



PROCEEDING INTERNATIONAL SEMINAR

IMPROVING TROPICAL ANIMAL PRODUCTION FOR FOOD SECURITY

3-5 November 2015

Eddy Agus Mokodompit Auditorium



Organized by

**Faculty of Animal Science Universitas Halu Oleo
Kendari - Southeast Sulawesi
Indonesia**



Unhalu Press
Kendari, 2015



Proceeding
INTERNATIONAL SEMINAR
IMPROVING TROPICAL ANIMAL PRODUCTION
FOR FOOD SECURITY

3-5 NOVEMBER 2015
Kendari, Southeast Sulawesi, Indonesia



Unhalu Press
Kendari, 2015

**Proceeding
INTERNATIONAL SEMINAR
IMPROVING TROPICAL ANIMAL PRODUCTION
FOR FOOD SECURITY**

**3-5 NOVEMBER 2015
Kendari, Southeast Sulawesi, Indonesia**

Editors:

Zainal Jaelan (Universiti Putra Malaysia, Malaysia)

Patricio S (Carabao Research Center, Philippine)

J. Murali Dharan (Tamil Nadu Veterinary and Animal Science University, India)

Whitney Dollemore (Northern Territory Dept. of Primary Industry and Fisheries,
Australia)

Nasrullah (Director of Animal Feedstuff, Directorate General Animal Husbandry and
Animal Health, Ministry of Agriculture, Indonesia)

Bambang Purwantara (Bogor Agricultural University, Indonesia)

Cece Sumantri (Bogor Agricultural University, Indonesia)

Herry Sonjaya (Hasanuddin University, Indonesia)



Unhalu Press

Kendari, 2015

Proceeding International Seminar Improving Tropical Animal Production for Food Security

3-5 November 2015, Kendari, Indonesia

Editors:

Zainal Jaelan (Universiti Putra Malaysia, Malaysia)
Patricio S (Carabao Research Center, Philippine)
J. Murali Dharan (Tamil Nadu Veterinary and Animal Science University, India)
Whitney Dollemore (Northern Territory Dept. of Primary Industry and Fisheries, Australia)
Nasrullah (Director of Animal Feedstuff, Directorate General Animal Husbandry and Animal Health, Ministry of Agriculture, Indonesia)
Bambang Purwantara (Bogor Agricultural University, Indonesia)
Cece Sumantri (Bogor Agricultural University, Indonesia)
Herry Sonjaya (Hasanuddin University, Indonesia)

Desain Cover dan Tata Letak: Unhalu Press

Diterbitkan pertama kali oleh Unhalu Press
Kampus Hijau Bumi Tridharma
Jalan H.E.A. Mokodompit, Kendari 93231
Email: unhalupress@uho.ac.id, press@uho.ac.id

Proceeding International Seminar “Improving Tropical Animal Production for Food Security”

Zainal Jaelan, Patricio S., J. Murali Dharan, W. Dollemore, Nasrullah, B. Purwantara, C. Sumantri dan Herry Sonjaya
xi + 257 hlm, 21,0 x 29,5 cm

ISBN : 978-602-8161-91-6

Undang-Undang Republik Indonesia Nomor 19 Tahun 2002 tentang Hak Cipta

Lingkup Hak Cipta

Pasal 2

1. Hak cipta merupakan hak eksklusif bagi pencipta atau pemegang hak cipta untuk mengumumkan atau memperbanyak Ciptaannya, yang timbul secara otomatis setelah suatu ciptaan dilahirkan tanpa mengurangi pembatasan menurut peraturan perundang-undangan yang berlaku.

Ketentuan Pidana

Pasal 72

1. Barangsiapa dengan sengaja melanggar dan tanpa hak melakukan perbuatan sebagaimana dimaksud dalam Pasal 2 Ayat (1) atau Pasal 49 Ayat (1) dan Ayat (2) dipidana dengan pidana penjara masing-masing paling singkat 1 (satu) bulan dan/atau denda paling sedikit Rp1.000.000,00 (satu juta rupiah), atau pidana penjara paling lama 7 (tujuh) tahun dan/ atau denda paling banyak Rp5.000.000.000,00 (lima miliar rupiah).
2. Barangsiapa dengan sengaja menyiarkan, memamerkan, mengedarkan, atau menjual kepada umum suatu ciptaan atau barang hasil pelanggaran hak cipta atau hak terkait sebagaimana dimaksud pada Ayat (1) dipidana dengan pidana penjara paling lama 5 (lima) tahun dan/atau denda paling banyak Rp500.000.000,00 (lima ratus juta rupiah).

Remark From The Chairman of International Seminar Committee

Assalamualaikum Warahmatullahi Wabarakatuh

Distinguished Ladies and Gentleman,

As the host of the International Seminar, we are very grateful and would like to thanks to keynote speaker, all invited speakers and presenter who have prepared the papers and participating to the seminar. We strongly believe that their significant contribution will be useful to all of societies to enhance the development of tropical animal production in the future.

The theme of this seminar is “Improving Tropical Animal Production for Food Security”. We believe that food issue has become important and strategic sector and it should be the main strength of the Indonesian economic empowerment. Food security in the animal production field is the concept of fulfilment food from animal which is produced using sustainable and eco-friendly farm system appropriate with local wisdom. Therefore, it was necessary to formulate various policies, programs and strategies to accelerate the improvement of the production and the productivity of the tropical animal based on the latest research.

In this seminar we have keynote speaker, Prof. Dr. Ir. Ali Agus, DAA, DEA, he is an expert in Nutrition and Feed Technology. His current position is Dean of Faculty of Animal Science of Gadjah Mada University, Indonesia. He will talk about the role of agricultural by products in beef cattle production.

Besides that, we have seven invited speakers from different countries;

Prof. L. C. Cruz, he was Head of Philippine Carabao Research Canter.

Prof. Dr. Dahlan Ismail, he is an expert in the field of integrated livestock system, Universiti Putra Malaysia.

Dr. Kieren McCosker, he is an expert in free range-based management of cattle production. He works at Department of Primary Industry and Fisheries, Northern Territory, Australia.

Prof. Monchai Duangjinda, he is an expert in animal breeding–native chicken production. His current position is Dean of Faculty of Agriculture, Khon Kaen University. He also works as Director of Research and Development Network Center for Animal Breeding (native chicken), Thailand.

Prof. A. K. Thiruvankadan, he is an expert in animal genetics and breeding conservation. His current position is Head of Tamil Nadu Veterinary and Animal Sciences University, India.

Prof. Bui Van Doan, he is an expert in Animal Production, Faculty of Animal Science and Aquaculture, Vietnam National University of Agriculture Vietnam.

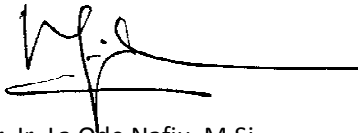
And the last, Ir. Eko Widodo, M.Agr.Sc. M.Sc. PhD, he is an expert in poultry nutrition, Faculty of Animal Science, Brawijaya University, Indonesia.

We also have participants who will deliver their researches through poster presentation. We wish all the participants could fulfill their expectation as well as enjoying the interaction among all scientists in this seminar.

High appreciation to Rector of Universitas Halu Oleo and Dean of Faculty of Animal Science Universitas Halu Oleo, who have concerned and supporting this seminar. We thanks to the sponsorship; Government of Southeast Sulawesi, Major of Kendari, Major of Baubau, Regent of West Muna, BRI, Kendari Pos, ISPI and HILPI South East Sulawesi who have contributed for the successfull of this seminar. We also would like to thanks to committee who have helped in the preparation of this seminar.

Finally thanks to you all, for the successful of this seminar. I wish all of you would be very pleasant and most enjoyable stay in Kendari.

Wassalamualaikum Warahmatullahi Wabarakatuh

A handwritten signature in black ink, appearing to read 'L. Nafiu', with a long horizontal line extending to the right.

Dr. Ir. La Ode Nafiu, M.Si.

Chairman of International Seminar Committee

Preface

The Proceeding of International seminar “Improving Tropical Animal Production for Food Security”. The seminar was held on 3-5 November 2015 at Eddy Agus Mokodompit Auditorium, Universitas Halu Oleo, Kendari, Southeast Sulawesi, Indonesia, and organized by Faculty of Animal Science, Universitas Halu Oleo, Kendari. As much as 49 papers were contained in this proceeding. The papers consist of 8 papers from key note and invited speakers, 24 papers for oral presentation and 17 papers for poster presentation. Papers were divided into 6 categories, they are Genetic and Breeding, Physiology and Reproduction, Nutrition and Feed Technology, Forage and Pasture Management, Processing and Animal Product, and Livestock Management and Marketing.

The committee would like to say thank you very much to all of the reviewers, editorial staff, and all of the members of the committee who have given their support for the successfull of this international seminar and for the preparation of the proceeding. Finally, we would like to say thak you vey much for all the authors for their significant contribution to the seminar. We strongly believe that their significant contribution will be useful to all of societies to enhance the development of tropical animal production in the future.

Editorial Team

Board of Director : Prof.Dr.Ir.H.Usman Rianse,MS.
Prof.Dr.Ir Takdir Saili,M.Si.

Chairman : Dr.Ir. La Ode Nafiu, M.Si.

Secretary : Rahman, S.Pt.MT.

Honorary Treasurer : Sophian, SE.

Committe Members : Prof.Dr.Ir H Harapin Hafid,M.Si.
Syam Rahadi, S.Pt.,MP.
Dr. Muh Amrullah Pagala, S.Pt., M.Si.
Rahim Aka S.Pt., MP
Dian Agustina, S.Pt., M.Si.
La Ode Muh Elwan, S.Sos., M.PA
Amiluddin Indi, S.Pt., M.Si.
Sitti Nilawati S.,S.Sos., M.Si.
Fuji Astuti Auza, S.Pt., M.Si.
Achmad Selamat Aku S.Pt., M.Si.
Ir. Natsir Sandia, MP.
La Ode Arsad Sani, S.Pt.,M.Sc.
Astriana Napirah, S.Pt.,M.Sc.
Dra. Wa Kuasa, M.Hum.
Drs. Aris Pagala

Contents

KEY NOTE AND INVITED SPEAKERS

Ruminant Nutrition: The Role of Agricultural by Products in Beef Cattle Production	
Ali Agus	1
Breeding Strategies for Improvement of Global Traits in Thai Indigenous Chicken	
Monchai Duangjinda	6
Institutionalization of Swamp Buffalo Development in The Philippines	
L. C. Cruz	15
Solving Food Security Problems Through Ideas, Creativity, Innovation and Commercialization (ICIC) Ways in Tropical Animal Production System	
Ismail Dahlan	38
Improving Beef Cattle Production in Free Range Systems: Implications for Indonesia	
Kieren McCosker	55
Strategies to Improve Goat Production in India	
A. K. Thiruvankadan and R. Rajendran	63
Lienminh Chicken Breed: Native Breed and Livelihood of People on District-Island Cat Hai of Hai Phong City, Vietnam	
Bui Huu Doan, Pham Kim Dang, Hoang Anh Tuan, and Nguyen Hoang Thinh	73
Selected Plant Phytobiotics Feed Additive Based on Antimicrobial Property and Application in Meat-Type Duck	
Eko Widodo	80

ORAL PRESENTATION

Genetic and breeding

Diversity Gen Growth Hormone (GH) of Kacang Goat in Kota Gorontalo and Regency of Bone Bolango (Province of Gorontalo)	
Fahrul Ilham, Safriyanto Dako, Agus Bahar Rachman, Muhammad Ihsan Andi Dagong, and Lellah Rahim	87
Morfometric Potrait of Swamp Buffalo in Bombana	
La Ode Nafiu, T. Saili, and A. Bain	94

Physiology and Reproduction

The Clinical Symptom and Anatomical Pathology of Tolaki Chicken Which Infected Newcastle Disease Viral	
M. A. Pagala, Muladno, C. Sumantri, and S. Murtini	108
Body Condition Score of Bali Cows: Its Effecty on Reproductive Status	
Muhammad Yusuf, Djoni P. R., Abdul Latief Toleng, Rika Haryani, Mawardi A. Asja Z., and Sahiruddin	115

The Quality of Fresh semen of Bulls at 5⁰C and 24⁰C with or Without Diluent	
Enike Dwi Kusumawati and Henny Leondro	122
Spermatozoa Viability of Filial Ettawa Goat After Sexing Process	
Enike Dwi Kusumawati, Henny Leondro, Trinil Susilawati, and Nurul Isnaini	127
 Nutrition and Feed Technology	
Performance of Kampong Chicken Fed Rations With Supplementing Dry Carboxylate Salt Mixture (DCM) or Cococnut Oil Hydrolysisate (COH)	
Andi Murlina Tasse, Rahim Aka, La Malesi, Fuji A. A., Diska B. A., and Salomina S.	131
Provision of Multi-Nutrient Block for Local Goats: Effect on Physico-Chemical Properties of Goat Milk	
Asmuddin Natsir, M. I. A. Dagong, M. Zain Mide, R. Islamiyati, M. Irwan, and H. Basri ..	135
Determining The Pattern of Pesticide Residue Contamination and The Improvement of production, Quality, and Milk Safety of Dairy Cattle With Probiotic-Based Lignochloritic Bacteria	
Indah Prihartini	142
The Effect of Feeding <i>Gliricidia sepium</i> Leaf in The Dry Season on Ettawah Cross Bred Goat Milk Production and Quality at Household of Tumpang Regency, in Malang District	
Asmah Hidayati	149
Chemical Composition of Broiler Chicken Breast Fed Ration with Supplementation of Protected Fatty Acid	
Fitrianiingsih, A. M. Tasse, and Natsir Sandiah	154
Usage of Antibiotic on Chicken Poultry in District of Malang, East Java, Indonesia	
Lili Zalizar, R. Relawati, and W. Pancapalaga	158
Evaluation Model of Protected Fish Oil Supplementation to Realize The Quality and Productivity of Goat in The Doko District	
Dyah Lestari Yulianti, Aju Tjatur N. K., and Tri Ida Wahyu K.	168
Differences in The Quality of Feed on Blood Glucose Levels, Production, and Quality of Milk in Dairy Cattle	
Henny Leondro	173
The Nutrients Potential of Agricultural Waste As Feed of Ruminants in Southeast Sulawesi	
Rahman, H. Hafid, S. Rahadi, R. Aka, A. A. Anas, and S. Baena	180
The Supplementation Effect of Turmeric (<i>Curcuma domestica</i> Vahl.) and Brotowali (<i>Tinospora crispa</i> L. Miers) Extract on Broiler Meat Quality	
Syam Rahadi, A. Indi, Rahman, Y. Yadi, W. Kurniawan, and Mansur	185
 Forage and Pasture Management	
The Adaptability, Biomass Production, and Nutritional Value of Introduced Grasses in Timor-Leste	
Pedro de Deus, Y. A. Sutaryono, and I. G. E. Gunartha	189
Indentification of Weed and Their Potency as Forage	
Halim, F. S. Rembon, and Resman	194

The Effect of Liquid Extract Organic Fertilizer of Centrosema (<i>Centrosema pubescens</i>) Leaf Sheats on The Growth and Biomass Production of Elephant Grass (<i>Pennisetum purpureum</i>)	
Muhammad Mukhtar and I Komang Astawa	198

Processing and Animal Product

Improving The Quality of The Yogurt With The Addition of Honey	
Aju Tjatur Nugroho Krisnaningsih and D. L. Yulianti	205
Study of The Lipid Hydrolysis Ability of Some Lipolytic Bacteria Species in Preserved Meat Combination Method of Lettuce Leaf Ensiling and Kepayang Seed Fermentation	
Permata Ika Hidayati	212

Livestock Management and Marketing

Dairy Cattle Business Development Through Agribusiness System Supporting Business District of Karangploso Ngijo in The Village of Malang Regency	
Dimas Pratidina Puriastuti Hadiani and W. E. Susanto	221
Mapping of Leading Livestock Subsector in East Java Province	
Sutawi	226
Building Animals Cattle Collective Farming System as an Alternative in Anticipation of Impact Global Warming (Case in Taruna Cocoa Farmers in East Kolaka)	
Idrus Salam and La Ode Nafiu	231

POSTER PRESENTATION

Genetic and breeding

Variation on Body Weight and Body Dimension of Buffalo in Kabaena Island, Bombana, Southeast Sulawesi	
M. Rusdin, Ld. Nafiu, T. Saili, and S. Rahadi	237
Genetic Analysis of Tolaki Chicken During Growth Period	
Rusli Badaruddin and Ld. Nafiu	238
Enhacing Local Tropical Beef Cattle Production Supporting Food Security in Indonesia	
Endang Tri Margawati	239

Physiology and Reproduction

The Effect of Controlled internal Drug Release (CIDR) on Concentration of Estrogen Hormone in Different Kacang and Bligon Does	
Popalayah, Ismaya, and Nono Ngadiyono	240
Epididymal Sperm Maturation Level of Bali Cattle Based on The Presence of Cytoplasmic Droplet	
Rina Sumiarti, Ld. Baa, and T. Saili	241

Nutrition and Feed Technology

The Effect of Storage Period on Chemical Composition of Hydrolized Feeds for Broiler	
Denvy Meidian Daoed, A.M. Tasse, and A. Indi	243
Performance of Kampong Chicken Fed Fermented Fish Meal With Different Fermenter	
Asnawar, Ld. Nafiu, and A. M. Tasse	244
The Effect of Chitosan Supplementation in The Diet on Fat and Cholesterol Level of Duck Blood	
Surahmanto, M. A. Pagala, N. Sandiah, and Fitriarningsih	246
The Using of Protected Fatty Acid Supplement to Improve Carcass Percentage of Broiler Chicken	
Fuji Astuti Auza, A. M. Tasse, W. L. Salido, and A. Napirah	247
In Vitro Effects of Oligosaccharides on Bacterial Concentration and Fermentation Profiles in Dairy Calf Colon Content	
L. Hendraningsih, C. Sutrisno, J. Ahmadi, A. Muktiani, and B. Sulistyanto	249
The Effect of LAB Inoculants on The Chemical and Microbial Composition in Fermentation of TMR Silage	
Ahmad Wahyudi, Sutawi, and L. Hendraningsih	250

Processing and Animal Product

The Effect of Soaking Period on Chemical Quality of Gelatin Derived from Broiler Leg Skin	
Elen Rosalia Joka, H. Hafid, and T. Saili	251
The Effect of Sweet Potato Flour, Kabuto Flour, and Sago on Broiler Chicken Meat Ball Quality	
Fakhrul Arifin Nasution, H. Hafid, and Rahim Aka	253

Livestock Management and Marketing

Profile and prospect of Development of Buffalo in Bombana District, Southeast Sulawesi	
La Ode Arsad Sani, Usman Rianse, Rusli Badaruddin, and Achmad Selamat Aku	254
Identification of Farmers Knowledge on Rice Straws Technology for Beef Cattle Development in Enrekang Regency	
Agustina Abdullah, Hastang, A. A. Amrawati, and Jamila	255
Exploring Dairy Farmer’s Knowledge and Practices of Manure Management in Enrekang Regency	
Syahdar Baba, Asmuddin Natsir, Fatma, and Izdin Idrus	256
The Analysis of The Beef Cattle Development Policy by Means of Social Aid Program in Gorontalo Province	
Laode Sahara and Sri Yenny Pateda	257

Diversity Gen Growth Hormone (Gh) of Kacang Goat In Kota Gorontalo and Regency Of Bone Bolango (Province Of Gorontalo)

Fahrul Ilham¹, Safriyanto Dako¹, Agus Bahar Rachman¹, Muhammad Ihsan Andi Dagong², and Lellah Rahim²

¹Department of Animal Science, Faculty of Agriculture, State University of Gorontalo, Gorontalo

²Department of Animal Science, Faculty of Animal Science, University of Hasanuddin, Makassar
Email: fahrulilham80@yahoo.com

ABSTRACT

Growth Hormone (GH) is a hormone produced by cells in the anterior lobe of the pituitary somatotrop and formation process under the control of GH gene. One important function of this hormone is to help the process of tissue formation and metabolism of fat to meat forming. The purpose of this study was to determine the genetic diversity of genes GH Kacang goat in sub-populations of Kota Gorontalo and Regency of Bone Bolango. Blood samples were used for DNA extraction process in Centre of Biotechnology Laboratory University of Hasanuddin is 41 samples of Kacang goats with 21 samples from Kota Gorontalo city and 20 samples from Regency of Bone Bolango. Genomic DNA was extracted using a kit DNA extraction Genjet Genomic DNA Extraction (Thermo Scientific) following standard protocol phenol-chloroform, amplified by the technique of Polymerase Chain Reaction (PCR), and genotyping was done by Polymerase Chain Reaction-Restriction Fragment Length Polymorphism (PCR-RFLP) using the restriction enzyme Hae III. Data were analyzed descriptively by calculating the frequency of genotype, allele frequency, and degree of heterozygosity. The results showed GH genotype frequencies for the genotypes AA and AB were 2.45 and 97.5% respectively and the frequency of alleles A and B were 51.2 and 48.7% per cent respectively and the observed heterozygosity (Ho) and expected heterozygosity (He) were 0.97 and 0.50 respectively. Based on the sub-population genotype frequencies obtained GH gene of Kacang goat from Kota Gorontalo is 95.25 % for AA and 4.76% for AB, the frequency of allele A and B was 52.3% 47.6%, observed heterozygosity (Ho) 0.95 and expected heterozygosity (He) 0.51. GH gene genotype frequencies in Kacang goat from Regency of Bone Bolango is AB 100%, the frequency of allele A and allele B 0.5 0.5, observation heterozygosity (Ho) of 1.00 and expectation heterozygosity (He) 0.51. Based on the results concluded GH gene Kacang goat from Kota Gorontalo and Regency of Bone Bolango is polymorphic so that it can be used as the basis for the implementation of the selection.

Key Words: Genetic Diversity, Growth Hormone, Kacang Goat

INTRODUCTION

Kacang Goat as one of the local goat native to Indonesia which has advantages among others like able to adapt and survive on land with low quality forage conditions, resistance to local diseases is quite good, and the reproductive rate is high. Kacang Goat have smaller body size and body weight better than goats of Peranakan Etawah (PE) that is preferred by traditional farmers because they does not require high costs in the supply of feed during the production process. Along with population growth, the demand for meat in Indonesia is increasing as well so the goats are increasingly required not just for the main products (meat, milk, and feathers), but as one of the main requirements in various religious rituals such as animal sacrifices or the procession aqiqah in Islam.

Existence of Kacang goat in some areas of Indonesia today is quite alarming and increasingly threatened by the onslaught of interbreeding with imported goat breeds. This is done with a desire

to accelerate the increase in productivity, but not accompanied by efforts to make the preservation of breed of Kacang goat as Animal Genetic Resources locally. Based on data from the Directorate General of Animal Science and Veterinary Republic of Indonesia (2013) up to the year 2013, the population of goats in Indonesia is 18.576.192 of which, 9.864.157 (56.42%) spread across the island of Java, 4.108.439 (23.59%) on the island of Sumatra, and 3.510.127 (19.99%) are scattered on other islands in Indonesia. Specifically in the provzince of Gorontalo, total population of goats owned 76.982 is dominated of Kacang goat and small portion of breed of Etawa goat and derived from crosses both.

Kacang goat as one of the germplasm and has been designated by the government as clumps of Kacang goat through a decree of the Minister of Agriculture No. 2840 / Kpts / LB.430 / 8/2012 need to be followed through purification, development, and sustainable use in the context of preservation. Research results of Ilham (2014) in the local goats in regency of Bone Bolango expressed that goats found in phenotype is Kacang goat, breed of Etawa goat and derived from crosses both.

The diversity of phenotypes are often in different levels with the level of genetic diversity (genes) of each goat. One gene that is often used to determine the genetic diversity in goats is genes Growth Hormone (GH). These genes function to control the process of formation of GH in the cell somatotrop the anterior lobe that plays a role in tissue growth and fat metabolism (Burton *et al*, 1994), increasing the efficiency of the use of feed, increasing the growth of organs and bone in animals growing (Etherton and Bauman, 1998), and setting the development of mammary glands in ruminants (Akers, 2006). Detection of genetic diversity has better accuracy than phenotypically because is not affected by the environment. Under these conditions, this study aims to determine the genetic diversity of genes GH Kacang goat in Kota Gorontalo and Bone Bolango Regency, Gorontalo Province.

MATERIAL AND METHODS

Blood Collection

Collection of blood samples obtained from goat of Kacang had 21 numbers from Kota Gorontalo and Bone Bolango Regency have 20 number so the total samples analyzed were 41. The determination is based on the region of origin of most populated goat of Kacang in each of the districts. Blood collected using vacumtainer tubes from the jugular vein (about 3 ml) using a needle and tubing vacuttainerberisi venojet EDTA. Blood from every region were subsequently collected and stored in a refrigerator temperature of 4 ° C prior to extraction of genomic DNA. The process of extracting and GH gene diversity analysis was carried out in the Laboratory of Integrated Biotechnology, Faculty of Animal Science, University of Hasanuddin.

Extraction of DNA

Blood DNA extraction procedure was based on standard phenol-chloroform method (Sambrook *et al.*, 1989). DNA was isolated and purified using a DNA extraction kit Genjet Genomic DNA Extraction (Thermo Scientific) extraction by following the protocols provided. A total of 200 ml of blood samples were lysed by adding 400 ml of lysis buffer solution and 20 ml proteinase K (10 mg / ml) was then incubated at 56°C for 60 minutes in water bath shaker. After incubation the solution was added 200 mL of 96% absolute ethanol and centrifuged at 6,000 xg for 1 minute. Purification of DNA was conducted using spin column by adding 500 µl wash solution wash buffer I, followed by centrifugation at 8000 × g for 1 minute. After the supernatants were discarded, the DNA re-washed with 500 mL wash buffer II and centrifuged at 12,000 xg for 3 minutes. Furthermore, the DNA was dissolved in 200 mL of elution buffer and disetrifugation at 8,000 x g. DNA extracted was collected and stored at -20 ° C. DNA quality testing conducted qualitatively by electrophoresis on a 1.5% agarose gel with 1x TBE buffer (89 mM Tris, 89 mM boric acid, 2 mM Na₂ EDTA) containing 100 ng / ml ethidium bromide and visualized on a UV transiluminator (gel documentation system).

Amplification of target DNA by the Polymerase Chain Reaction (PCR)

Composition of the PCR reaction was conditioned at 25 µl reaction volume consisting of 100 ng of DNA, 0.25 mM each primer, 150 µM dNTP, 2.5 mM Mg²⁺, 0.5 and 1x Taq DNA polymerase buffer. Primers used for gene amplification GH consists of forward primer with the DNA sequence 5'-CTCTGCCTGCCCTGGACT-3' and reverse primer with a DNA sequence 5'-GGAGAAGCAGAAGGCAACC-3' (Hua *et al.*, 2009). Proses amplification preceded by initial denaturation at 94 ° C for 2 min, followed by the second stage has 35 cycles, each cycle consisting of denaturation at 94 ° C for 45 seconds, annealing (annealing) on temperature 65°C for 30 seconds, and elongation (extension) of the cycle ending at a temperature of 72 ° C for 5 minutes. Process of amplification target of DNA using PCR machine (SensoQuest, Germany). Detection of the success of the amplification process is carried out by means of PCR products in electrophoresis on 1.5% agarose gel with 1x TBE buffer (89 mM Tris, 89 mM boric acid, 2 mM Na₂ EDTA) containing 100 ng / ml of ethidium bromide, and visualized on a UV transilluminator (gel documentation system).

Genotyping Gene Fragment GH

PCR products obtained from each of the target genes was analyzed by the method of Restriction Fragment Length polymorphisms (RFLP) through cuts GH gene using HaeIII restriction enzyme cutting sites which have GG | CC. A total of 4 µl DNA PCR products added 0.5 µl restriction enzyme (5U); 0.7 µl enzyme buffer; and 1 µl milique water to a volume of 7 µl further incubated for 17 h at 37 ° C. PCR-RFLP products later in electrophoresis on 2% agarose gel with 1x TBE buffer (89 mM Tris, 89 mM boric acid, 2 mM Na₂ EDTA) containing 100 ng/ml ethidium bromide. Then visualized on a UV transilluminator (gel documentation system). Allele is determined by interpreting the ribbon (band) formed the most distant migration of the anode (-) to the cathode (+) as the A allele, allele B next, and so on.

Data analysis

The data were then analyzed by calculating the value of each of the genotype frequency, allele frequency, the degree of heterozygosity, and hardy-Weinberg equilibrium by chi-square test with the formula Nei and Kumar (2000).

The formula used to calculate the frequency of genotype and allele frequencies among others:

$$X_{ii} = \frac{n_{ii}}{N} \times 100\%$$

$$X_i = \frac{(2n_{ii} + \sum_{j \neq i} n_{ij})}{2N}$$

Description:

- X_{ii} = Frequency Genotype
- X_i = allele frequencies - i
- N_{ii} = number of samples ii genotype
- N_{ij} = number of samples ij genotype
- n = number of samples

The formula used to calculate the value of the observation heterozygosity (H_o) and expectations of heterozygosity (H_e), among others:

$$H_o = \sum_k^s w_k \sum_{i \neq j}^q X_{kij}$$

$$H_e = 1 - \sum_k^s w_k \sum_i^q X_{ki}^2$$

Description :

- H_o = heterozygosity observation among the population;
- H_e = heterozygosity expectations among the population;
- w_k = the relative size of the population;
- X_{kij} (i ≠ j) = frequency in the population to A_iA_j-k

RESULTS AND DISCUSSION

GH Gene Amplification

GH genes in Kacang goats were successfully amplified by PCR using a 1.5% agarose gel. Long GH which successfully amplified gene fragment in this study was 422 bp (Figure 1). This is similar to research conducted by Hua *et al* (2009) that the length of the GH gene amplification product by using the base pair primer was 422 base pairs (bp). Long fragment amplification product can be determined by matching the attachment site on the primer pair GH gene sequences (GenBank access number JN012229.1).

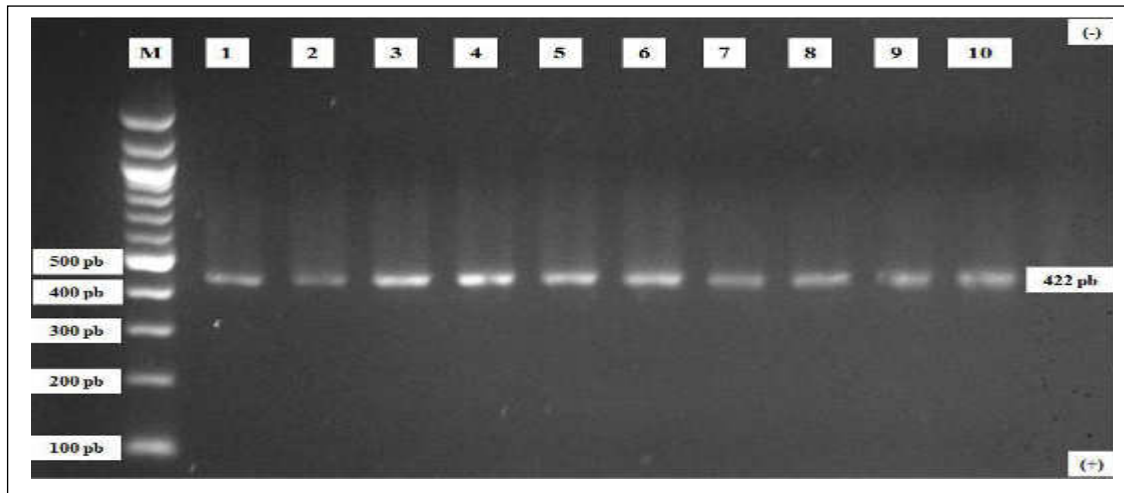


Figure 1. Growth Hormone Gene Amplification results Kacang Goat with PCR Technique

GH gene amplification is a process of propagation or multiplication component of GH gene DNA extracted using the aid of PCR. Temperature annealing in Kacang goats in this study is 65°C for 30 seconds. This condition is different from the temperature annealing in goats of Peranakan Etawah (PE), Saanen, and Peranakan Etawah-Saanen (PESA) which is 60° C for 45 seconds (Yuniarsih *et al*, 2011), in cattle Bali temperature of 60°C (Sumantri *et al*, 2011), but similar to the results of research on Kacang goat in Jeneponto (Yuliyanty, 2013). Several factors can affect the success rate of amplification in livestock among other interaction components of the mixture of PCR (Palumbi, 1996), the temperature annealing (Yuniarsih *et al.*, 2011), the purity of the extraction, the accuracy of the primaries used is the content of G / C is 50%, as well as the accuracy of PCR conditions (Rahayu *et al.*, 2006).

The diversity of genes GH / HaeIII with RFLP

Genetic diversity can be calculated using several measuring devices including genotype frequency, allele frequency, and degree of heterozygosity. Genotype frequency is the proportion of individuals of each genotype, gene frequency involves the identification of alleles at each locus were analyzed and the calculation of the proportion of different types of alleles (Zein *et al*, 2012). Allele frequency is relatively from allele frequency in the population or the number of total alleles contained in the population (Nei and Kumar, 2000) The value of heterozygosity is the most appropriate way to measure the genetic diversity of a population (Nei, 1987).

The frequency of genotype and allele frequencies

Based on the results of the analysis of genotype frequency in the DNA fragment GH genes in Kacang goats of the 41 samples the results of two kinds of genotypes AA and AB was obtained while genotype B was not found (Table 1). AB genotype frequency (97.5%) was higher than the AA genotype frequency (4.76%). AB genotypes in this study is characterized by the formation of three

fragments with a length of each 422 bp, 366 bp, and 56 bp fragment while AA 2 fragment with a length of 366 bp and 56 bp (Figure 2). This result does not vary much with the results Yuliyanti (2013) in Kacang goats that received genotypes AB (0.723) high, while the AA genotype (0.276) The results of the other studies obtained frequency of Boer goat genotype AB (0.837) higher than the AA genotype (0.162) but not found BB genotype (Hua *et al.*, 2009).

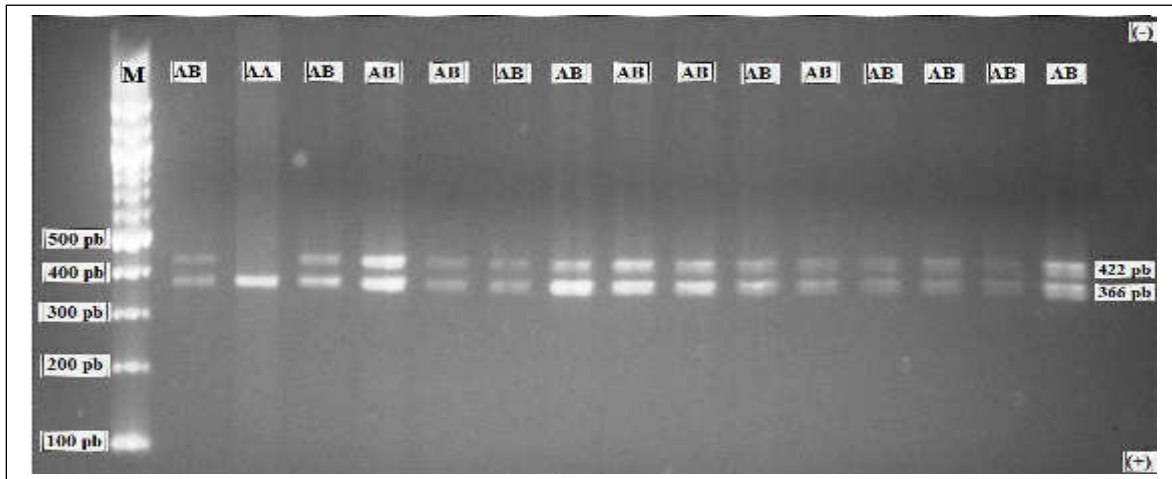


Figure 2. Visualization of PCR-RFLP gene segments GH|HaeIII goat beans in Gorontalo city and Bone Regency Bolango

Results of analysis of gene segments GH|HaeIII Kacang goat on both sub-populations indicated that the A allele frequency was 0.512 higher than the frequencies of alleles B 0.487. A allele frequencies were higher due to the discovery of genotype AA in the sub-population of the Kota Gorontalo though only one tail so that the effect on the results of the A allele frequency calculation higher than allele frequencies of alleles obtained B. is not much different from the results Yuliyanti (2013) who discovered the A allele frequency was 0.638 and the B allele was 0.36. Allele frequency values of both A and B lower than 0.95 indicates a polymorphic gene GH|HaeIII in Kota Gorontalo and Regency of Bone Bolango. Nei (1987) says that an allele is said to be polymorphic allele if it has a frequency equal to or less than 0.99. Nei and Kumar (2000) stated that the genetic diversity occurs when there are two or more alleles in a population (typically more than 1%).

The degree of heterozygosity and Hardy-Weinberg Equilibrium

Based on the analysis, the value of observation heterozygosity (H_o) was 0.97 and expectation value of heterozygosity (H_e) is 0.50 (Table 1). Heterozygosity value is slightly different from the results of Yuliyanti (2013) in Kacang goats in Jeneponto stating H_e H_o amounted to 0.533 and 0.461. Heterozygosity values influenced the amount by the number of samples, the number of alleles and allele frequencies. According to Tambasco *et al* (2003), the difference between the value of the observation heterozygosity (H_o) and the expectation value of heterozygosity (H_e) may be an indicator of lack of balance genotypes in the population observed. Nei (1987) stated that the value of heterozygosity ranged between 0 (zero) to 1 (one), if the value of heterozygosity equal to 0, then among the population measured have a genetic relationship is very close and if the value of heterozygosity equal to 1 then among the population as measured there genetic or genetic linkage relationships altogether. Observation heterozygosity values is higher than the expectations of heterozygosity indicates a relatively high genetic diversity in the population of Kacang goats in Kota Gorontalo and Regency of Bone Bolango District. Some factors that may affect the high level of diversity is the mating of females to males who are not pure breeds of Kacang goat.

Table 1. Frequency of genotypes, allele frequencies and heterozygosity Value Kacang Goat in Kota Gorontalo and Regency of Bone Bolango, Gorontalo Province

Region	n (goat)	Genotype	Frequency Genotype	Allele Frequency		Heterozygosity		X ²
				A	B	Ho	He	
Kota Gorontalo	21	AA	1 (0,047)	0,523	0,476	0,95	0,51	16,4
		AB	20 (0,952)					
		BB	0					
Bone Bolango	20	AA	0	0,50	0,50	1,00	0,51	19,0
		AB	20 (1,00)					
		BB	0					
Kota Gorontalo and Bone Bolango	41	AA	1 (0,024)	0,512	0,487	0,97	0,50	36,23
		AB	40 (0,975)					
		BB	0					

Description: degrees of freedom (db) = 1; X 20.05 = 3.84 and = 6.64

Balance X_{20,01} alleles within a population (Hardy-Weinberg equilibrium) be based on the value of chi squared (X²) are calculated based on differences in genotype frequency of observations with genotype frequencies expectations (Misrianti *et al* , 2011). Based on the analysis of gene GH|HaeIII chi squared on the results obtained in the two sub-populations of Kacang goats in Kota Gorontalo and Bone Bolango in an unbalanced state (X² count 36.3 > X² Table 3.84) of provisions expected by Hardy-Weinberg law. This imbalance indicates that there has been a relationship that is not random in both subpopulations are caused by several factors. Hardy Weinberg equilibrium is closely related to the frequency of genotype and allele frequencies. Based on Hardy-Weinberg law that dominant and recessive gene frequencies in a population large enough will not change from generation to generation if there is no selection, migration, mutation, genetic drift (Hardjosubroto, 1998). The results of research conducted by Ilham (2014) declared a local goat in Bone Bolango phenotypically characterized qualitatively like those of Kacang and Peranakan Etawa goats beans(?genes). Introductions Peranakan Etawah (PE) goat in the past in order to improve the genetic quality of Kacang goat in Gorontalo bit much has altered the genetic composition of Kacang goat in Kota Gorontalo and Bone Bolango Regency. Artificial selection that is not directed has caused the Kacang and PE goats with a pattern that is not directed also to produce offspring goat-PE composite but without clear genetic composition percentage causing an imbalance of Hardy-Weinberg.

CONCLUSION

Based on the results of the study concluded GH gene genotype frequencies of the whole sub-populations observed was AA and AB 2.45% and 97.5%, the frequency of allele A and allele B 51.2% and 48.7%, observations heterozygosity (Ho) 0,97 and hope heterozygosity (He) 0.50. Kacang goat population in Kota Gorontalo and Bone Bolango Regency in an unbalanced condition and are polymorphic so that it can be used as the basis for selection in order to improve the quality of genetic relationship.

REFERENCES

- Akers, R.M. 2006. Major Advances Associated with Hormone and Growth Factor Regulation of Mammary Growth and Lactation in Dairy Cow. *J. Dairy Sci.* 89: 1222-1234.
- Burton, J.L., B.W McBride., E. Block and D.R. Glimm. 1994. A Review of Bovine Growth Hormone. *Can J. Anim. Sci.* 74: 167-201.
- Ditjennak PKH. 2012. Statistics Ranch. Directorate General of Livestock and Animal Health, Ministry of Agriculture.
- Etherton, T.D. and D.E Bauman. 1998. Biology of Somatotropin in Growth and Lactation of Domestic Animals. *Physical Rev.*, 78: 745-761.
- Hua, G.H., S.L Chen., J.N Yu., K.L Cai., C.J Wu., Q.L Li., Ax Liang., L.Han., L.Y Geng., Z.Shen., D.Q Xu & L.G That. 2009. Polymorphism of The Growth Hormone Gene and Its Association with Growth Traits in Boer Goat Bucks incomplete.
- Ilham, F. 2014. Phenotype Diversity Local Goat Bone Bolango District. Proceedings of the National Seminar and Workshop on Optimization of Local Resources in Technology-Based Livestock People 1st, 2014. UNHAS Makassar. October 9 to 10 2014: 41-50
- Nei, M. 1987. *Molecular Genetics Evolutionary*. Columbia University Press, New York.
- Nei, M. and Kumar, S. 2000. *Molecular Evolution and Phylogenetics*. Oxford University Press.
- Misrianti, R. C. Sumantri, and A. Anggraeni. 2011. Diversity Gen Growth Hormone Receptor (GHR) In Holstein Friesian dairy cows. *JITV.* 16(4): 253-259.
- Palumbi, S.R. 1996. *Nucleic Acids II: The Polymerase Chain Reaction*. In: D.M. Hillis, C. Moritz and B.K.Mable (Editor). *Molecular Systematics*. 2nd Edition. Sinauer Associates. Inc., Massachusetts, USA.
- Rahayu S., S.B Sumitro., T Susilawati., And Soemarno. 2006. Identification of GH Gene Polymorphism (Growth Hormone) Bali cattle by PCR-RFLP method. *Berk. Penel. Biological: 12* (7-11).
- Rahmat, D. 2010. Model Pattern Breeding (Breeding Scheme) Sustainable Termak. Scientific work. Faculty of Animal Husbandry, Padjadjaran University. Bandung.
- Sambrook, J., E.F Fritsch, and T. Maniatis. 1989. *Molecular Cloning.A Laboratory Manual*. 2nd Ed. Cold Spring Harbor Laboratory Press.
- Sumantri, C., M. Imron., Sugiyono., Andreas., Misrianti, R., A.B.L Isaac. 2011. Diversity Group Gen Growth Hormone (GH, GHR, GHRH and Pit-1) Relation to Response Super ovulation, ovulation rate, fertilization rate and embryo quality in the Central Cattle Embryos Livestock (BET) Cipelang. *JITV.* 16(2): 126-139.
- Tambasco, D.D., C.C.P Paz., M. Tambasco-Studart., A.P Pereira., M.M Alencar., A.R Freitas., L.L Countinho., I.U Packer., and L. C. A. Regitano. 2003. Candidate Genes for Growth Traits in Beef Cattle *Bos Taurus x Bos indicus*. *J. Anim. Bred. Genet.* 120: 51-60.
- Yuliyanty. 2013. Diversity of Gene GH (Growth Hormone) on Kacang Goat Population in Jeneponto. Thesis. Faculty of Animal Husbandry. Hasanuddin University. Makassar.
- Yuniarsih, P., Jakaria and Muladno. 2011. Exploration Growth Hormone Gene Exon 3 at Goats Peranakan Etawah (PE), Saanen and PESA Through PCR-SSCP Technique. National Seminar on Animal Husbandry and Veterinary Technology, 2011.
- Zein, M.S.A, S Sulandari, Muladno, Subandriyo, and Riwantoro. 2012. Genetic Diversity and Kinship Local Goat Indonesia Using Microsatellite DNA Marker. *JITV.* 17(1): 25-35.