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Body weight and statistic vital of Texel sheep in Wonosobo District by giving the ramie hay as an additional woof

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Abstract. *Kuntjoro A, Sutarno, Astirin OP. 2009. Body weight and statistics vital of Texel sheep in Wonosobo District by giving the ramie hay as an additional woof. Nusantara Bioscience 1: 23-30.* This research is aimed to observe the body weight and vital statistic measurement of 50 Texel sheep. Sheep are classified into five treatments of giving woof P0 (giving greenish tree woof without concentrate), P1 (giving greenish woof and concentrate without adding the ramie hay/0%) concentrate), P2 (giving greenish woof and concentrate by adding 10%) ramie hay), P3 (giving greenish woof and concentrate by adding 20%) ramie hay), P4 (giving greenish woof and concentrate by adding 30%) ramie hay), every treatment was repeated 10 times. The result shows that even though it can't replace the concentrate function, adding ramie hay as much as 10%), 20%) and 30%) on sheep woof can increase the body weight's growth, respectively 186.67 g/day, 153.34 g/day dan 103.34 g/day. The addition of ramie hay 10%), 20%) and 30%) can increase the addition of statistic vital's measurement on breast of sheep livestock 1.20 cm); 0.95 cm) and 0.90 cm); the addition of statistic vital measurement on the body length of sheep livestock 0.05 cm); 1.00 cm) and 0.75 cm) and also the addition of breast width is 1.50 cm); 0.15 cm) and 0.3 cm). Meanwhile, the addition of ramie hay on livestock woofs can only increase the addition of vital statistical measurement on the breast at giving 30%) as big as 0.15 cm). It is needed to know further about giving ramie hay by comparing hay of different concentrations of leaf and stems.

Keywords: ramie hay, body weight, statistic vital, Texel sheep.

Abstrak. *Kuntjoro A, Sutarno, Astirin OP. 2009. Bobot badan dan statistik vital domba Texel di Kabupaten Wonosobo dengan pemberian limbah rami sebagai pakan tambahan. Nusantara Bioscience 1: 23-30.* Penelitian ini bertujuan untuk mengamati bobot badan dan pengukuran statistik vital dari 50 domba Texel. Domba dikelompokkan ke dalam lima perlakuan pemberian pakan, yaitu P0 (pakan hijauan, tanpa konsentrat), P1 (pakan hijauan dan konsentrat tanpa limbah rami/0%), P2 (pakan hijauan dan konsentrat dengan menambahkan 10% limbah rami), P3 (pakan hijauan dan konsentrat dengan menambahkan 20% limbah rami), P4 (pakan hijauan dan konsentrat dengan menambahkan 30% limbah rami), setiap perlakuan diulang 10 kali. Hasil penelitian menunjukkan bahwa meskipun belum dapat menggantikan fungsi konsentrat, penambahan limbah rami sebanyak 10%, 20% dan 30% pada pakan dapat meningkatkan pertumbuhan bobot tubuh domba masing-masing sebesar 186,67 g/hari, 153,34 g/hari dan 103,34 g/hari; juga meningkatkan statistik vital pada dalam dada domba sebesar 1,20 cm, 0,95 cm dan 0,90 cm; panjang tubuh 0,05 cm, 1,00 cm dan 0,75 cm; dalam dada 1,50 cm, 0,15 cm dan 0,3 cm. Sementara itu penambahan limbah rami pada pakan ternak hanya dapat meningkatkan penambahan ukuran statistik vital dalam dada pada pemberian rami 30% sebesar 0,15 cm. Perlu kajian lebih lanjut tentang pemberian limbah rami dengan berbagai konsentrasi limbah daun dan batang yang berbeda.

Kata kunci: sampah goni, berat badan, statistik vital, domba Texel.

INTRODUCTION

In the Wonosobo district, a kind of sheep, namely Texel, has been limitedly domesticated. This Texel, or locally named *dombos*, is a superior type of sheep which produces meat and wool with fairly good quality. With the support of the potential areas available in Wonosobo District, it is easy to develop the farm of Texel sheep (*Ovis aries*) with excellent results, with relatively rapid growth and with the weight of the adult males can reach 90-100 kg, and adult females can reach 50-70 kg. With that consideration, many people raise them on their farms (Livestock Office of Wonosobo District, 2001, 2007).

Besides, Wonosobo is a producer of ramie plants (*Boehmeria nivea* (Linn.) Gaudich.), which are used as raw materials for textiles (Brink dan Escobin 2003; Escobin 2005). Ramie (*Boehmeria nivea Gaudich*) is a typical textile raw material in China (Bally 1957) used for Chinese burial shrouds over 2,000 years and used in mummy cloths in Egypt about 3000-5000 years BC. It is used to produce textiles and ropes because it is highly absorbent, dries quickly, dyes relatively easy, resists shrinkage, and is unusually tolerant with bacteria, mildew, and insect attacks (Wang et al. 2007). Ramie has long been used in Indonesia, the kingdom of Majapahit mentioned ramie among the goods brought from China (Yoshimoto 1988). Rami is very important. Many research has been done to increase

production by phytohormones (Prayudhiani 2000; Wang et al. 2007), microorganisms (Mayerni 2004), in vitro propagation (Wang et al. 2008), and even genetic engineering (Dusi et al. 1993).

Currently, ramie hay is thrown away or used as fertilizer in Wonosobo. While ramie has cattle's necessary nutrients, ramie leaf hay has a relatively high protein content (24%). When they are mixed as animal feed ingredients, they can increase the efficiency of the food costs (Agrina Prima 2006). Ramie plants are suitable to be planted in Indonesia at the ideal height of 400-1500 m asl (above sea level), with daily temperature 20-27^{o}C and rainfall > 140 mm/month evenly throughout the year, open-structured soils such as clay, sand lightly with a pH of 5.6 to 6.5 by ages productive 6-8 years, harvested 5-6 times a year (Dempsey 1975; Sudiro 2004). This plant has a drought-tolerant cultivar (Liu et al. 2005). Fiber productivity is highest in the highlands (> 700 m asl.), 2.5 to 3.0 tons/ha/year, followed by mainland medium (400-700 m asl.), 2.0 to 2.5 tons/ha/year, and lowlands (400 m asl.), 1.5 to 2.0 tons/ha/year (Setyo-Budi et al. 2005). Intensive cultivation of ramie in Bogor can produce up to 4.5 tons/ha/year, and crop yields have increased in the following year to obtain an average production of 5.0 tons/ha/year, with leaf and stem production ratio of 45% and 55%.

Ramie leaves contain protein, fat, and high fiber to improve the nutritional value of feed when used as a concentrate (Sastrosupadi 2004). Provision of ramie on small cattle has no significant adverse effect, but granting ramie above 30 kg/day in dairy cows resulted in wet eczema disease in the legs (Lahiya 1984). Dinh et al. (2007) state that ramie good fresh whole plants or parts of it have leaf crude protein (> 21% dry weight and ash (19-22% dry weight) is high, drying can reduce the crude protein content. The coefficient of digestibility of organic matter, crude protein, and fresh leaves of ramie fiber, respectively, 78.5, 80.9, and 82.6%, while the dried leaves, respectively, 63.1, 60.6, and 76.1% and in all their fresh crops, respectively are 66.1, 75.9, and 62.5%, so that ramie has a high nutritional value for ruminants.

Animal feeding is one factor that is very strategic for the success of poultry farms because it contributes ± 70% of the total production cost (BPTP 2000). Potential agricultural waste can be used as concentrate feedstuffs. Waste is always associated with low prices, but there are some things to consider in its utilization of continuity, availability, nutrient content, and the possibility of limiting factors such as anti-nutritional substances and whether or not the material is processed before it can be used as feedstuffs (Mathius and Sinurat 2004).

Physiologically, sheep require roughage in their feed, especially from forage such as fresh grass, hay, silage, or hay and grain mixtures containing minerals and vitamins. Besides fresh grass and forage, twigs, branches from trees, and shrubs can be used as food additives for the sheep (Hanafi 2004). Sheep food is in the form of food concentrates and forages. Greenery is good forage with more fiber content of 18%, which is a natural food for ruminants, either in the form of grasses consisting of grass and grass fields or the form of superior legume. The concentrate is a food with high protein content and low crude fiber content (Sofyan and Lili 2000).

For growth, production, reproduction, and basic living, animals need nutrients. Fattening aims to produce a high and efficient weight gain and produce a high-quality carcass. It is required the food contains high nutrition because livestock production would increase if the nutrient content of food increased (Tillman et al. 1991). Concentrates can stimulate the growth of beneficial bacteria in the rumen forage digestion, increasing the body weight (Dirdjopranoto et al., 2007).

Protein is essential for life because these substances are active protoplasm in all living cells (Anggorodi 1990). Protein plays an important role in the process of growth, production, and reproduction. According to Tillman et al. (1991), growth is generally expressed by measuring weight gain, carried out by weighing repeatedly, and checking body weight growth every day, every week, or every other time. Growth stages have fast and slow stages. The rapid phase occurs at puberty, and the slow phase occurs when the animals have reached adult ages. Meanwhile, according to Sugeng (2000), to assess the outer form of the animals, the measurements of certain parts such as body length, width, chest, chest circumference, and height are carried out.

This study is aimed to determine weight gain and measurement of vital statistics including chest circumference, body length, high gumba, in the chest and chest width on the sheep of Texel after the addition of ramie hay on the additional food.

MATERIALS AND METHODS

Time and place

The experiment was conducted in the farmland belonging to the *Bina Tani* group at Tegalgot Village, Kepil Subdistrict, Wonosobo District, Central Java. The experiment was conducted from September until October 2007. Preparation of concentrate food was carried out in the Fooder Factory Mill belonging to *Bina Tani*, Wonosobo. Proximate food analysis was carried out at the Laboratory of Animal Nutrition and Feed, Department of Animal Science, Faculty of Agriculture, Sebelas Maret University, Surakarta.

Materials

The sheep used in this research was cross-fertilization between Texel sheep and cattle belonging to a group of local sheep of *Bina Tani*, Tegalgot Village, Kepil Sub-district, Wonosobo District, with the age of 80-10 months, consisting of 50 animals with the weight of 14-25 kg.

The cage used as research material is owned by farmers of the *Bina Tani* group with a size of 40 cm x 120 cm consisting of 50 cages.

Bina Tani group members obtained forage by finding the form of forage grass and Leguminous around the Village area Tegalgot, Sub-district Kepil. Each group member brought a basket weighing about 30 kg.

Concentrates were obtained from the forage factory owned by the *Bina Tani* group under the technical supervision of the Faculty of Animal Science, Gadjah Mada University, Yogyakarta, and Office of Animal Husbandry and Fisheries of Wonosobo District.

The ramie in the form of leaves and stems (45%: 55%) in dry condition (moisture content 10-15%) was obtained from the farmers' ramie and ramie-processing factory of PT. Prima Agrina, Wonosobo.

Experimental design

The research design used a completely randomized design with four treatments in the form of food concentrates and the addition of ramie hay (0%, 10%, 20%, 30%), as control animals were given only greenery. Each treatment and control was carried out with 10 replications for observation time 0 weeks, two weeks, and four weeks.

Procedures

Food making

The addition of ramie hay in the concentrate is mixed homogeneously using a machine (mixer) of the factory by mixing the following:

P0 = forage alone.

P1 = concentrate without the addition of ramie hay;

P2 = 90% concentrate plus 10% ramie hay;

P3 = 80% concentrate plus 20% ramie hay

P4 = 70% concentrate plus 30% ramie hay

To know the nutrient content of the food concentrate for each treatment (addition of ramie hay 0%, 10%, 20%, and 30%), we conducted the proximate analysis at the Laboratory of Animal Nutrition and Feed, Faculty of Agriculture, Sebelas Maret University, Surakarta.

Feeding

The five groups of animals (P0, P1, P2, P3, and P4) were given forage in sufficient quantities as needed (± 20% of body weight) or about 4 kg/day, and the feeding was done twice a day morning and afternoon. Additional food and concentrates were given to the groups of animals (P1, P2, P3, and P4) in sufficient quantities as needed (± 2.5% of body weight) or 500 g/day and administered twice a day, given before the greenery was given.

Weighing the body's weight

Weighing is done with scales (dacin) by placing animals in ramie sacks that have been specially made. Weighing is done three times, namely before the start of treatment (0 weeks), after the research had been carried out for two weeks, and at the end of the study (4 weeks).

Measurement of vital statistics

Measurements made with dipsticks and Medline. The chest line was measured using the Medline encircling the chest at the back of the shoulder. The torso's length was measured using the dipstick, the distance between the front edge of the shoulder joint and the filter bone. The height of gumba was measured with a dipstick of the highest part of gumba to the ground following the perpendicular line. The inner line of the chest is measured by using a dipstick by drawing a vertical line between the edge of the back and the chest. The width of the chest is measured by using a dipstick by drawing a horizontal line between the outer edge of the left and right shoulder joints.

Data analysis

The data obtained were analyzed using the analysis of variance (ANOVA) one way with the observed variables of the sheep's body weight and vital statistics. Further tests with LSD were conducted.

RESULTS AND DISCUSSION

The nutritional content of the food

Test results proximate to the nutrient content of the food given in this trial are presented in Table 1.

Protein is essential for life because these substances are active protoplasm in all living cells (Anggorodi 1990). Protein has an important role in the process of growth, production, and reproduction. The protein content of ramie leaves is 24-26%, 5-6% for fat; 25-30% for Phosphorus, 5-6% for calcium, 36-46% for carotene (Sudiro 2004). Protein has an important role in the process of growth, production, and reproduction. The needs of the crude protein for the sheep range from 12.5 to 14.4% from the rations (BPTP Ungaran 2000), while according to Anggorodi (1990) protein content of Leguminosae ranges from 14.3 to 17.4%. The one of grass ranges from 4.3-10.3%, so the feeding should be mixed with legume and grass or other supplementary food.

High fiber content can inhibit the growth of animals. According to Hanafi (2004), twigs, branches from trees, and shrubs can be used as food additives other than fresh grass and other greenery. However, the selection of the food ingredients should consider possible limiting factors such as nutrition and the anti-nutrient material whether or not it is processed before being used as food (Mathius and Sinurat 2004). According to Sutardi (1980), the lignin content of the greenery is closely related to the benefits of fodder. If the rate is high, then the coefficient of food digestibility related to the benefits of forage is low.

Table 1. Nutrient content of the foods given in the research.

Treatment	Composition	Crude protein	Crude fiber
P1	without ramie	13.84%	11.61%
P2	added by 10% ramie	13.14%	13.95%
P3	added by 20% ramie	12.64%	14.61%
P4	added by 30% ramie	11.02%	15.29%

Texel sheep body weight

In this study, the initial data results from the initial weight of the animals gained by weighing all the sheep to determine the initial weight of each treatment. The initial weight of Texel sheep throughout the study group was 14-25 kg, with an average body weight of 20 kg. Texel sheep with a bodyweight of the observation period of 2 weeks after treatment had a 16-28 kg range with an average body weight of 23.48 kg. Texel sheep's bodyweight of the observation period of 4 weeks after treatment ranged 18-29 kg with an average body weight of 25.86 kg (Figure 1).

The highest average initial body weight (0 weeks) is in the group given with the addition of ramie hay by 30%, which was P4 (21.3 kg), and then flowed by P0 and P3 (which weighted 20 kg), and P1 (19,6 kg). The results of weighing the average body weight on the second week obtained the highest body weight, which was P4 (23,6 kg), followed by P1 (23,5 kg), P2, and P3 (22,9 kg), and then the lowest was P0. The result of weighing the average body weight after four weeks was that the highest body weight was gained by P1 (26,4 kg), then consecutively followed by P2 (24,7 kg), P3 (24,6 kg), and P4 (24,4 kg), and the lowest achieved by P0 (22,4 kg).

The body weight Texel sheep on all treatments shows a further increase in body weight. The highest weight was gained by P1 (213,34 g/head/day), followed by P2 (186,67 g/head/day), P3 (153,34 g/head/day), and P4 (103,34 g/head/day), while the lowest was P0 (96,67 g/head/day). The highest percentage of the increase in body weight was achieved by P1 (32%), followed by P2 (29,32%) P3 (23%), while the lowest was P4 (14,55%). It is below the average daily gain control group, 18.37% (Figure 2).

From Figure 2, it can be concluded that the Texel sheep which has been researched are still below the standard weight gain of the pure species of Texel sheep, but already above the ones treated with additional food for fattening sheep given with ramie hay carried out by The Office of Animal Husbandry and Fisheries of Wonosobo District in 2005 which only gained 71 g/head/days. This situation can occur because the sheep used in the research results from the cross-fertilization of the Texel sheep species for the fattening project. The standard average weight gain for the pure species of Texel sheep is 300 g/day, with the test results on individual growth varying between 250 and 540 g/day (Anon 2000). According to Sodiq and Abidin (2002), the highest daily growth could be gained with a weight gain of 0.3 kg per day. The average daily weight gain achieved with intensive maintenance is 0.2 kg per day.

In the efforts of cattle fattening, growth is an important goal. Excess food from basic living needs will be used to increase body weight. The cattle's weight gain reflects the extent of the benefits of food given to the cattle (Hanafi 2004). After multiple comparison tests between the means using the LSD method, it is shown that the significant difference in the control group with each treatment was only found in P1 and P2. This is proved from the test results for each mean, of which all have significance under 0.05 (P, 0.05). Thus, it indicates that the treatment of giving the 10% and 20% of ramie hay has a significant impact (P <0.05) on weight gain for the Texel sheep. Besides, according to Gabbi et al. (2004), the increase in the supply of ramie hay to fatten White New Zealand rabbits has a negative response on the productive performance of animals when those already receive high levels of fiber on a diet. According to de Toledo et al. (2008), the combination of ramie and alfalfa hays, the main fiber source ingredient in rabbits' diets, caused a positive synergic effect and improved growth performance.

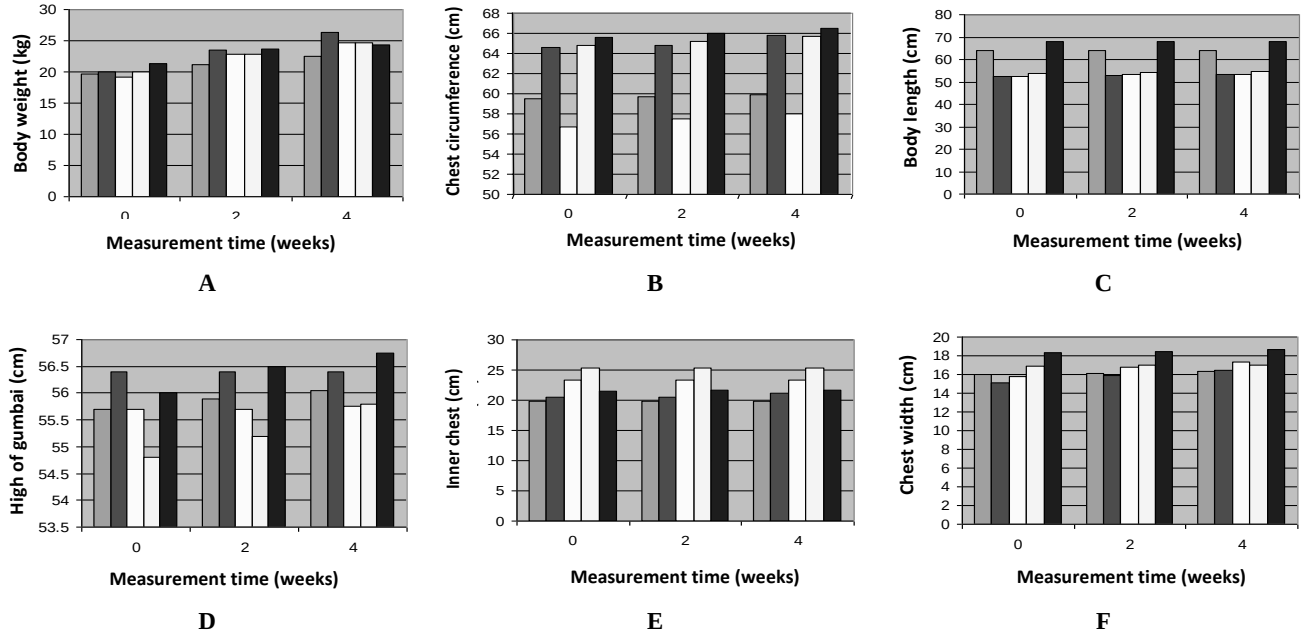

Figure 1. The average frequency distribution measurements of Texel sheep according to the treatment period. A. body weight of sheep, B. chest circumference, C. body length, D. high gumbai, E. inner chest, F. chest width.

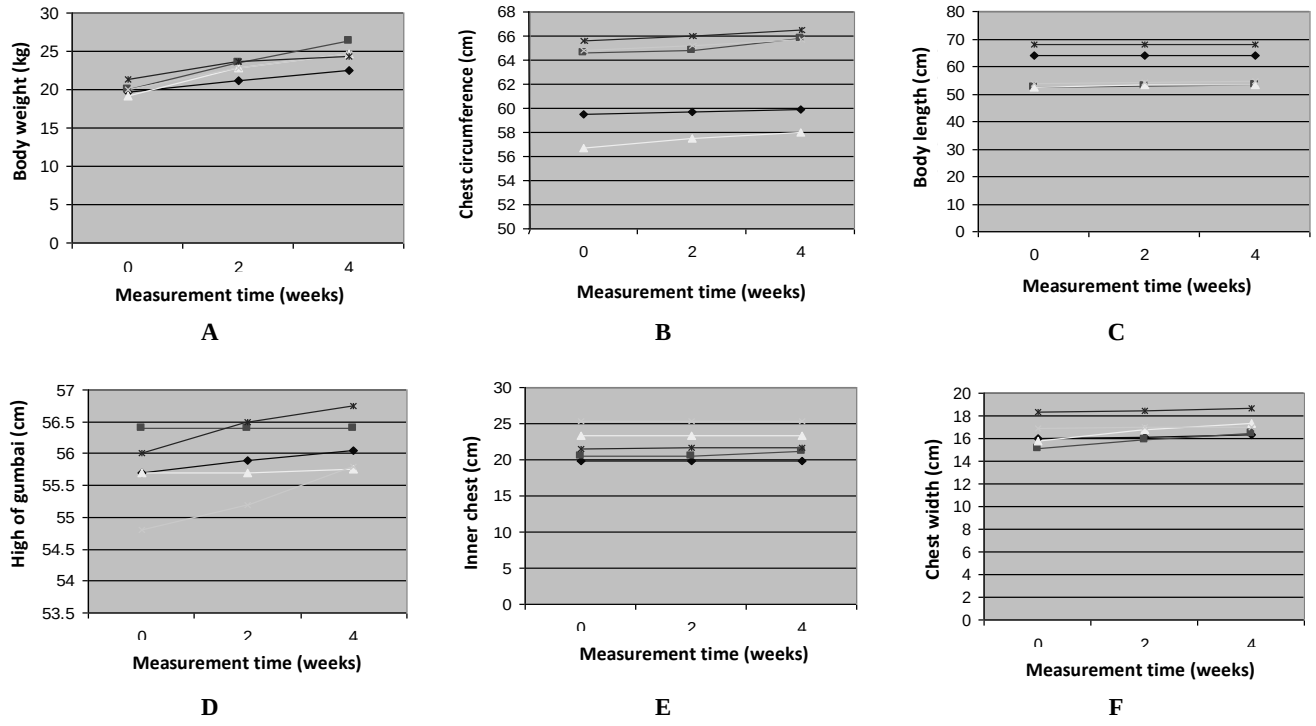

Figure 2. The average percentage increase in Texel sheep on each treatment. A. body weight of sheep, B. chest circumference, C. body length, D. high gumbai, E. inner chest, F. chest width. P0: ♦ , P1: ■ , P2: ▲, P3: X , P4: *.

The data of body weight increase in Figure 2 shows that the greater the addition of ramie hay, the more negative impact on weight gain. This situation is caused by a decrease in protein content of the food given with the additional ramie hay, even though the food provided is already in accordance with the needs of the sheep.

Vital statistics of the Texel sheep

Chest circumference

The average chest circumference of Texel sheep at the beginning, middle, and end of treatment is presented in Figure 1. The highest average of chest circumference of Texel sheep at the beginning of treatment (0 weeks) is at P4 (65.6 cm), then at P3 (64.8 cm), P1 (64.6 cm), and P0 (59.45 cm), while the lowest is at P2 (56.75 cm). The measurement results on average chest circumference after two weeks of treatment shows the highest chest circumference is at P4 (66 cm), followed by P3 (65.15 cm), P1 (64.8 cm), and P0 (59.85 cm), and the lowest average of chest circumference was obtained at P2 (57.45 cm). The measurement results on average chest circumference after four weeks of treatment achieved the highest chest circumference at P4 (66.5 cm), followed by P1 (65.85 cm), P3 (65.75 cm), P0 (59.7 cm), and the lowest at P2 (57.95 cm).

The chest circumference of Texel sheep on all treatments shows a different increment. The highest chest circumference is reached at P1 (1.25 cm), followed by P2 (1.2 cm), P3 (0.95 cm), and P4 (0.9 cm), whereas the lowest is at P0 (0.40 cm). The highest increment percentage of chest circumference is achieved in P1 (1.25%), followed by P2 (1.2%), P3 (0.95%), P4 (0.9%), while the lowest is at P0 (0.4 %) (Figure 2).

The results of Anova's further test with LSD show that the addition of ramie hay 10%, 20%, and 30% can increase the vital statistics growth of each Texel sheep chest circumference of 1.20 cm, 0.95 cm, and 0.90 cm. This situation is caused by feed protein degradation and crude fiber increment due to the addition of ramie hay. The addition of ramie hay in cattle feed lowers the percentage of the protein content of feed and increases feed crude fiber, where protein plays a vital role in growth, production, and reproduction.

Body length

The average body length of Texel sheep at the beginning, middle, and end of treatment is presented in Figure 1. The highest average body length at the beginning of treatment (0 weeks) is found in P4 (67.8 cm), then in P0 (63.9 cm), in P3 (53.8 cm), while the lowest is in P1 and P2 (respectively, 52.4 cm). The result of measuring the average body length two weeks after treatment obtains the highest body length is on P4 (68.15 cm), followed by P0 (64.05 cm), P3 (54.6 cm), P2 (53.2 cm), and the lowest is at P1 (53 cm). The measurement results of average body length four weeks after treatment show the highest body length is P4 (68.15 cm), then P0 (64.1 cm), P3 (54.6 cm), P1 (53.55 cm), and the lowest is P2 (53.45 cm).

The average body length of Texel sheep on all treatments shows different increments. The highest average length increment of sheep is at P1 (1.15 cm), followed by P2 (1.05 cm), then P3 (0.8 cm) and P4 (0.35 cm), while the lowest is at P0 (0.2 cm). The highest increment percentage on body length is achieved in P1 (2.19%), then P2 (2%), P3 (1.49%), and P4 (0.52%), while the lowest is in P0 (0.31%) (Figure 2).

The Anova's further test with LSD shows that adding ramie hay of 10%, 20%, and 30% in the feed can increase the vital statistics addition of body length, consecutively, of 1.05 cm, 0.80 cm, and 0.35 cm. The decreased condition is caused by the degradation of feed protein and crude fiber increment on feed due to the addition of ramie hay.

Wither's height

The wither's average height of Texel sheep at the beginning (0 weeks), middle (2 weeks), and end of treatment (4 weeks) is presented in Figure 1. At the beginning (0 weeks), the highest average of withers height is found in P1 (56.4 cm), then P4 (56 cm), P0, and P1 (respectively, 55.7 cm), whereas the lowest is in P3 (54.8 cm). The result of withers average height measurement two weeks after treatment shows that the highest withers height is at P4 (56.5 cm), followed by P1 (56.4 cm), then P0 (55.9 cm), P2 (55.7 cm), and the lowest is at P3 (55.2 cm). The result of withers average height measurement four weeks after treatment shows that the highest withers height is at P4 (56.75 cm), followed by P1 (56.4 cm), P0 (56.05 cm), P3 (55.8 cm), and the lowest is at P2 (55.75 cm).

The average withers height of Texel sheep on all treatments shows different increments (Figure 2). The highest increment of withers height of sheep is at P3 (1 cm), followed by P4 (0.75 cm), P0 (0.35 cm), and P2 (0.05 cm), whereas P1 did not experience any withers height increment. The highest percentage of withers height increment is achieved in P3 (1.83%), followed by P4 (1.34%), P0 (0.63%), and P2 (0.09%), whereas P1 does not increase at all.

The Anova further test results with LSD show that adding ramie hay of 10%, 20%, and 30% in the food can increase the vital statistics addition of withers height of each treatment by, consecutively, 0.05 cm, 1.00 cm, and 0.75 cm. The relatively limited increase is due to the reduced protein content of food and the increase of crude fiber due to ramie hay additions.

The inner part of chest

The average inner part of the chest of Texel sheep at the beginning (0 weeks), middle (2 weeks), and end time of treatment (4 weeks) are presented in Figure 1. Measurement of the average inner part of the chest at the beginning of treatment (0 weeks) are highest at P3 (25.3 cm), then P2 (23.3 cm), P4 (21.5 cm), P1 (20.5 cm), while the lowest was in P0 (19.8 cm). Results of average measurement of the inner part of the chest two weeks after the treatment show the highest is on P3 (25.3 cm), followed by P2 (23.3 cm), P4 (21.6 cm), P1 (20.5 cm), and the lowest at P0 (19.8 cm). Results of average measurement of the inner part of the chest four weeks after treatment show the highest achievement is at P3 (25.3 cm), followed by P2 (23.3 cm), P4 (21.65 cm), P1 (21.15 cm), and the lowest is at P0 (19.85 cm) (Figure 2).

The highest average addition of the inner part of the chest is reached at P1 (0.65 cm), followed by P4 (0.15 cm) and P0 (0.05 cm), while P2 and P3 do not experience any increment. The highest percentage increment of the inner part of the chest is achieved in P1 (3.17%), followed by P4 (0.69%), P0 (0.25%), while P2 and P3 are not increased (Figure 2).

The Anova further test results with LSD show that adding 30% ramie hay in feed can increase the vital statistics addition of the inner part of the chest (0.15 cm), whereas other treatments give no significant effect. This situation is caused by the degradation of feed protein and crude fiber increment on feed due to the addition of ramie hay.

Chest width

The average chest width of Texel sheep at the beginning of treatment (0 weeks), middle of treatment (2 weeks), and end of treatment (4 weeks) are presented in Figure 1. The measurement of the average width of the chest at the beginning of treatment (0 weeks) shows the highest number is found in P4 (18.35 cm), and P3 (16.9 cm), P0 (15.95 cm) and P2 (15.8 cm), while the lowest is at P1 (15.15 cm). Chest width average measurement results on two weeks after treatment show the highest chest width is at P4 (18.45 cm), followed by P3 (17.05 cm), P2 (16.8 cm), P0 (16.2 cm), and the lowest is at P1 (15.9 cm). Chest width average measurement results after four weeks of treatment show the highest chest width is at P4 (18.65 cm), then P2 (17.3 cm), P3 (17.05 cm), P1 (16.5 cm), and the lowest is at P0 (16.3 cm).

The average chest width of Texel sheep in each treatment represents different increments (Figure 2). The highest increment of sheep chest width is at P2 (1.5 cm), followed by P1 (1.35 cm), P0 (0.35 cm), P4 (0.3 cm), while the lowest is in P3 (0.15 cm). The highest percentage of chest width increment is achieved by P2 (9.49%), followed by P1 (8.91%), P0 (2.19%), and P4 (1.63%), while the lowest is in P3 (0.89 %). Considering the vital statistics data of Texel sheep, it appears that the size of vital statistics of research sheep is still below the class D standard measure of vital statistics on Texel sheep with 2.5 years of age, i.e., the chest circumference is 80 cm, withers height is 65 cm and 65 cm of body length (Office of Animal Husbandry and Fisheries of Wonosobo District 2007).

The Anova further test results with LSD shows that the addition of ramie hay of 10%), 20%) and 30%) in the food can increase the vital statistics addition of chest width, each for 1.50 cm); 0.15 cm) and 0.30 cm). This situation is caused by feed protein degradation and crude fiber increment in the feed due to the addition of ramie hay.

After the data analysis with one-way ANOVA is performed to all the calculation results obtained in all treatments, the value of the statistical test, i.e., $F_{obs} > F\alpha$, thereby H_{0A} is rejected, while H_{1A} is accepted. Thus, these tests show significant differences among all treatments on

body weight and size of the vital statistics, including chest circumference, body length, withers height, inner part of the chest, and chest circumference of Texel sheep on each treatment. Anova's other test results with LSD show that the addition of ramie hay will increase body weight and size of the statistics vital.

Economic calculation

The result of observation toward the addition of ramie hay in the food given to the Texel sheep shows the economic cost of food as presented in Table 2. Economically, though not yet to replace concentrate food, the maintenance of Texel sheep with the addition of ramie hay by 10%, 20%, and 30% can reduce the costs of the food from Rp 330,000, - to Rp 319,000, -; Rp 309,000, - and IDR 298 000, - and gained the profit per head of for each sheep Rp 52,050, -; Rp 38,100, - and Rp 16,650, -. While the maintenance of sheep by feeding them with concentrates without any additional food of ramie hay gained a benefit of Rp 63,000, - and the sheep fed only with greenery alone without giving concentrates gained a profit of Rp 28,500, -. This situation is caused by the cost of the feed control group, P1 (without hay of ramie), P2 (the addition of ramie hay 10%), P3 (ramie hay 20%), and P4 (30% ramie hay), respectively IDR 150,000.00/month; Rp 330,000.00/month; IDR 319 500.00/month; IDR 309,000.00/month and Rp 298,500.00/month. The cost of feed is treated with grass price of Rp 3,000.00/buckets (for six heads), concentrates IDR 1,200.00/kg and ramie hay price IDR 500.00/kg and livestock prices Rp 15,000/kg body weight.

Table 2. Economic analysis of sheep feed costs by treatment.

Treatment	Prices feed (IDR)	Added body weight (kg)	Price sheep (IDR)	Advantages (IDR)
P0	150,000	29	435,000	285,000
P1	330,000	64	960,000	630,000
P2	319,500	56	840,000	520,500
P3	309,000	46	690,000	381,000
P4	298,500	31	465,000	166,500

CONCLUSION

The group achieved the highest weight gain of sheep with the additional food of ramie hay, respectively 0%, 10%, 20%, and 30%. Though not yet able to replace the function of the concentrate, the addition of ramie hay as much as 10%, 20%, and 30% in food increases the weight gain of sheep for each percentage 186.67 g/head/day, 153.34 g/head/day and 103.34 g/head/day. The increased size of the vital statistics of the chest line, body length, and chest width is achieved by adding ramie hay in the cattle food as much as 0%, 10%, and 20%. In comparison, the group reached the highest body height with the additional food of 20% and 30% ramie hay, and the group achieved the most increased chest width with the additional food of 0% and 30% ramie hay.

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