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Soaking in Seawater of Rice Straw Increases *In Vitro* Dry Matter and Organic Matter Digestibility

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Abstract

This research aims to improve the digestibility and nutritional value of rice straw as a ruminant animal feed and determine the effect of long soaking in sea water of rice straw on digestibility *in vitro* dry matter and organic matter. The used materials in this study are a bales machine, weighing scales, rapiah rope, poly bags, rice straw varieties Ciliwung obtained from rice fields in Bantimurung, sea water with 2.71% saline, as well as tools and chemicals for analysis of *in vitro* dry matter and organic matter digestibility with pepsin, calculus method. This study is done based on Randomized Complete Design (RCD) with 5 treatments and 4 replications. Variance based on the long soaking treatment gives the nature of the response curve linear on the digestibility of dry matter and also to organic matter digestibility. The magnitude of the correlation length relationship soaking rice straw and with sea water for *in vitro* dry matter and organic matter digestibility that is 96.5% and 96.8% respectively. Based on the results of research and discussion can be concluded that rice straw is soaked with sea water 3-12 days producing dry matter digestibility and organic matter are higher than the rice straw that is not soaked with sea water. Soaking of the sea water for 3-12 days increase the digestibility of dry matter and organic matter.

Keywords: rice straw, digestibility, *in vitro* and seawater

A. Introduction

The general problem of livestock business in Indonesia is the higher feed prices and the availability of livestock feed ingredients, both from the quality aspect and the provision of feed in a sustainable manner. This is due to the shifting of the function of agricultural land into settlements and industries that can reduce the opportunity of planting grass as the main food for ruminant livestock. This forage feed material is well known by season factor. During the

rainy season, it is available in large quantities and the abundance in the dry season is rather very limited. To overcome this, the breeders feed the rest of the farm like rice straw.

Rice straw from harvesting is not much eaten by livestock, even if it is given to cattle, there are only a few eat. It is because it has less favorable to livestock. So that after harvesting the paddy, the farmers only accumulate and allow the rice straw to dry and even burn. The rice straw has not been widely used by the community for ruminants. The barriers to the widespread use of rice straw for ruminant feed are low nutritional value when compared to forage feed. This is due to lower crude protein content, the lower energy content and low digestibility (only 37%) and the mineral content is mismatched so that the dry matter consumption is limited (Sitorus, 2002), the use of rice straw directly or as a single feed can not meet Supply of nutrients needed by livestock. In addition, collecting rice straw and transporting it around the house (settlement) is very difficult, because the rice fields are relatively far from home.

The abundant agricultural waste in the form of rice straw can be used in ruminant livestock to overcome the obstacle of providing animal feed material during the dry season, it is necessary to make an effort to increase the usefulness of the waste through a proper feed technology. One of the appropriate feed technology that is done in the processing of animal feed ingredients is to soak the rice straw in the sea water. The main constraining factor in the use of rice straw as animal feed is the low coefficient of digestibility and nutritional value (Abdullah, 2008).

B. Methodology

1. The Material

This research was divided into two stages. The first stage is the making of rice straw bales which are then soaked in seawater in the Feed Industry and Technology Laboratory, and the second stage of chemical analysis and digestibility in vitro dry matter & organic material at the Laboratory of Chemical Feed Faculty of Animal Husbandry, Hasanuddin University, Makassar. The tools used in this research are ball, scales, measuring cylinders, rope, oven, thermometer, 120 ml volume plastic, rubber stoppers, analytical balance, incubator, crucible g0och, stirrer, incubator, tube, polybag, pH measurement and furnace. The materials used are rice straw, salt water 2.71%, sodium carbonate, acid - pepsin, buffer cellulose – carbonate

2. The Method of Research Design

This research was conducted by using Completely Randomized Design (Gaspersz, 1991) with 5 treatments and 4 replications in which each replication consisted of 5 bales of rice straw weighing 10 kg / ball and the treatment was as follows:

P0 : rice straw bales are not soaked
T1 : rice straw bales are soaked for 3 days
T2 : rice straw bales are soaked for 6 days
T3 : rice straw bales are soaked for 9 days
T4 : rice straw bales are soaked for 12 days

3. The Research Procedures

This research was designed to determine the level of digestibility in vitro dry matter and rice straw organic material soaked in seawater. This research begins with the making of rice straw ciliwung varieties obtained from the area of rice field Bantimurung Maros. Then it was made in the form of bales weighing 10 kg / ball which amounted to 20 bals then done soaking with different time. After soaking, the aerated rice straw is milled. Furthermore, it conducted in vitro digestibility analysis at the Laboratory of Chemical Feed Faculty of Animal Husbandry, Hasanuddin University, Makassar.

In vitro digestibility, the research was performed using the cellulase pepsin method (Goto & Minson, 1977). The vitro stages begin with the sample weighed as much as ± 0.5 grammes and put into a plastic centrifuge tube of 120 ml volume. Then 25 ml of the pepsin - acid solution was added to each tube and then sealed the tube with rubber plug and then incubated for 72 hours at 500C, followed by fine shaking 6 times (shaking 1 time in 12-hour time scale). After that, the rubber plug was removed and 1.5 ml of sodium carbonate 1 mole was inserted through the tube wall and followed by the addition of 30 ml of cellulose acetate buffers into each tube. At this stage, the pH of the study sample is taken into account so that the pH of the sample becomes 4.5 - 4.7. If the pH of the sample is lower than the specified number, then sodium carbonate is added and if the pH of the sample is higher than the research sample then the acetic acid is added.

Then, the tube is closed and incubated for 48 hours at 500C and followed by fine shaking 4 times (Shuffle 1 time in a 12-hour time scale). Furthermore, the contents of the tubes are filtered through the crucible gooch that has been dried and weighed previously. The last stage is the crucible containing the research sample weighed and already dried. To determine the digestibility of organic matter, it has done by clarifying the sample for 3 hours at 5200C.

The calculation of digestibility :

$$DMD = \frac{100 - (WSG + Residu\ Oven - WSG\ E\mathit{mpty}) \times 100}{Dry\ Sample\ Weight\ of\ the\ Oven}$$

$$DOM = \frac{100 - (BSG + Residu\ Oven - BSG + Sample\ After\ Furnace) \times 100}{Heavy\ Organic\ Matter\ Dry\ Sample}$$

Description:
DMD = Dry Material Digestibility
DOM = Digestibility Organic Materials
WSG = Weight Sentered Glass

C. Result and Discussion

The average digestibility in vitro dry matter and organic rice straw material soaked in seawater with different soaking periods. And the statistic analyzed was doing under SPSS Ver.16.0 software. It could be seen in Table 1.

Table 1. The average digestibility in vitro dry matter and rice straw organic material soaked in seawater with different soaking periods

Treatment	*In vitro Digestibility* (%)	
	Dry Matter (DM)	Organic Matter (OM)
T_0	37,30 ± 0,429[a]	31,89 ± 0,309[a]
T_1	37,86 ± 0,524[a]	34,94 ± 0,878[b]
T_2	38,70 ± 0,168[b]	37,11 ± 0,251[c]
T_3	39,27 ± 0,697[b]	38,80 ± 0,963[d]
T_4	40,74 ± 0,379[c]	39,96 ± 0,482[e]

Description = superscripts Different in the same column show real differences (P <0.05)

Based on the variance in Table 1, it showed that soaking of straw in seawater significantly (P <0,05) to the digestibility of in vitro dry matter and organic matter. The average in vitro digestibility values of dry matter at each treatment were T0 (37,30) T1 (37,86), T2 (38,70), T3 (39,27) and T4 (40,74). In vitro digestibility, the value of the highest drying material in T4 treatment and lowest on T0 treatment. Based on the calculation of variance, it was seen that T0 was not significantly different with T1. But it was significantly different (P <0.05) with T2, T3 and T4. While T2 was not different from T3 but significantly different (P <0.05) with T0, T1 and T4. And T4 was significantly different (P <0.05) with T0, T1, T2 and T3.

The average in vitro digestibility values of organic matter at each treatment were T0 (31,89) T1 (34,94), T2 (37,11), T3 (38,80) and T4 (39,96). In vitro digestibility, the value of the highest organic material in the T4 treatment and the lowest in treatment T0. Based on the calculation of variance, it is seen that T0 is significantly different (P <0.05) with T1, T2, T3 and T4 as well as others. The result of analysis of soaking variety of rice straw in sea water by using otogonal polynomial test can be seen in Table 2.

Table 2. The Results of Analysis of Variety Effect of Soaking Rice Scraw Imprint in Sea Water Against In vitro Digestion Dry Material and Organic Material

Variance	Opportunity F table <F arithmetic	
	Dry Matter (DM)	Organik Matter (OM)
Treatment	< 0.01	< 0.01
Contrast 0 vs 1,2,3,4	< 0.01	< 0.01
Orthogonal Polynomial:		
- Linear	< 0.01	< 0.01
- Quadratic	> 0.05	< 0.01
- Cubic	> 0.05	> 0.05
- Quartiles	> 0.05	> 0.05

Description: Not Real (P> 0.05), Real (P <0.05) and Very Real (P <0.01)

1. Dry matter digestibility

The effect of long time immersion of rice straw in seawater on in vitro dry matter digestibility based on response curve analysis can be seen in figure 1.

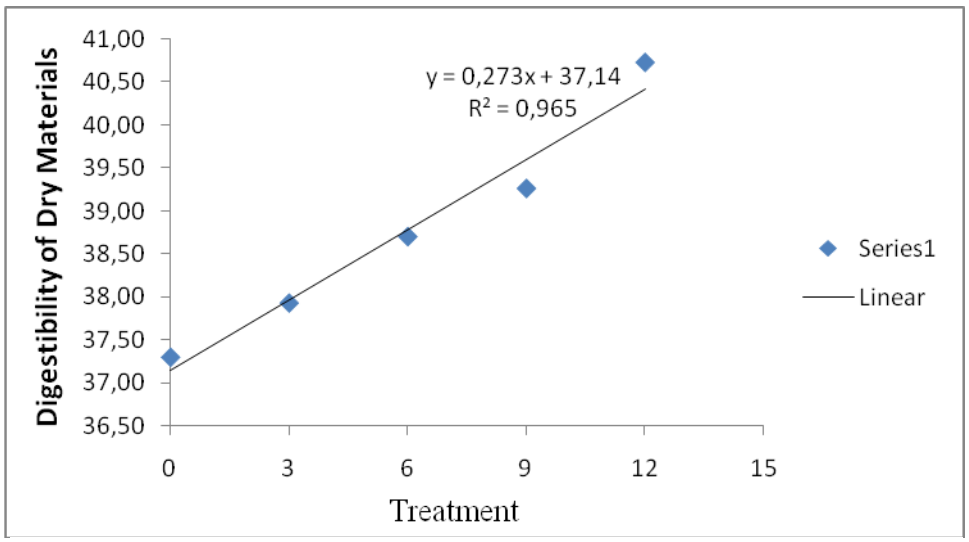

Figure 1. Curve of Response of Longer Effect of Immersion of Rice Straw with Sea Water Against In vitro Digestibility of Dry Material

Based on the results of the above response curve analysis, it is known that dry matter gives a linear response to the duration of soaking of straw in seawater. The magnitude of the long correlation relationship of soaking rice straw in seawater to digestibility in vitro dry matter is 96.5%. It means 96.5% influence of immersion duration to increase in vitro digestibility of rice straw dry matter. It can be seen in Table 1. That the average digestibility of in vitro dry matter has increased from each treatment from T1 to T4.

2. Organic Material Degradation

The effect of long immersion of paddy straw in seawater on in vitro digestibility of organic matter based on response curve analysis could be seen in figure 2.

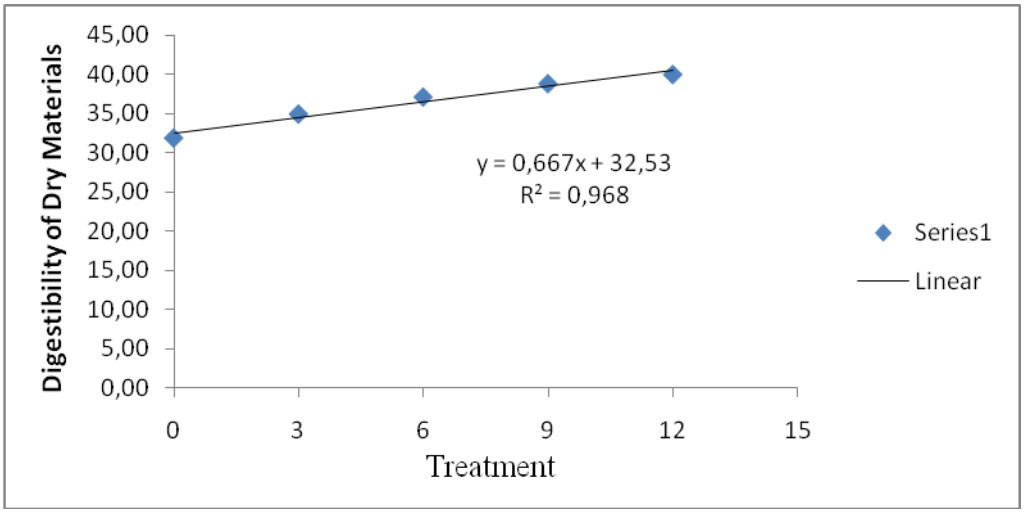

Figure 2. Response Curve of Longer Effect of Soaking Rice Straw in Sea Water Against In vitro Digestibility of Organic Material

Based on the results of the response curve analysis above, it is known that the organic material gives a linear response for the duration of soaking the straw with sea water. The magnitude of the correlation relationship of long rice paddy straw in sea water to the digestibility of in vitro dry matter is 96,8%. This means 96.8% influence of immersion duration to increase in vitro digestibility of rice straw dry matter. This can be seen in Table 1. That is average In vitro digestibility of dry matter has increased from each treatment from T1 to T4.

In vitro digestibility of dry matter and rice straw organic material is done by mimicking the process that occurs in the digestive tract of ruminants. This in vitro technique is performed by the addition of pepsin and cellulose enzymes. This is supported by an opinion (Rahima, 2010) that in vitro techniques can be performed by the addition of enzymes such as pepsin and cellulose enzymes. The pepsin is an enzyme found in the stomach that will begin to digest proteins by breaking down proteins into smaller parts. These enzymes include proteases; Pepsin is secreted in the inactive form, pepsinogen, to be activated by stomach acid. Furthermore, it is explained by Rahima (2010) that cellulose is the name for all enzymes that break the beta-1,4 glycosidic bond in cellulose, sedo dextrin, cellobiose and other cellulosic derivatives. Chemulase is not owned by humans, therefore humans can not decompose cellulose.

The occurrence of increase in digestibility in vitro dry matter and rice straw organic material soaking in seawater from day 3 to day 12 that is on a treatment T1 to T4 which indicates that soaking in sea water is one way that can improve digestibility Dry ingredients and organic matter proven in T0 treatment is lower than other treatments and the longer time immersion digestibility of rice straw dry material is increasing. This is caused by the content of NaCl by sea water where NaCl is one of the minerals needed by the body of livestock. The increasing digestibility of rice straw is caused by mineral content that can affect the condition of the rumen. This is in accordance with the opinion of Prabowo (1984) which states that increased digestibility by increasing the proportion of mineral additions can be explained as a result of the influence of rumen conditions so that the degradation of nutrients by rumen microbes also increases. This suggests that even if the mineral needs are met, the benefits of mineral addition can still be obtained by stimulating the digestibility of the nutrients in the rumen.

NaCl is one of the chemicals that can be used to improve the dry materials and organic materials. The use of NaCl as well as the use of alkali such as lime where the addition of lime treatment can improve digestibility. It proves Saadullah, Haque & Dolber (1981) that with the addition of lime (alkali) treatment increased the digestibility of rice straw dry matter from 38% to 49%, and with the addition of 10% molasses and urea containing 2% N, increased paddy rice digestibility by 54% Dry matter consumption up to 71.3 g / kg $W^{0.75}$.

In addition to the treatment with chemicals also occur the physical treatment of soaking where the immersion is thought to be able to overhaul the cell wall layer such as lignin so that microorganisms can digest cellulose and hemicellulose. In line with Bulo & Munier (2008) that the processing of rice straw physically as cut, milled, soaked, boiled, made pellets and irradiation gamma will break the cell wall layer like lignin and expand the surface of food particles so that rumen microorganisms can be directly Digest cellulose. The speed of fermentation will increase, food retention time will decrease and feed consumption increase.

Soaking rice straw with sea water for several days has a significant effect on the digestibility of dry matter and organic matter. Actually, it is not in line with Badurdeen, Ibrahim & Schiere (1994) which states that wetting rice straw with salt water (NaCl) significantly does not affect the digestibility or intake of rice straw.

D. Conclusion

Based on the results of the study, it was concluded that the 3-12 days sea water soaked rice straw produce the higher dry matter digestibility and organic matter if it is compared with the unsoaked sea water rice straw. The 0-12 days immersion time duration difference provides a linear response to dry matter as well as to organic matter. The highest dry matter digestibility and the highest organic material based on the response curve is seen at 12 days of soaking time.

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The Maintenance Management of Broiler Chicken in Achieving Ideal Body Weight (Case Study in RRMC "Rural Rearing Multivication Centre " Puubunga, Indonesia)

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Abstract

The broiler chicken farm at RRMC has good maintenance management and feeding procedures. The productivity level of the livestock had been achieved and it meets the standard market weight of 2 kg for one maintenance period of 35 days. The shape of the coop in the RRMC is a semi-monitor whose coop location faces the rising sun, so the chicken can get direct morning sunlight. Preparation of the coop at the time of DOC comes is very important because the coop should be sterile from various seeds of disease. Whether it comes from fungi, viruses, bacteria and protozoa. In addition, during maintenance, employees must be diligent in controlling the existing chicken in the coop and see the condition of feed and drink that must be given ad libitum in order to produce the ideal body weight according to the wishes of the entrepreneur and its customers. The results of the research, it can be concluded that maintenance management in RRMC very clear and in accordance with existing procedures, whether it is feeding, handling of diseases affected by disease, vaccine and drugs.

Keywords: broiler chicken, weights, maintenance management.

A. Introduction

The Kolaka district is a developing area in Southeast Sulawesi, Indonesia. Along with the increase in income per capita, the the need for animal protein of Kolaka's population is increasing also. People are increasingly aware of the importance of animal protein for the growth of body tissues. One source of protein is broiler chicken meat. Judging from the nutritional value, broiler chicken meat is not inferior to meat from other livestock. The broiler chicken meat is also easy to get it and the price is relatively cheap than other meats.

Although the level of chicken meat consumption in this area is high, but it is not yet accompanied with the increase of the production of broiler chicken itself. This is because the maintenance management has not been effective (Anggorodi, 1990). One of the obstacles in the broiler maintenance management is the fluctuation of erratic feed prices. The feeding factors cannot be ignored because the feed can be called the most important financing factor in a broiler farm.

The animal farms that have implemented the technological maintenance management is one of the obstacles in increasing of the broiler population (Daghir, 1998). Actually, the Kolaka'

temperature is very supporting the development of broiler. So that the chances of broiler chickens in this area are still very wide open. Through the research of Broiler Chicken Management in Rural Rearing Multivication Centre (RRMC), it is expected to know how to keep chicken from DOC / Starter to Finisher. It is starting from the equipment used / feeding, seed selection, vaccination and coop's model system that will eventually be applied in the field.

B. Methodology

The research was conducted in RRMC Puubunga Village, Baula Sub-district, Kolaka District, Indonesia. The maintenance treatment of broiler farm maintenance business has been conducted for 35 days.

1. The Research Procedures

The maintenance temperature procedures in RRMC ranges from 32.2-350C, the humidity ranges from 60-70%, the lighting/heating of the coop according to the existing rules. The layout of the coop faces the rising sun in order to get the morning sun and not resist the direction of strong winds. The coop model is corrected based on the age of chicken, for chicks aged 1-1 weeks (DOC) using brooder coop (Brooder house). After 2 weeks old, the chick coop is in enlarge. Before the DOC entered the coop, the coop room was cleaned and disinfected first. Initial maintenance is performed on the brooder house for 1 week with room temperature brooder 38-390C.

After that, the newly installed DOC into Brooder house and given drinking water that has been mixed with sugar as much as 5% to restore the condition of chicks due to travel. After 4 hours, chicks are given Vita chicks that are useful to spur growth in DOC. Brooder circle measuring 5x7 meters follow the age of DOC the more days the greater the weight of the body. If the weight of DOC body increase, then the brooder should be enlarged.

2. The Aspect to be Studied

The aspects studied in this research are:

a) An Overview of the RRMC Company.
b) Observe the management of broiler chickens in RRMC.
c) Specific observation of broiler chicken maintenance procedures in RRMC to achieve ideal body weight.

3. The Sample Appearance Method

Samples selected by *Nonprobability sampling* are Purposive based on the purpose of case study research. Selected samples amounted to 5 people, namely:

a) Chair : 1 Person
b) Manager : 1 Person
c) Secretary : 1 Person
d) Treasurer : 1 Person
e) Employees : 1 Person

4. Data Source

The source of the data obtained based on two types of properties collected, namely:

a) Primary data is data obtained directly from respondents. In the implementation of the research will get primary data obtained from interviews with company managers, staff, employees and communities around the company.
b) Secondary data is data obtained indirectly. At RRMC it is the source of research-related books and journals.

5. The Data Analysis

Analysis of data obtained by using Feed Conversion formula, as follows:

The formula calculates feed conversion:

$$FCR = \frac{\text{Feed consumption (g/head/day)}}{\text{Weight gain (g/head/day)}}$$

Source: Ferry (2003)

C. Result and Discussion

1. Coop Preparation DOC

Based on the results of research conducted on broiler farms RRMC broiler breeding coop facing toward the rising sun. For the other side of the wall facing the direction of the sunset. This aims to reduce the grips in the coop and prevent the growth of seeds of disease, lice, or moisture caused by litter pads that are too wet due to feces, urine and if the water is spilled (Kortasudjatna & Supridjatna, 2005).

In RRMC using a postal litter system with the consideration that this type of enclosure better air circulation in the coop can run well.

The steps in the preparation of the DOC enclosure are:

a) Tidy and separate equipment according to function. Furthermore, all equipment is cleaned and washed with water except for heating devices such as coal/brooders. The heater is simply dried with a damp cloth. Clean and sterile equipment is kept in a clean place;
b) Clean up all dirt and unused items inside and outside the enclosure. The feces must be cleaned immediately and transported out of the site, after which the coop floor is cleaned;
c) Washing the coop with a sprayer *(sprayer)* with high pressure, starting from the top, walls and floors. The washing process can be done by adding detergent with a ratio of 1 kg of detergent to 1000 litres of water (1: 1000) then rinsing it again with clean water;
d) Perform sterilization using disinfectant. The disinfectant used is *Medicep.* Sterilization is done in all parts of the enclosure and the environment around the coop;
e) Calcification uses calcium oxide or lime farming to the inside, floor and the outside perimeter of the coop;
f) Leaving the coop for 1-2 days before the DOC arrives and during after spraying there should be no entry until the floor and the whole coop is dry;
g) The day before the DOC came, the husk was sprinkled with a thickness of 7 cm. Before use, the husk has been fumigated with Formalin and Potassium permanganate with a 2: 1 ratio (40ml formalin: 20 grams PK for an area of 2.8 m3). The dosage is 2-3 times the standard dose so that the chaff is sprinkled free of fungus.

2. The Preparation of DOC

Preparation of DOC conducted at RRMC as follows:

a) Installing Brooder/Sires

Broiler farming business at RRMC uses Brooder/heating from kerosene derivatives. This tool is rectangular and filled with coal as much as 6 kg/day overnight at 1000 DOC. The size of the brooder circle is 5 × 7 m. Each held a brooder enlargement, followed by DOC age every 2-3 days to DOC was 2 weeks old. The required temperature at the age of DOC or phase Starter is 38-39^{o}C.

b) Installation of Feeding Place (*Baby chick*) and a Drink

The feeding place for broiler chicken in RRMC uses *baby chick* at the age of Starter. Where DOC feed is needed depends on the number of DOC population for each Brooding house. Feeding *Crumble* (grain) AB-1 feed after DOC came about 15-20 minutes. One feeding site is assumed to be 100 DOCs and placed alternately with the drinking water.

By the time the DOC arrives, the drinking place is filled with water with palm sugar/red with a dose of 5% (50 grams) a litre of water for 4 hours. The provision of sugar water is intended for DOC to obtain / recover energy quickly. After 4 hours DOC is given Vita chick to spur growth on DOC. Every 6 hours and a maximum of 8 hours of Vita chick water were replaced. This is because the active substances and chemical composition is no longer useful in chickens, when passing from the maximum time and drinking water should not be exposed to the sun.

c) Check the Quality and Quantity of DOC

The broiler chicken farm in RRMC is using DOC from PT. JAFFA COMFEED INDONESIA Tbk. MB 202 Platinum Strain. The first activity is done when the DOC comes is to pay attention and check the DOC situation as a whole, both quality and quantity, such as: free from disease, DOC looks active, bright and full fur, rectum is not dirty and weighs not less than 45 grams/head.

3. Maintenance Management

The management of broiler breeding maintenance management in RRMC is very good for everything related to chicken and covers various aspects, including sanitation, vaccinations of antibiotics and disease handling of livestock. Management of broiler chicken maintenance on RRMC farm is as follows:

a) Feeding

The feed broiler chicken used in the RRMC farm business consists of two types: Starter (1-21 days old chickens) and Finisher (age 21-35 harvesting days). The difference between the two types of feed is mainly on protein and energy content. Starter contains 21-23% protein and metabolism energy 3200 Kcal / kg for feed Finisher contains 18% protein and metabolism energy 2500 Kcal.

The feed given in RRMC during the Starter phase is Crumble AB-1 (granular) feed which aims to quickly spur growth during DOC and before entering the Grower period. While the feed phase Finisher given mix feed. The mixed feed was corn, bran and concentrate, with a 3: 1 ratio of 60% maize, 10% bran and 30% concentrate, the feed was mixed into one aiming to get the protein, fat and carbohydrates well met.

b) Feed consumption

Feed consumption in broiler farming business in RRMC is influenced by many factors, among others: physiological condition, physical condition of feed, weight, growth rate, nutrient content of feed and environmental temperature. Feed consumption required broiler chicken is 6 sacks 3.5 tons/period for 1000 heads. The consumption of feed of the recorder/day is 150 grams.

Consumption of food spent in a week is 1050 grams, thus the age of one to twenty-one days in the Starter phase of consumption of cultivated feed is 1300 grams/head. The type of feed consumed by broiler chicken is Crumble AB-1 while the age of chicken on the twenty-first day until the age of thirty-five days in this case in Finisher phase consumption of cultivated feed is 4000 grams/head with mixed feed type. This can be seen in Table 1.

Table 1. Feed Consumption

Age (Weeks)	Feed consumption (gram/head)		Type of Feed
	Per Phase	Cumulative	
1-21 days	Starter	1300	Crumble AB-1
21-35 days	Finisher	4000	Compound

Source: Broiler Chicken Farm RRMC.

c) Feed Conversion

Maintenance of broiler chickens in RRMC with Feed Conversion Ratio (FCR) can be calculated in the maintenance phase those are in the Starter phase and in the Finisher phase. FCR is obtained from the ratio between the amount of feed consumed and the live weight. On the first day to twenty-one days the weight of chicken is 1000 grams/1kg with feed consumption 1300 grams and feed conversion 1.3. The chicken weight at theage of twenty-one days to the age of thirty-five days is 2000 grams/2kg with feed consumption of 4000 grams and the feed conversion is 2.0. This can be seen in table 2.

Table 2. Feed Conversion

Age (days)	Chicken Weight (gram)	Feed Consumption (gram)	Feed Conversion
1-21 Days	1000	1300	13 %
21-35 Days	2000	4000	2 %

Source: Broiler Chicken Farm RRMC.

d) Increase of Body Weight

The maintenance of broiler chickens at broiler breeding business in RRMC weight gain of each chicken is always considered. This is because the chicken production during harvest can be stable and reach the desired body weight. To get a good production need to be controlled with regular weighing every week. If the weight of the chicken has not met the standard, then the amount of feed can be increased by the percentage of weight deficiency of the standard. However, if the chicken body weight exceeds the standard, then the amount of feed given remains the same as the amount of feed given earlier.

Weight gain at DOC age on December 10, 2014 is 45 grams/head with weight gain per phase 45 grams. On December 30, 2014, at the at the age of two to twenty-one days, the chicken weight is 1000 grams/head, with weight gain per phase production of 1000 grams/head. For broiler weight at age twenty-one day to thirty-five days is 2000 grams/ head with weight per phase production of 2000 grams/head. This can be seen in table 3.

Table 3. Weight Growth

No	Age (Days)	Date	Average Weight (gram/head)	Weight Growth per Phase Productions (gram)
1	DOC	December 10, 2014	45	45
2	2-21 Days	December 30, 2014	1000	1000
3	21-35 Days	January 13, 2015	2000	2000

Source: Broiler Chicken Farm RRMC

The table above can be concluded that broiler body weight in RRMC has met the standard by reaching ideal body weight that is 2000 grams or 2 kg/head during maintenance period 35 days.

4. Health Handling

Health care carried out in broiler farm business in RRMC is the prevention of disease in this case vaccination. In addition, also given drugs include: *Vita stress* supplements and antibiotics such as, *therapy* given at the age of 18-21 days. For *Nutrient, Clomysin* and *Doctrine* are given at the time of chicken exposed to a white defecation disease are often called *Pullorum disease*.

Table 4. Vaccination Program

Age	Date	Vaccination	How to Giving
4 days	December 14, 2014	ND-IB	Through Drops of Nose
18 days	December 28, 2014	ND Lasota	Through Drinking Water

Source: Broiler Chicken Farm RRMC

How to administer the vaccine can be through eye drops, nasal drops, drinking water, intramuscular (meat) and subcutaneous (under the skin) injection, wing puncture and sprayer. Vaccination done in RRMC is by way of nose drops that serves to prevent disease ND (*Newcastle disease*) in livestock. The vaccine is performed on a 4 days DOC and *ND Lasota* vaccine through drinking water at 18 days of age.

The disease that attacks broiler chickens in RRMC is white defecation disease or *Pullorum disease* is caused by *Salmonella Pullorum bacteria*. Symptoms are often characterized by the occurrence of white diarrhea. The high mortality rate due to this disease occurs in chicks, especially chicks aged less than 2 weeks.

The peak of death occurs in chickens aged 1-2 weeks first so that breeders in RRMC provide treatment that *Clomysin* and *Doctril* or *Furazolidone* are mixed in the animal feed affected by the disease. The given dose is as much as 25 grams per ¼ tons of feed for 2-3 weeks. Treatment of chickens older than 4 weeks is not recommended and if chickens are seriously infected, they should be destroyed and should be followed by improved sanitation programs.

5. Mortality Rate

The mortality rate found in broiler farming business in RRMC is 10 tail or 1% of 1000 chickens are kept. A mortality rate of 1% does not affect production costs, but for 20-30%

mortality it has an enormous effect on production costs. One that suppresses mortality is by choosing good quality chicken seeds.

Table 5. Number of Chicken Mortality for Maintenance of 1000 heads.

No	Age (Weeks)	Amount (head)
1	DOC	4
2	1	2
3	2	3
4	3	1
Total		10

Source: RRMC Chicken Farming.

6. Harvesting

Harvesting process conducted at the farm in RRMC that is at age 35 days and carried out in the morning after the chicken fed. This harvest time is most anticipated by the farmers because the effort during maintenance will soon be replaced. An expected harvest, of course production in accordance with the wishes or chickens showed optimal growth (Ferry, 2003; Murtidjo. 1987).

7. Marketing

The marketing conducted on broiler RRMC broiler farm is directly supplied to the market Lamekongga, Puubunga and surrounding villages. This is in accordance with the conditions in the field stating that broiler chicken is in great demand by the people of Puubunga Village and Lamekongga market community (Ferry, 2003).

D. Conclusion

The feeding and drinking is done in ad libitum so the chicken is not short of food and drink. The feed that is spent during one period is 6 sacks or 350kg for 1000 heads or 150 grams/head/day. This will increase the chicken body weight increase during maintenance until harvest reaches 2 kg. In this case broiler chicken in RRMC achieve body weight desired by company, that is body weight which is ideal for that with 35 days maintenance period.

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The Effect of Males Age on the Quality of Bali Cattle Fresh Semen

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Abstract

This research was conducted by conducting experiments in UPTD laboratory of Livestock and Livestock Feeding Agricultural Service of Sulawesi Barat Province. The purpose of this research is to compare the age of males during March to April 2013. The results of this research are expected to be used as a guideline for the use of Bali Cattle research as a semen producer based on the age of livestock that can be used as one of the criteria in the selection of prospective semen producing males. The research material is fresh semen of Bali Cattle with requirement of 70% individual motility. The research method used is observation method by observing the fresh semen quality of Bali Cattle research which has been classified into 3 groups based on age 3, 5, and 6 years. The data analysis used is the analysis of the variety and the design is Completely Randomized Design. The results showed that the quality of fresh semen in the three age groups (3, 5, and 6 years) where volume: 5.2 ± 1.2; 6.4 ± 1.1; And 6.4 ± 0.8 ml, color: milk, white, pH: 6,4 ± 0,1; 6.4 ± 0.1; And 6.3 ± 0.1, consistency: concentrated; Medium; Concentrated and concentrated, concentrations: 1909.6 ± 418.8; 1223.3 ± 220.8; And 1790.8 ± 240.5 million / ml, and 92.5 ± 2.9%, abnormality: 4.4 ± 1.2; 4.3 ± 1.2; And 3.3 ± 1.0%. The conclusions of this research indicate that the age of males gives a significant effect on the fresh semen volume, fresh semen concentration, gives a very significant effect on fresh semen concentration and does not have a significant effect on fresh semen sperm abnormalities. And a male of Bali Cattle age 3-6 years old in UPTD Livestock Feeding and Animal Feed Agricultural Service of Sulawesi Province has good semen quality for Artificial Insemination.

Keywords: bali cattle, semen, age, sex of cattle.

A. Introduction

Artificial Insemination is a marine technique by inserting fresh semen or frozen semen into the female genital tract by means of a device made by humans. It aims to improve the genetic quality of livestock, avoid the spread of venereal disease, increase the number of offspring of superior males with insemination to many females and improve the welfare of farmers (Ihsan, 1997; Blakely & Bade, 1998; Ax, Dally, Didion, Lenz, Love, Varner, Hafez & Bellin, 2000; and Pangestu, 2002). Artificial Insemination is one of the programs passed by the

government to improve the genetic quality and productivity of cattle in Indonesia. Through artificial insemination technology the potential of superior bulls can be optimized. The quality of semen has an important role in artificial insemination, so it needs careful and careful examination (Anonimus, 2005). Motility is the most widely used criterion for semen evaluation. Spermatozoa motility calculation method is relatively simple ie observation by using a microscope. Susilawati, Suyadi, Nuryadi, Isnaini & Wahyuningsih (1993) stated that the qualified semen of a superior male can be influenced by several factors, such as male's age, genetic characteristics, temperature and season, ejaculation frequency and food. An experiment was cited by Susilawati, et al. (1993) reported that males aged 2 to 7 years can produce the best semen with high pregnancy rates in married females compared with males outside the interval. The age factor is one of the factors affecting the quality of fresh semen, however there is not much information about the effect of age on fresh semen quality, so further research is needed. Based on the above, the authors will conduct research on "The Effect of Males Age on The Quality of Fresh Semen Bali Cattle".

B. Methodology

1. Materials

This research has been carried out in early located at Cattle Farm at The Regional Insemination Centre – Livestock Hall of Sulawesi Province (UPTD-IB). The research material used is fresh semen with the individual motility requirement of 70%, minimum mass motility 2+, and frozen semen obtained from 3 male cattle stud Bali. Tools used: Artificial vagina, Light microscope, Object glass, Ose, Spectrophotometer. Materials used: Fresh Semen Cattle Bali, Semen before freezing, Semen frozen Bali Cattle, Eosin-negrosin dye, 3% Na-Cl.

2. Method

The research method used is the method of observation. The parameters observed were percentage of motility of spermatozoa on fresh semen, frozen semen and percentage of viability and spermatozoa abnormalities on fresh semen Balinese cattle were classified into 3 groups by age: a. Bali Cattle age 3 years as much as 1 tail. B. Bali Cattle age 5 years as much as 1 tail. C. Bali Cattle age 6 years of 1 tail. Semen Bali Semen Shelter has done 2 times a week, on Monday and Thursday with 2 times ejaculations. The number of replications during this research as much as 6 times. Data obtained during the research and then analysed by using variance analysis.

3. Parameters

a) Fresh Semen Volume
   The immediate semen volume was observed after the shelter, which the results can be seen on 10 ml storage tube scale.
b) Color of Fresh Semen
   Colors of semen can be categorized into 3 kinds of white yellowish, white milk and white clear.
c) Fresh Semen pH
   PH can be seen by matching the color of the litmus paper that has been dropped by semen with color on the litmus paper packaging tube.
d) Fresh Semen Concentration
   The spermatozoa concentration can be calculated using a spectrophotometer, by mixing 0.02 ml of semen liquid with 3.98 ml of 3% NaCl, then homogenized, after it is placed into the cuvet and inserted in the spectrophotometer, the result can be read by looking at the screen in the spectrophotometer which is then matched with a handle.
e) Spermatozoa Motility
   Mass motility can be observed by dripping the semen into a glass object and covered with a glass cover, then observed using a microscope with 100x magnification. The assessment is as follows:
   +++ = big waves, large numbers and fast to move places.
   ++ = small waves are small and slow to move.
   + = The waves do not exist, only the movement of spermatozoa themselves.
   N = no moving spermatozoa, all dead. In such circumstances, it is called necrospermia.

Mass motility is based on the number of moving spermatozoa, the percentage of live spermatozoa and its movement activity. Very good judgment (+++), moderate (++), ugly (+), and

very ugly (N). Individual mobility is checked by dripping a drop of semen on an object and covered with a glass cover, then observed using a microscope at 400x magnification. How to calculate as follows:

$$\frac{\text{Total of Spermatozoa Progresif}}{\text{Total Spermatozoa Progresif} + \text{Spermatozoa non Progresif}} \text{ x } 100\%$$

a) Spermatozoa Viability

The examination is done by dripping a drop of eosin-negrosin and placed on one glass of clean and warm object, then the one drop of semen is added and mixed evenly. After drying checked by microscope with 400x magnification and calculated 100 spermatozoa cells. The live spermatozoa do not absorb the color, while the dead absorb the color. How to calculate as follows:

$$\frac{\text{Total of } \textit{Life} \text{ Spermatozoa}}{\text{Total of } \textit{Life} \text{ Spermatozoa} + \text{Total of } \textit{Dead} \text{ Spermatozoa}} \text{ x } 100\%$$

b) Spermatozoa Abnormalities

Calculation of percentage of spermatozoa abnormalities using the same preparation with preparations to calculate the percentage of live spermatozoa. The way of calculation is as follows:

$$\frac{\text{Total of } \textit{Abnormal} \text{ Spermatozoa}}{\text{Total of } \textit{Normal} \text{ Spermatozoa} + \text{Total of } \textit{Abnormal} \text{ Spermatozoa}} \text{ x } 100\%$$

4. Data Analysis

Data obtained during the research, then it is analyzed using analysis of the variety and design used is Completely Randomized Design. If there is any real difference, then it is continuing with the test of Small Difference.

C. Result and Discussion

1. Quality of Fresh Semen.

Fresh semen used in this study is the result of fresh semen reservoirs of Bali cattle aged 3, 5 and 6 years obtained from UPTD Livestock Breeding and Forage Landmarks Sulawesi Provincial Agriculture Office. The fresh semen examination includes volume, color of semen, pH, consistency, concentration. Inspection of fresh semen is done to see the quality of the semen whether it can be done next process or not.

2. Fresh Semen Volume.

The test results mean fresh semen volume is shown in Table 2. Data were analyzed using analysis of variance and used was completely randomized design (CRD) design. If there is any continued difference by Least Significant Difference (LSD)

Table 2. Fresh Semen Volume in 3 Groups of Age Cattle Bali

Male, Age (Year)	Average Volume ± SD (ml)
3	5,2±1,2a
5	6,4±1,1b
6	6,4±0,8b

Note: Different notations show a marked difference (P <0.05)

Volume is one of the minimum standards for quality evaluation that will be used for Artificial Insemination. The volume of beef semen semen ranges from 4-6 ml / ejaculate (Bearden & Fuquay, 1984). The nature of semen is influenced by the age of the male and the interaction between age and interval of shelter. Age also has a significant relationship with the season, so it can affect the volume of ejaculate and percentage motile spermatozoa. Male age at the time of semen shelter affects ejaculate volume, concentration and motility of spermatozoa (Mathevon, Buhr & Dekkers, 1998). The males age had a significantly different effect (P <0.05) on a fresh semen volume in the age group of 5, 6 years, and fresh semen volume was best shown in the 6 years age group of 6.4 ± 0.8 ml. The difference in volume is thought to be due to different age variations, which can affect the size of the testes and the production of semen.

According to Susilawati, et al. (1993) and Mathevon, et al. (1998) large testicular size has more seminiferi tubules, which will increase the number of spermatozoa supported by more seminal plasma seminal. Testicular size is positively correlated with weight gain. The volume of semen obtained during the study was lower than other research, which was 8.45 ± 4.45 ml. Although according to Hafez (2000) the volume is still normal that is between 5-8 ml.

3. Color of Fresh Semen.

The color of semen varies between the color of milk, white, brown, yellow and cream (Anonimus, 1992). The results of fresh semen color examination in all three age groups of Bali Cow during the study were white milk. The color of this semen is normal according to the opinion of Bearden & Fuquay (1984) and Susilawati, et al. (1993) which states that the color of cow semen from normal ejaculation is white milk and 10% are cream colored.

4. pH of Fresh Semen.

The results of the fresh semen pH were examined in Table 3.

Table 3. Fresh Semen pH at 3 Bali Cattle Age Group

Age of males (Year)	pH average ± SD
3	6,4±0,1
5	6,4±0,1
6	6,3±0,1

The average results of cattle Bali semen pH examination in the 3, 5 and 6 year age group were 6.4 ± 0.1, 6.4 ± 0.1, respectively; And 6.3 ± 0.1.pH this can still be said to be normal because Bearden & Fuquay (1984) state that the average normal semen pH is 5.9-7.3. The pH of semen in each age group showed no significant difference between males. It allegedly influences the content of citric acid. Susilawati, at al. (1993), the content of citric acid in each semen of the study may change depending on the condition of the males. Bearden & Fuquay (1984) suggest that high spermatozoa concentrations are more acidic than semen with low spermatozoa concentrations.

5. *Consistency of Fresh Semen.*

The results of the fresh consistency of semen consistency are shown in Table 4.

Table 4. Consistency of Fresh Semen at 3 Groups of Age Cattle Bali.

Age of males (Year)	Average Consistency
3	**P**
5	**S**
6	**P**

Note:

- P = Concentrated
- S = Medium

Consistency is the degree of consistency. The consistency of semen can be checked by shaking the tube containing the semen. Good semen, its viscosity degree is almost the same or slightly thicker than milk, while the seminy is ugly, both color and consistency similar to coconut water (Hafez, 2000). At the study site, how to check the consistency of semen not to shake the tube containing the semen, but by looking at the concentration of semen which has previously been calculated by using a spectrophotometer, with a standard calculation as follows:

< 1000 = watery
1000-1500 = medium
> 1500 = concentrated

6. Concentration of Fresh Semen

The average concentration of fresh semen is shown in Table 5.

Table 5. Concentration of Fresh Semen at 3 Groups of Age Cattle Bali.

Age of males (year)	Konsentrasi rata-rata ± SD (106/ml)
3	1909,6±418,8b
5	1223,3±220,8a
6	1790,8±240,5b

Note: Different notations show a very real difference (P <0.01)

Lunstra & Echternkamp (1982) reported that the concentration of spermatozoa Hereford and Angus cows were accommodated twice a week using an artificial vagina amounted to 200-700 million spermatozoa/ml, and Charolais Cattle were accommodated once a week at 200-1200 million spermatozoa/ml for 12 The first week after reaching puberty. Differences in spermatozoa concentrations among males are thought to be due to genetic quality in each male (Situmorang, 2002). The concentration and the percentage of motile spermatozoa was influenced by the Age of lazy and have a tendency to increase with age up to 22 months (Mathevon, et al., 1998).

Age of males gave a very significant different effect (P <0.01) on fresh semen concentrations in the 3, 5 and 6 years age group. Balinese cattle in the 3-year age group showed the highest concentration among other age groups. This happens because in old age, spermatogenesis process activity has decreased so that the spermatozoa produced will also decrease. The concentration of spermatozoa from the four age groups of cattle is still quite normal when compared with studies Brito, Silva, Viera, Deragon & Katelic (2002) in cattle Bos Taurus, namely 1,200 million / ml in males aged 1 and 2 years.

7. Abnormalities of Fresh Semen Spermatozoa.

The results of the average abnormalities of fresh semen spermatozoa are shown in Table6.

Table 6. Fresh Semen Spermatozoa Abnormalities in 3 Groups of Age Cattle Bali.

Age of males (Year)	Abnormalities of average ± SD (%)
3	4,4±1,2
5	4,3±1,2
6	3,3±1,0

The results showed that Age of males did not affect the percentage of fresh semen abnormalities (P> 0.05). Percentage of abnormality of all age groups is still within the normal range. This is in accordance with the opinion of Toelihere (1993) which states that abnormalities of less than 20% can still be used for insemination. Sperm abnormalities over 30-35% indicate male infertility.

D. Conclusion

The results showed that Age of males had significantly different effect on fresh semen volume, fresh semen concentration and fresh semen spermatozoa have a very significant different effect on fresh semen concentration and did not give a significant effect on the motility of fresh semen and semen spermatozoa abnormalities fresh. , And fresh semen volume is best shown in 6-year-old males of 6.4 ± 0.8 ml. Because so at age 6 can affect the size of the testes and the quality of semen. Large testicular sizes have more seminiferi tubules, which will increase the number of spermatozoa supported by more seminal plasma seminal and are positively correlated with increased body weight.

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The Quality of Kampung Broiler (KB) Chicken Frozen Semen with DMA Concentrations on Yolk Lactate Ringer Diluent

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Abstract

Chicken Kampung Broiler (KB) is the result of a cross between a local chicken (chicken) with broiler imported chicken (broiler chicken). Testing the quality of frozen chicken semen from crossing needs to be done to get high productivity. This study aims to obtain a concentration of cryoprotectant *Dimethyl Acetamide* (DMA) the best of the concentration of 5%, 7% and 9% in chicken semen freezing KB. The semen used in this study came from three chickens of KB and repeated as many as nine times. Semen is collected by the method of message three times a week. Semen is evaluated macroscopically and microscopically. Subsequently spermatozoa were diluted with yolk diluent and the addition of three DMA cryoprotectant concentrations (5%, 7%, and 9%). Semen diluted 0:25 ml is packed into *straw.* Then equilibrated at a temperature of 5 ˚C for two hours. After equilibration evaluation of motility and viability of spermatozoa. It is then frozen on liquid nitrogen vapor for 10 minutes. Frozen semen is then stored in liquid nitrogen containers at a temperature of -196 ˚C. After 24 hours, the *thawing* semen in 37 ˚C for 30 seconds. The results showed that the addition of DMA 9% in Ringer's lactate diluent yolk produces a percentage motility and viability after *thawing* is greater than 5% and DMA 7%. Neither the addition of DMA 9% concentration can increase *recovery rate* after *thawing.*

Keywords: frozen semen, chicken KB, DMA

A. Introduction

Chicken Kampung Broiler (KB) is the result of a cross between a local chicken (chicken) with broiler imported chicken (broiler chicken). A cross between a broiler chicken with opportunities to perform these types of livestock breeding, so it can produce a new race or

nation chicken *(proven breed)* whose productivity is better. Testing the quality of frozen chicken semen from crossing needs to be done to get high productivity. Frozen semen that has poor quality causes low fertility of eggs and vice versa for good quality frozen semen will result in better percentage of fertile eggs.

Semen freezing is an effort used to prolong the life-force of spermatozoa. The cryopreservation technique will be an invaluable tool for the poultry industry (Fulton, 2006) and for the continued success of the remaining genetic resources of poultry. But in the freezing process frequently encountered is *cold shock* and cell damage caused by the formation of ice crystals. Processing of frozen semen needs to pay attention to several factors such as dilution and precise cryoprotectant concentration so as to protect the spermatozoa from clotting effect. Semen diluent should contain a source of nutrients, buffers, preventing *cold shock,* cryoprotectant, and antibiotics.

Semen freezing needs to be added a protective agent commonly referred to as cryoprotectants that can prevent ice crystals from forming and stabilize the plasma membrane of spermatozoa during clotting process. The cryoprotectants used should be readily soluble in water and should have small molecular weights for faster penetration into cells and reduce toxicity due to high osmolarity. Proper cryoprotectant concentrations in the diluent are essential for protecting the spermatozoa during freezing (Suidzinska & Lukaszewicz, 2008).

Cryoprotectant grouped into cryoprotectant who work inside and outside the cells (Chen, Lien, Chen, Chang, Tsai, & Yang, 2005; and Luz, Holand, Pereira, Teixeira, Vantini, & Freitas, 2009). *Dimethyl acetamide* (DMA) is a type of cryoprotectant that working in the cell, molecular weight 87.12 g / mol and a specific gravity of 0.94 g / cm ^{3} is a solution that is easily soluble in water, alcohol, ether, acetone, benzene and other solvent. DMA cryoprotectant have good penetration in the cells with membrane *lipid* content of the lot. DMA optimum dose in semen thinners ducks by 10% (Han, Niu, Liu, & Yang, 2005), and Arab chicken by 7% (Iskandar, Mardalestari, Hernawati, Mardiah, & Wahyu, 2006).

In addition to the type of cryoprotectant used, the concentration of cryoprotectants will also affect the quality of frozen semen. The diversity of poultry spermatozoa quality as well as the optimum effectiveness of cryoprotectants in cryopreservation process are different from the results of each researcher. Earlier research got optimum performance from DMA that is 5-10%. This study was conducted to determine the effectiveness of each concentration of DMA cryoprotectants (5%, 7% and 9%) in the yolk lactate diluent yeast on freeze semen of KB cocks.

B. Methodology

1. Sources of Semen

Rooster used in this research is 3 chickens of crosses and kampung broiler (KB). Rooster used is a sex and 1 year old. Rooster is individualized. Rooster used is adapted to semen collectors and in cage environments. Adaptation takes two months. Once accustomed to the environment of cages and collectors, new chickens can be used in research to accommodate the semen.

Feed given in the form of feed so (commercial food) in the form of pellets from the company PT. Gold Coin Indonesia. Feed is given at a dose of 150 grams / day and drinking water in ad libitum. The nutrient content of feed can be seen in Table 1.

Table 1 Nutrient content of feed from PT. Gold Coin Indonesia.

Composition	Nutrient content
Crude protein (%)	17 .00
Ash (%)	14 .00
Crude fibre (%)	6 .00
Rough fat (%)	3 .00
Calcium (%)	4.2 0
phosphor (%)	0.60

2. Materials and Equipment

The materials used for research include physiological Na-Cl, egg yolks, ringer lactate, antibiotics (penicillin and streptomycin), dye eosin negrosine, alcohol, paper towels, liquid nitrogen, and cryoprotectant *dimethyl acetamide* (DMA) at a concentration of 5%, 7 %, And 9%.

Equipment used for the storage and evaluation is the syringe 1 ml, 2 ml *microtube,* microscopes, glass objects, glass coverings, shelf semen tube, *counting chamber,* plastic pipette, scissors or *straw cutter,* and *refrigerators.* While the equipment involved to cryopreservation semen including the freezing and thawing of frozen semen which include collection tubes semen 2 *ml,* test tubes 5 ml, micropipette, tip micropipette, *sterofoam* box, set the storage of frozen semen *(storage container)* or container of liquid nitrogen (-196 ^{o} C), pipette, plastic straw *(straw)* measuring 0:25 ml, 1 ml syringe fitted with connectors straw, tube racks, semen in a plastic box, Bunsen, thermometer, and a refrigerator.

This research was carried out in Poultry Breeding Cage, Faculty of Animal Science IPB and Laboratory of Animal Reproduction, Faculty of Veterinary Medicine of IPB. The study was designed using a Completely Randomized Design (RAL) with three DMA cryoprotectant treatments (5%, 7%, and 9%) and nine Deuteronomy.

3. Preparation of Thinning Material

Diluents used are glucose, egg yolk, penicillin, streptomycin, DMA, and lactated ringer. DMA concentration used as diluent (Table 2).

Table 2. Composition of the frozen semen thinners used

Composition	DMA		
	5%	**7%**	**9%**
Ringer lactate (mL)	8.5	8.3	8.1
Egg yolks (mL)	1	1	1
DMA (mL)	0.5	0.7	0.9
Penicillin (IU mL $^{-1)}$	1000	1000	1000
Streptomycin (mg ml $^{-1)}$	1	1	1
Total (mL)	10	10	10
The osmotic pressure (mOsmol kg $^{-1)}$ [a]	889	1104	1294
pH [b]	7	7	7

[a] diluent osmotic pressure was measured using the osmometer. [b] pH *just* diluent (fitted) with *Tris hydroxymethyl aminomethane.*

4. Fresh Semen Collection of Chicken KB

Collection of semen chicken KB from each treatment is done three times a week. The semen shelter technique used is by sorting (massage) on the back of the chicken. Semen shelter is done by two people. One holds the chick on both of his thighs with his left hand while massage the back of the chicken to stimulate the semen out, and another prepares a scaled semen container.

5. Evaluation of Fresh Semen Chicken KB

Evaluation of fresh semen was done to find out the quantity, quality and characteristics of fresh semen from male KB chickens. Semen checks are carried out according to standard methods which include macroscopic and microscopic evaluation.

a) Macroscopic Evaluation

A macroscopic evaluation was conducted to estimate the invisible semen quality which includes; Volume, color, consistency / degree of viscosity, pH point.

b) Microscopic Evaluation

1. Spermatozoa movement includes mass movement and progressive motion Individual/motility.
2. Percentage of Spermatozoa (number of spermatozoa / ml semen
3. Percentage of Life (Viability)
4. Spermatozoa Abnormalities
5. Measurement of osmotic pressure of fresh semen and diluent

6. Semen Packing

The eligible semen is then processed. These conditions are more than 60% motility, mass movement ++ / +++, live percentage of 65% minimum. Semen diluted cryoprotectant treatment of this type of DMA at a concentration of 5%, 7% and 9%, incorporated into the *straw.*

7. Equilibrium of KB Chicken Semen

Furthermore *straw* that has been filled with semen placed in the refrigerator for equilibration process, at a temperature of 5˚C for 2 hours. Then half the semen that has been equilibrated observation of motility and viability (percentage of live spermatozoa) to determine the decline in the quality of semen after equilibration. The rest of the *Straw* that has been equilibrated then placed on a shelf freezing, placed 5 cm above the surface of liquid nitrogen at a temperature of -110 ˚ C for 10 minutes.

8. Storage

Frozen semen is stored in liquid nitrogen for further testing.

9. Frozen Chicken Semen Quality Testing Post-thawing KB

Testing is done 24 hours after storage. Di- frozen semen *thawing* in warm water (37˚C) for 30 seconds. The parameters measured in the semen inspection are the percentage of motility and viability.

The success of freezing is also assessed *Recovery Rate* (RR) is the percentage of spermatozoa were successfully recovered from the freezing process which is calculated by comparing the percentage of motile spermatozoa in fresh semen, and after *thawing.*

$$RR = \frac{Persentase\ spermatozoa\ motil\ setelah\ thawing}{Persentase\ spermatozoa\ motil\ semen\ segar} \text{ X } 100$$

C. Result and Discussion

1. Characteristic of Fresh Semen Chicken KB

Macroscopic showed good quality of fresh chicken semen (Table 3). The degree of acidity (pH) is neutral with a mean of 7.31 ± 0.06, is white, consistency is thick, mass movement is quite (++) and smells typical. The mean volume of chicken KB obtained only 0:13 ± 0:01 ml or lower than 0.2 ml volume Kampung chicken (Junaidi, Arifiantini, Sumantri, & Gunawan, 2016[a]); 0.22 ml Pelung chicken (Junaedi, 2015); and 0.17 ml Merawang chicken (Sartika, 2010). Cruciferous village chicken semen volume equal to the volume of Sentul semen broiler chickens is 0:13 ml/ejaculation (Junaidi, Arifiantini, Sumantri, 2016[b]), chicken KB low volume of research carried out due to frequent semen shelters. It shows that the frequent semen chicken shelter can cause the decrease of semen/ejaculation volume.

Table 3. Characteristics of Fresh Semen Chicken KB

Parameter	Results
Color	White
Viscosity / consistency	Thick
Mass Movement	++
Smell	Typical
PH	7:31 ± 0:06
Volume (ml / ejaculation)	0:13 ± 0:01
Motility (%)	76.66 ± 1.66
Viability (%)	88.12 ± 1:24
Concentration (Million / ml)	2623 ± 51.1
Concentration / Ejaculation (million / ejaculate)	361.04 ± 45
Total Abnormality (%)	13:44 ± 0.70
Primary Abnormalities	4:41 ± 1:01
Secondary Abnormalities	9:03 ± 0.63
The osmotic pressure (mOsmol / kg)	255

The motility of spermatozoa in chicken KB is 76.66 ± 1.66%. This figure is within the range of normal motility which ranges from > 70% according to the instructions Dumpala, Parker, & Danie, (2006). The motility of spermatozoa is an indicator of the size of the ability to fertilize ovum spermatozoa in the process of fertilization. Progressive sperm motility (move forward) become an absolute benchmark calculated. This means moving spermatozoa spin or move in place let alone that does not move is not used as a measure of sperm quality assessment. Viability of fresh semen cock KB 88.12 ± 1:24% larger than the chicken

viability *Parent stock* 82.3 ± 5.9%, based on the research results Castillo, Romboli, AIand, & Marzoni (2010) but lower than the Pelung chicken 90.97% (Junaidi, 2015) and Kampung chicken 91.14% by Junaidi, *et al.* (2016[a]).

KB chicken sperm concentration obtained was 2623 ± 51.1 million / ml, this figure is lower than some other types of chicken is 3:12 Kampung chicken billion (Junaidi, et al., 2016[a]); 2.95 billion chicken Sentul (Junaidi, et al., 2016[b]); 3.1 billion Arab chickens (Ervandi, 2011); Pelung chicken 3.19 billion (Junaedi, 2015) and 3 billion in chicken. The value of spermatozoa / ejaculation concentration Chicken KB is 361.04 ± 45 million / ejaculation.

Percentage of total spermatozoa chicken abnormalities of KB amounted to 13.44 ± 0.70%. There are two kinds of spermatozoa abnormalities found in chickens of the KB namely primary abnormalities 4.41 ± 1.01% and secondary abnormalities 9.03 ± 0.63%. In general, the abnormalities of chicken KB spermatozoa both in total abnormalities and in secondary and secondary abnormalities are high. High abnormalities affect the ability of chicken fertility.

2. *Quality of Frozen Cubed Chicken of Kampung Broiler (KB***)** *with DMA Concentration on Ringer Lactate and Yellow Egg Dilution*

The results showed that the addition of DMA to the yolk lactate ringer diluent did not affect the motility and viability of the spermatozoa after equilibration. In accordance with the results of statistical analysis showing that DMA was not significant on percentage of motility and viability of spermatozoa after equilibrium (Table 4). This is because at the time of equilibrium there has not been a drastic temperature drop (from body temperature to very low temperature) so that the effect of DMA protection has not been seen.

Table 4. Quality of frozen FP semen at various clotting stages in yellow lactate ringer diluent at various doses of DMA

Clotting stages	DMA concentration (%) [a]		
	5	7	9
Fresh semen			
Motility (%)	76.66 ± 1.66	76.66 ± 1.66	76.66 ± 1.66
Viability (%)	88.12 ± 1:24	88.12 ± 1:24	88.12 ± 1:24
After equilibration			
Motility (%)	51.11 ± 2.73	52.77 ± 1:21	56.11 ± 2:16
Viability (%)	76.25 ± 0.71	75.50 ± 1:00	76.93 ± 0:47
after *thawing*			
Motility (%)	14:25 ± 2.13b	16:29 ± 2.91b	24.44 ± 1.66a
Viability (%)	26.13 ± 2.12A	28.41 ± 2.85B	36.52 ± 1.62A
Recovery rate (RR)	18.97 ± 3.23b	21:35 ± .07ab	31.58 ± 2.31a

[a]different letters that follow the numbers on the same row and column shows the difference (Uppercase highly significant (P<0.01) in small letters while showing results significantly different (P <0.05).

Frozen semen motility after *thawing* with the addition of DMA show a significantly different effect (P <0.05). Extra DMA 9% in Ringer's lactate diluent yolk produces a percentage motility after *thawing* (24.44 ± 1.66%) greater than 5% DMA (14:25 ± 2:13%) and DMA 7% (16:29 ± 2.91%). Viability after *thawing* using DMA 9% (36.52 ± 1.62%) was higher (P<0.01) in DMA than 5% (26.13 ± 2.12% of) and DMA 7% (28.41 ± 2.85%).

The high percentage of motility and viability of sperm after *thawing* on the addition of 9% DMA capable of providing protection viability of spermatozoa during the freezing process. *Recovery rate* (RR) of semen with diluent DMA 9% (2:31 ± 31.58%) was higher (P<0.05) compared to 5% (3:23 ± 18.97%) and DMA 7% (21:35 ± 4:07%). So it can be concluded that the freeze spermatozoa using DMA diluent 9% more spermatozoa that successfully recovered after the freezing process.

The osmotic pressure test showed that fresh semen in the KB chickens had a value of 255 mOsmol / kg (Table 3). The result of osmotic pressure testing on semen diluent was 889-1294 mOsmol / kg (Table 2) showed a fairly high osmotic pressure compared to semen osmotic pressure. The result of osmotic pressure test of diluent with addition of DMA got frozen semen dissolution of chicken KB with ideal osmotic pressure that is 1294 mOmol/kg. The ideal osmotic pressure was obtained from the addition of 9% DMA concentration to the frozen semen thinners. This is consistent with the statement Junaidi (2015) that the ideal osmotic

pressure on chicken frozen semen diluents namely 1010-1230 mOmol / kg. Based on these results it is seen that the diluent has a hyperosmotic pressure. The high osmotic pressure outside the cell will cause secrete water from inside the cell, causing the cell to contract and the fluid that comes out cells replaced by cryoprotectant (Souhoka, Matatula, Mesang-Nalley, & Rizal, 2009).

D. Conclusion

Extra DMA 9% in Ringer's lactate diluent yolk produces a percentage motility and viability after *thawing* is greater than 5% and DMA DMA 7%. Neither the addition of DMA 9% concentration can increase *recovery rate* after *thawing.*

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The Influence of the Farmers Knowledge Level toward the Ettawa Goat Reproduction Regulation System at Ranojaya, Indonesia

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Abstract

This research was conducted from May to June of 2016 in Ranojaya, Indonesia. There was so the purpose of this research is to find out how much influence the farmers' knowledge level toward the Ettawa goat reproduction regulation system in Ranojaya, Indonesia. In determining the location of the research, the researchers were deliberately placed in Ranojaya, Indonesia. It was by looking at the stressing of Ranojaya area. It was found that most of the community have business of Ettawa goat. The technique of determining the sample using purposive sampling technique, where the samples are deliberately selected from a population on the basis of the criteria determined by the researcher is the breeder of Ettawa goat who knows about the regulation of the reproductive system, and from the 1,193 population of 15 selected farmers as the sample/respondent. The results showed that (1) There was a significant correlation between knowledge level of farmer with reproduction system arrangement on an Ettawa goat in Ranojaya, Indonesia. (2) The correlation coefficient between variable X1 (number of livestock ownership) to variable Y is 0.75. This means that there is a strong relationship between the factor of the number of livestock owned on the knowledge level of the farmers with the regulation of reproduction system in Ettawa goat cattle. (3) The correlation coefficient between variables X2 (long breeding) to variable Y is 0.64. This means that there is a strong relationship between the old factors of breeding to the level of knowledge of farmers with the regulation of reproduction system on livestock Ettawa goat. (4) The result of program effectiveness calculation and the effectiveness of the increase of respondent knowledge about the reproduction system regulation on Ettawa crossbreed goat got the effective result, namely 72,75%. While the increase of knowledge of respondents got an effective result that is 47.5%, or there is an increase in knowledge of the respondents after having been done illumination was 14.87%.

Keywords: knowledge level of farmers, goat reproduction system, ettawa goat.

A. Introduction

The livestock sub - sector is one aspect of agricultural development that has meaning in supporting the overall economy that is directed to improve the welfare of the people, especially the increase of income for the managers and the improvement of nutrition of the beneficiaries, the situation is done through the utilization of livestock commodities, be it big cattle, And poultry.

Livestock commodities are part of several important developmental aspects and need serious attention in the face of the National Meat Self-Meat program so that this livestock commodity is one of the important aspects that need to be considered as a source of meat producer that has quality and quantity in global market competition (Saswono, 2002).

Priority in improving public welfare in the field of livestock business is a very promising potential if supported by a maintenance management system that has value efficiency and effectiveness to increase the acceleration of physical development of livestock that leads to increased income and welfare of farmers and their families.

Cultivation of livestock Ettawa goat is one commodity in Kolaka particularly in Sub Toari, because people have a lot to feel the benefits of raising Ettawa goat effort as an attempt to increase the income of farmers' income of farmers.

Toari Sub-district is one of the sub-districts located in the southern Kolaka regency that has the characteristics of the western region located on the edge of the coast and the contour of a hilly area with sufficient rainfall levels for vegetation which is one of the favorable factors in the supply Forage (HMT). This region is partly comprised of transmigration communities from Java and Bali as well as migrants from South Sulawesi with almost 70% of the population already having experience in the field of Ettawa goat breeding (according to Toari Sub-district profile data).

In addition to the above potential business Ettawa goat livestock in Toari Sub District is very promising if managed intensively, because according to data from livestock officers Toari Sub district the number of livestock out of Toari District area used as seeds as much as ± 1800 tail in 2014. This is very Potential is developed if we can change the paradigm of Ettawa goat breeders from those who are just raising livestock as a side business to be a stable business that can improve the welfare of farmers and their families. Based on the potential of existing natural resources, the breeders of Ettawa goat in Toari Sub-district have potential opportunities if the business-oriented goat breeding business of Ettawa is business-oriented, where the improvement of human resources ability must be balanced with the direction or purpose of its business. Based on the above orientation there are some obstacles that arise due to the knowledge level of livestock farmers on the regulation of the livestock reproduction system is still very less, this has an impact on the slow increase in production which ultimately also affects the low-income level of farmers.

For that the researchers want to research about the farmer’s knowledge level toward the Ettawa goat reproduction system.

B. Methodology

1. The research population

The population of this research is the owner of an Ettawa goat in Toari Sub-district which is distributed in 10 villages. The number of goat cattle in Toari Sub-district is 5.074 heads maintained by 1,513 breeders (census data of 2015 from Livestock Head of Toari Sub-district). The population above is determined again the number of Ettawa goat in Ranojaya, Indonesia. In the research process required the existence of population data as well as the number of samples used as respondents. Population is a complete set of units or individuals whose characteristics want to know. The number of individuals who are members of the population is called population size (Anggoro, 2008).

2. Determination Technique of Research Samples

The sample that will be used in this research is 15 people, so that the sampling is done by a purposive sampling technique, where the sample is purposely selected from a population on the basis of the criteria determined by the researcher that is the breeder of Ettawa goat who knows about the reproductive system arrangement. Effendi (1987) says that the sample is part of a population member that provides information or data required in a research.

There are several kinds of technical sampling used in a research, but in this research used a technique of purposive sampling (Purposive sampling), that is the withdrawal of samples conducted on the basis of knowledge and consideration of the researchers. Purposive sampling

is a purposive sampling technique selected with Selected sample considerations meet scientifically responsible qualifications (Effendi, 1987).

3. Method of collecting data

Data collection using the following techniques:

a) Primary data

Primary data obtained from respondents' answers through direct interviews using structured questions that have been prepared in the form of questionnaires. The questionnaires were distributed in the form of questionnaires to farmers about the reproductive goat reproduction system of Ettawa, and the questionnaires were carried out in two stages: (a) the first stage before the pre-test, (b) the second stage after the posts. In addition to using the primary data collection questionnaire also by conducting question and answer directly with the farmers about the reproductive goat reproduction control system of Ettawa to obtain information support related to the management of the reproductive regeneration system of Ettawa goat.

b) Secondary Data

Angoro (2008) says that the technical documentation research is a way of collecting data that is done by categorization and classification of materials related to research problems, both from document sources and books, newspapers, magazines and others. Secondary data collection used documentary research in the form of Toari Sub-district profile at Toari Sub-district Office and report from the Resort Head of Toari Sub-district.

c) Research variable

Variables in this research are the object of research which is also referred to as factors that play a role in the events or symptoms studied. Characteristics of respondents who become research objects are grouped into several variables, among others:

a. Variable X (Independent) or independent variable, consisting of:
   1. Variable X1, that is amount of livestock ownership
   2. Variable X2, that is Lama livestock
b. Variable Y (Dependent) or non-free variable is the knowledge level of breeder about the reproduction regulation system of Ettawa goat.

In addition to examining the relationship of the variables above, also conducted an evaluation of the effectiveness of the program of extension activities and the effectiveness of increasing the knowledge of farmer about the reproduction regulation system in Ettawa Crossbreed goat.

d) Data Analysis

Data analysis is a measurement tool used to determine correlation and causal relationships between two variables (variables X and Y variables), so that statistical methods will be used to test the relationship between two variables of this research using Product moment correlation (Effendi, 1987) with formula:

$$r = \frac{N(\sum XY) - (\sum X \sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

Information:
R = Correlation coefficient
N = Number of respondents
X1 = Number of livestock ownership
X2 = Length of breeding
Y = Knowledge level of Ettawa goat breeders

The formula of the Pearson Product Moment Method Correlation Approach is used to determine the relationship between the two variables (Variable X and Variable Y) which is expressed by the number that is moving between 0 to +1 or 0 to -1 (-1 = r = 1), if the correlation coefficient (r) approaching +1 or -1 means that there is a strong relationship, with the note that if close to -1 then the meaning of the observed variable relationship is strong and inversely proportional. Conversely, if close to zero (0) means there is a weak relationship or no relationship (Effendi, 1987).

The result of Pearson Product Moment Method Correlation statistic analysis is then compared with criticism value and significant table at 95% and 99% confidence level, it is to determine the relationship between the two variables (variable X and Y variable) whether it is very real related, real or not related real (Effendi, 1987). Anggoro (2008) stated that to know the effectiveness of the research program and the effectiveness of increasing knowledge about the influence of the knowledge level of the farmers on the regulation of reproduction system of an Ettawa Crossbreed goat and analyzing the data for the evaluation of Pre-test and post test is done with the program effectiveness formula and the effectiveness of knowledge improvement as the following:

1. The effectiveness of the extension program:

$$\frac{\text{Total of score post test X 100\%}}{\text{Gaps}}$$

2. The effectiveness of increased knowledge

$$\frac{\text{Total of score post test} - \text{Total of score Pre-test X 100\%}}{\text{Target}}$$

Anggoro (2008) to know the effectiveness of extension program and the effectiveness of farmer knowledge level about arrangement of marriage system on Ettawa crossbreed goat based on quesioner result is as follows:

a. Scores> 46.67 = Effective
b. Score 33.34 - 46.67 = Effective
c. Score <33,34 = Less effective

Information:

- Number of questions in questionnaire = 20 questions
- Maximum score = 60 and minimum score = 20
- How to determine the score = 60 - 20: 3 = 13,33.

C. Result and Discussion

1. Characteristics of respondent

Based on the result of research showed that farmers were the sample of this research as breeders of Ettawa goat in Ranojaya Indonesia that as many as 15 people who have distributed questionnaires given to the respondents. Variable Y (dependent) in this research is farmer knowledge level about the reproduction, regulation system in Ettawa goat animal. Variable X1 is number of livestock ownership and variable X2 is breeding length. Distribution of respondent characteristic factors on variable X1 (number of livestock ownership) obtained from the results of filling questionnaires on 15 respondents can be seen in Table 1.

Table 1. Results Pre-test Distribution of the relationship between the number of livestock ownership with the knowledge level of the farmer about the reproductive regulatory system in the livestock Ettawa goat

∑ livestock of ownership	Respondents		The score of knowledge	
	N	%	Total	Average
Many > 29	2	13,33	80	40
Medium 18 – 28	4	26,67	158	39,5
Little <18	9	60	339	37,7

Table 1 shows that the level of respondents with the category of total livestock ownership has the highest average score of knowledge level that is 40. The results of pre-test data indicate that in the large number of goat breeding categories, the knowledge level of breeders on the reproductive regulation system in the livestock Ettawa goat Has been good, although researchers have not yet conveyed information about the technical regime of reproductive regulation on Ettawa goat.

Table 2. Post-test Outcomes Distribution The relationship between the amount of livestock ownership with the knowledge level of the breeder about the reproductive regulatory system in the livestock Ettawa goat

∑ livestock of ownership	Respondents		The score of knowledge	
	N	%	Total	Average
Many > 29	2	13,33	120	60
Medium 18 – 28	4	26,67	240	60
Little <18	9	60	513	57

Table 2 shows the level of respondents with the category of large and medium number of livestock owners having the highest average score of knowledge level (multiple score 60, and score 60). Based on this post test result, it shows that after the extension of technical material about reproductive regulation system on Ettawa goat livestock, in the category of goat farm ownership more than 18 heads, the better the knowledge level of the farmers on the reproductive regulation system in Ettawa goat cattle. This is consistent with the field observation that livestock farmers who have more than 18 heads of goat ownership pay more attention to how to make the development of livestock population increasing through the pattern of reproduction of livestock. This statement is also supported by the results of correlation coefficient analysis between the number of livestock ownership with the level of knowledge that can be seen in Table 3.

Table 3. Coefficient of correlation of cattle ownership with knowledge of breeder to reproductive regulation system in Ettawa goat

Variable X_1	The level of knowledge	The Relationship of Variable X_1 and Y
∑ livestock of ownership	0,75	influence

The result of the analysis shows that the value of knowledge level r = 0.75, meaning there is a strong relationship between the factor of ownership to the knowledge level of farmers about the reproductive regulation system on Ettawa goat livestock. This is because the correlation results show 0.75 greater than the magnitude of the criticism price in the significant table (0.482) at a significant level of 95% which means there is a real relationship between the variables of livestock ownership with the knowledge level of breeders on the reproductive regulation system on Ettawa goat livestock.

Table 4. Pre-test results of the relationship between the duration of breeding with the level of knowledge of farmers about the reproductive regulatory system in livestock Ettawa goat

Long Breeding (Year)	Respondents		The Score of Level of Knowledge	
	N	%	Total	Average
Long >11	4	26,7	153	38,25
Medium 7 – 11	5	33,3	199	39,8
New <7	6	40	29	4,8

Table 4 shows that the respondents with the old breeding category have the highest average score of knowledge level that is 39.8. The results of pre-test data indicate that in the old category of breeders are having a better level of knowledge than others although researchers have not submitted information about the technical terms of reproduction regulation on Ettawa goat cattle.

Table 5 shows that the level of respondent with the old category of breeding old has the highest average score of knowledge that is 59.5. Based on this post test result, it shows that after the extension of technical material about reproductive regulation system on Ettawa goat cattle, in the old category of goat breeding more than 11 years, the better the knowledge level of the farmers on the reproductive regulation system in Ettawa goat cattle. Based on Catur (2006) that Ettawa goat cattle was one of kinds of breed goats that good for adding income.

Table 5. Post-test result of distribution of relationship between breeding length with knowledge level of breeder about reproductive regulation system on Ettawa goat cattle.

Long Breeding (Year)	Respondents		The Score of Level Knowledge	
	N	%	Total	Average
Long >11	4	26,7	238	59,5
Medium 7 – 11	5	33,3	294	58,8
New <7	6	40	341	56,8

The fact of the field shows that in the old breeding group the longer the breeder keeps his livestock, his level of knowledge about the reproductive regulation system in the Crossbreed goat livestock Ettawa is higher than the old and medium business, this is because the breeders who have long kept the goats already have a lot of experience in rearing his livestock even though it is still traditionally derived from his parent-derived habits. While breeders who are just starting a livestock business they are still learning have no experience with the innovation of the reproductive regulatory system in Ettawa Crossbreed goat so that the knowledge level score is still low (Sriatin, 2004).

The result of correlation coefficient correlation analysis between breeding length with knowledge level can be seen in Table 6.

Table 6. Coefficiency Correlation of long-term relationship with breeder knowledge level to reproductive regulation system on Ettawa goat

Variable X_2	Level of knowledge	The Relationship of Variable X_2 and Y
Long of breeding	0,64	Influence

The result of the analysis shows that the value of knowledge level r = 0.64, meaning that the old factor influences the knowledge level of the farmers to perform the reproductive regulation system on Ettawa goat. This is because the correlation results show 0.64 greater than the magnitude of the criticism price in the significant table (0.482) at a significant level of 95% which means there is a real relationship between the old variables of breeding with the knowledge level of breeders to the reproductive regulation system on Ettawa goat livestock.

2. Program Evaluation

Evaluation is a process undertaken to determine the effectiveness of the program made and subsequently the relevance, efficiency, effectiveness and impact of the program in accordance with objectives achieved systematically and objectively, namely the level of knowledge of breeders about the reproductive regulatory system in livestock goat Ettawa positive.

From the pre-test results in appendix 3 and post-test in appendix 4 the evaluation calculation will refer to the variable element of the knowledge level of the breeder to the reproductive regulation system on Ettawa goat cattle. The results of pre-test and post-test values can be seen in Table 7.

Table 7. Pre-test and posttest results.

Variable	Score		Max. Score
	Pre-test	Post-test	
The level of knowledge	28,85	43,65	60

Table 7 above showed that the initial knowledge level of respondents (pre-test) is 28.85 and after being given counselling the knowledge level of the respondents changed to 43.65, this proves that the extension activities conducted can increase the knowledge level of breeders about the reproductive regulation system on the livestock Ettawa goat ie 14.8%, this is characterized by increasingly understanding the breeder about the reproductive regulatory system in Ettawa goat cattle.

Then to calculate the effectiveness of the extension program and the effectiveness of changes in the knowledge level are:

1) The effectiveness of the extension program:

$$\frac{\text{The Score of post-test X } 100\%}{\text{Gaps}} = 72{,}75\% \textit{ (Effective)}$$

From the calculation can be concluded that the counselling done to obtain effective results marked by the breeders who want to find more information about the reproductive regulatory system in livestock Ettawa goat.

2) Effectiveness of Knowledge Improvement

$$\frac{\text{The score of post-test} - \text{The score of Pre-test X } 100\%}{\text{Target}} = 47{,}5\ \% \textit{ (Effective)}$$

From the calculation can be concluded that the level of knowledge of breeders about the reproductive regulatory system in Ettawa goat livestock effective results are characterized by increasing understanding of breeders to make reproductive arrangements on cattle Ettawa goat.

D. Conclusion

Conclusion of research was the knowledge level of livestock farmers influences the regulation of the reproductive system on an Ettawa goat in Ranojaya, Indonesia, there is a strong relationship between the factor of the number of livestock ownership of the knowledge level of the farmers about the regulation of the reproductive system of Ettawa goat, there is a strong relationship between the old factors of farming to the level of knowledge of farmers about the regulation of reproductive systems on Ettawa goat livestock, and the program of extension activities and the improvement of respondents' knowledge on the regulation of the reproductive system in Ettawa goat cattle obtain effective results.

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