubu *et al.*, 2013).

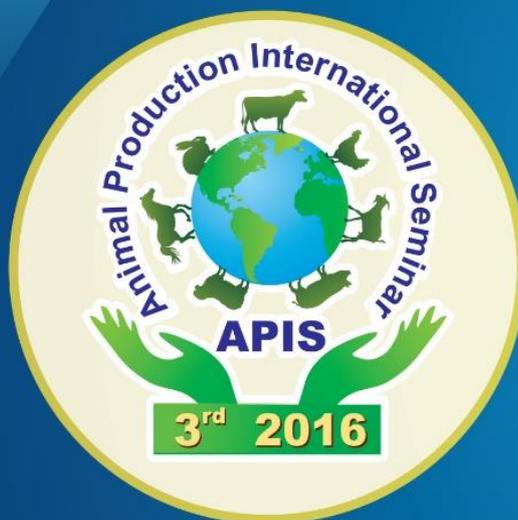
Conclusion

According to the results of this study, there were moderate correlation between body measurements and body condition score with yield grade. Therefore, it was concluded that the estimation of yield grade from body measurements and BCS could be a tool for production improvement without slaughter the sheep. Chest girth measurements would be the best to estimate yield grade value in Thin-tailed sheep.

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