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CIHATEUP FEMALE DUCKS PERFORMANCE GROWTH BY VARIOUS PROTEIN- ENERGY RATIONS GIVEN AT WATER MINIM HOUSING SYSTEM

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Abstract

Cihateup duck is one of the local duck which coming from Cihateup village, Tasikmalaya District, West Java- Indonesia. This bird is very good for laying ducks with production of about 280-300 eggs. Some constraints because of limited agricultural land, as well as agricultural intensification, resulting land fallow period after harvest has in a short and limited and commonly full of pollution with pesticides. That situation makes duck productivity going down or low. For this condition requires much effort to overcome the real problem by maintaining ducks used ration and water efficiently as a priority. The research were divided into two phases, where the first phase was done to determine the efficiency of protein utilization value (EUP) dietary by means of excreta collection, and to define the requirement standard of protein and energy during growth. Twelve *female ducks at 8 weeks old were used by using Scott et al. (1982) formula and carried out in two week. The second phase was aimed to evaluate the protein and energy diet levels during growth period. The protein in energy diet 300 kcal/kg was standard requirement and 2% of protein in energy diet just the same was evaluated. A Completely randomized design with four replications was used in this experiment. The parameters were feed consumption, body weight gain , feed conversion for the growth period, and age at first egg laid. Feeding trial was used 48 female Cihiateup ducks at 3 weeks old, and was carried out up until 20 weeks. The result indicated that efficiency utilization protein (EUP) dietary as big as 54.14%. The Protein and Energy requirement of female Cihateup ducks for starter, grower I and grower II phase were respectively need 17.75 percent of protein, 2,454.57 Kcal/kg; 11.79 percent of protein, 2,122.81 Kcal/kg; 7.17percent of protein and 2,207.30 Kcal/kg. Based with the two phase period, it can be concluded that female Cihateup ducks can be raised with the low energy (2,200 kcal/kg ME) and low protein (12.0%) in the growing (20 weeks) diet without any ill-effects on feed intake, body weight gain, feed conversion and the age of first lay.*

Key words : *Cihateup ducks, efficiency utilization protein (EUP), age of first lay ,water minim housing system.*

INTRODUCTION

Cihateup duck is one of the local duck which coming from Cihateup village, Tasikmalaya District, West Java- Indonesia. This bird is very good for laying ducks with production of about 280-300 eggs. Cihateup duck is namely mountainous duck because it can adapt to cool temperature and survive in high land (Wulandari et al., 2005). Some constraints because of limited agricultural land, as well as agricultural intensification, resulting land fallow period after harvest has in a short and limited and commonly full of pollution with pesticides. That situation makes duck productivity going down or low. For this condition requires much effort to overcome the real problem

by maintaining ducks used ration and water efficiently as a priority. Susanti and Prasetyo (2009) state that a local duck productivity can improved by improving the genetic, feed quality and management. Improving of genetic quality is considered was ways due to its permanent impacts. Although it is generally accepted that growth of female ducks are influenced by the dietary protein and energy rations (Leeson and Summers, 2001; Cheeke, 2005; Karman et al, 2008). To compose an efficient diet, firstly has to make the metabolizable energy and the protein for rearing purpose must be known. Energy is the control of feed consumption, meaning the ration energy will determine in feed intake. If the energy ration high then the consumption of ration is low, on the contrary if the energy ration is low so the consumption of ration is high. That is why the energy level of the ration will determine the level of nutrients composition such as protein substances. Therefore between energy and protein ration should be balance (Scott et al., 1982; Leeson and Summers, 2001). Similar results were observed by Fan et al. (2008), who performed a 42 days trial on ducks and evaluated the energy level which best fits for growth parameters of the ducks, showed increase in body weight with increase in energy from 2600 to 3100 kcal/kg. The result showed that the feed intake is affected by ambient temperature. This is due to thermostatically mechanism that can control income and expenditure of energy into and out of the body, in order to maintain a stable body temperature. Therefore energy is used in different climates, and its efficiency will be different (Soeharsono, 1976; Sturkie, 1976; Daghir, 2008). Ducks are kept in the tropics generally consume less feed than ducks kept in sub-tropical regions. However, low feed consumption was not significant due to the high content of energy ration. This is related to the volume of ration which first stimulates crop distension, so that feed consumption stopped despite energy intakes of protein and protein is still lack. The protein is essential organic substances and essential for growth and production (Pack, 2002). Therefore, the accuracy of the protein that is used both for maintenance, tissue growth and hair growth should be calculated by knowing the value of the efficiency of the use of protein in the ration. The balance of protein - energy is influenced by the environment, and the amount of ducks needs. Ration with a high energy level must be followed by a high protein, minerals and vitamins in order that be balance. Ketaren and Prasetyo (2002) reported that the nutritional requirements for laying ducks in the growth phase the age of 1-16 weeks tend to be low at about 85-100% of the recommendation of 15 percent. The balance of metabolizable energy and protein within ration determine the growth rates. Thus, the same benefit economically will be gained. Therefore the preparation of rations based on energy-protein needs can be a useful benchmark for duck farmers and livestock food industry in formulating rations for local Ducks especially Cihateup on water minim housing system.

MATERIALS AND METHODS

The research were divided into two phases, where the first phase was done to determine the efficiency of protein utilization value (EUP) dietary by means of excreta collection, and to define the requirement standard of protein and energy during growth. Twelve female ducks at 8 weeks old were used by using Scott et al. (1982) formula and carried out in two week.

$$EUP = \frac{PIP - (PEP - PEK)}{EUP} \times 100\%$$

EUP = Efficiency utilization of dietary protein (%)
PIP = Protein Intake from treatment ration (g)
PIK = Protein intake from corrected ration (g)
PEP = The amount of excreta protein derive from basal ration (g)
PEK = The amount of excreta protein derive from corrected ration (g)

The protein requirement by day using Scott et al. (1982) formula recommended as follows:

The Grower phase :

$$\frac{(A \times W \times 6{,}25) + (DG \times PC) + (DG \times F \times PF)}{EUP}$$

Explanation:
A = Endogenous Nitrogen excreta of the grower ducks (mg/kg body weight)
W = Body weight (kg)
DG = Daily gain of body weight (g)
PC = Protein content of carcass (%)
EUP = Efficiency utilization of dietary protein (%)
F = Percentage of feather from body weight (%)
PF = Protein content of feathers (%)

The metabolizable energy requirement for Cihateup ducks by using the Scott et al. (1982)
The Grower phase: Energy for their maintenance + activity energy + tissue production energy
1. Energy for maintenance: 83 x $W^{0.75}$: 0.82 Kcal
2. Energy activity: on cage system 37% of the energy for maintenance,
3. Energy to produce tissue: body gain x 1.5 Kcal.
To determine protein and energy in ration
Protein Requirement:

$$\frac{Requirenment\ of\ the\ protein\ (g)}{Feed\ intake\ perday} x100\%$$

Energy Requirement:

$$\frac{Requirenment\ of\ the\ energy\ (g)}{Feed\ intake\ perday} x100\%$$

Second experiment was done as the basis of the results from experiment 2. The diets were composed on the basis of energy-protein levels, standard and over the standard requirement (energy differences 300 kcal/kg and 2 percent protein). A Completely Randomized Design (CRD) was used in this experiment with 4 treatments, P1 (2200 kcal/kg ME and 12% protein), P2 (2200 Kcal/kg ME and 14% protein), P3 (2500 kcal/kg ME and 12% protein) and P4 (2500 kcal/kg and 14% protein), each treatment is repeated five times. Then the data was analyzed by Random Simple Test (Stell and Torrie, 1989). The research used 48 female Cihateup ducks at 3 weeks old, and was carried out up until 20 weeks. The variable analysis were feed intake, body weight gain , feed conversion for the growth period, and age of first lay.

RESULTS AND DISCUSSIONS

The Result of Research - First Experiment

The results of determination of the efficiency protein utilization, the energy and protein requirements on growth phases of female Cihateup ducks are shown at Table 1.

Table 1. Efficiency Protein Utilization Value, Energy and Protein Requirements for Female Cihateup on Growth Phases

Description	Growth Phase
Efficiency Protein Utilization (EUP) %	54.14
Energy Requirement/day (Kcal)	140.88
Energy Ration (Kcal/Kg)	2207.30
Protein requirement/day (g)	7.17
Protein Ration (%)	12

Table 1 shows that the efficiency of protein utilization value (EUP) for Cihateup female grower phase is 54.14 percent. EUP value Cihateup grower phase have the lowest UEP value of pekin ducks is 55% (reported by Scott and Dean, 1991), Muscovy ducks 58.65 (Wiwin Tanwiriah, 2011), Leghorn chicken is 61% (Scott et al., 1982). EUP value reflects the amount of protein utilization efficiency of nitrogen that can retention by ducks for growth per day, feather growth and replacement of nitrogen lost (Leeson and Summers, 2001). The difference between the value of EUP Cihateup with pekin ducks and leghorn chickens, because the results of more rigorous selection in the chicken and pekin ducks are done continuously. So the degistibility pekin ducks and mucsovy ducks is higher than Cihateup ducks. The result by using the method of Scott et al. (1982), the need for energy of female Cihateup on growth is 140.88 kcal/ bird/day, with slight restriction of energy, below the *ad libitum* rate, as a means of controlling excessive fat deposition in ducks. The level of energy in the ration 2,200 kcal/kg is enough to Cihateup female ducks grower period. These results agree with the opinion of Scott and Dean (1991) feed conversion are not normally expected in poultry when weight gain is reduced, since less gain relative maintenance requirement reduces efficiency of gain. For protein per day in a period of growing is 7.17 g/bird/day, For protein per day in a period of growing is 7.17 g/bird/day, with feed intake 150 g/head/day, it needs protein in ducks rations for growth phase is 12 percent. According to Khajarern and Khajarern (1987) recommended 10-15% protein for growing Thai ducks from 3 to 10 weeks of age. The recommendation of Shafiuddin (1985) was 17% protein for growing Bangladesh ducks, and that of Sainsbury (1980) was 15% for growing ducks. Ketaren and Prasetyo (2002) that the nutritional requirements for laying ducks in the growth phase the age of 1-16 weeks tend to be low at about 85-100% of the recommendation of 15 percent. According to Leeson and Summers (2001), the light weight breeds also require less protein per day for maintenance and so chicken need a somewhat lower overall daily protein intake than do on medium breeds.

The Results of Second Experiment (Feeding Trial)

The results of the influence of energy-protein levels for Growing (3 – 20 weeks) female Cihateup Ducks are shows at Table 2. It can be seen in the Table 2, that female Cihateup ducks in the growing stage the body weight gain was slow and feed intake was very high, so the feed 'conversion ratio was very high. This result was similar to that obtained by Thongwittaya et al. (1991), who reported that the most rapid growth rate of female Khaki Campbell ducks was observed up to 4 weeks of age, the lowest from 13 to 16 weeks of age, and the feed conversion ratio increased with an increase in age. Feed intake was not different among the treatments. It means that energy-protein level (2,200 – 2,500 Kcal ME/ 12-14% protein) did not influence diet palatability and ducks appetite. According to Cole (1996), the feed intake is influenced by age, body weight, level of production, environmental temperature and nutrient content of the feedstuff. Lesson and Summers (2001) reported that poultry eat to get energy required and they will stop to eat when energy needed is achieved. Rasyaf (2003) states that the palatability determine of the feed intake. The level of consumption of ration greatly affect the performance of livestock production and reflects the level of palatability of a ration that is consumed.

Table 2. The Effects of Dietary Energy Level on Feed intake, Body Weight Gain and The Feed Conversion Ratio for Growing (3 – 20 weeks) Female Cihateup Ducks

Variable	Ratio			
	P1 (2200:12)	P2 (2200:14)	P3 (2500:12)	P4 (2500:14
Feed Intake (kg/period)	13.48 [a]	14.96 [a]	13.19 [a]	14.54 [a]
Daily gain (g/period)	834.80 [a]	963.50 [a]	891.70[a]	928.2 [a]
FCR (kg/period)	16.15[a]	15.53[a]	14.80[a]	15.67[a]
age at first egg laid (day)	154 [a]	151 [a]	151 [ab]	150 [b]

Note: The similar superscript in the same row show non significant difference (P>0.05)

Analysis of variance showed that energy-protein into the ration was not significantly (P>0.05) effect on daily gain weight. The body weight gain after the age of 12 weeks ducks began to decline. This is because at that age there is a wing feathers growth and process of maturation reproductive organs such as ovaries and oviduct. This gives an indication that the ducks were fed 12 % protein at 16 weeks of age as well as with ducks fed 14 % protein. Thus, using 2,200 kcal/kg ME and 12 % protein in the ration to achieve normal growth ranging from the age of 3 - 20 weeks. The results of the present study are in line to the findings of Yung et al. (2001) and Wu et al. (2005), who reported that non-significant (P>0.05) difference was observed in weight gain, feed consumption and feed conversion (FCR) with increasing the protein and energy ratio in commercial breeder pullet diets at growing phase.

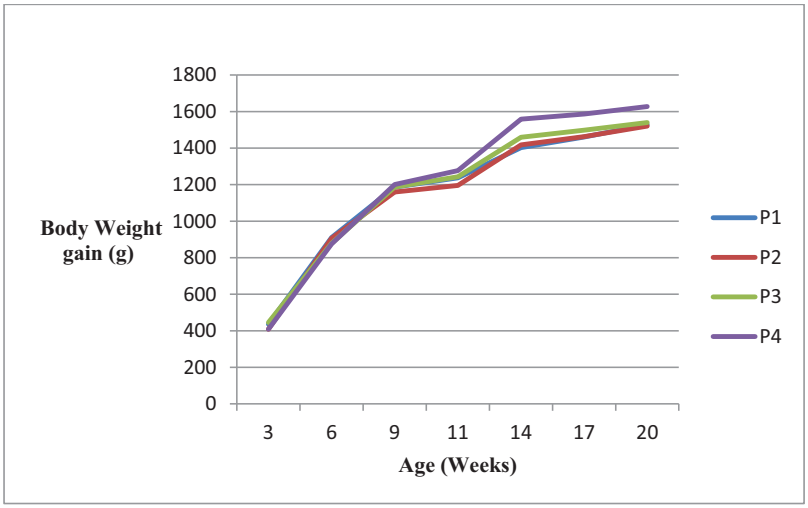

Figure 1. Growth Female Cihateup Ducks

Analysis of variance showed that energy-protein into the ration was also not significantly (P>0.05) effect on feed conversion ratio. In growing stage, the body weight gain was slow and feed intake was very high, so the feed 'conversion ratio was very high. The result was parallel on feed consumption and daily gain weight those was no significant different among the treatment. Pan et al. (1978) reported that

there was no significant difference in body weight gain and feed efficiency among growing Tsaiya ducks fed diets of different protein levels. The results of the present study are in line to the findings of Yung et al. (2001) and Wu et al. (2005), who reported that non-significant ($P>0.05$) difference was observed in weight gain, feed consumption and FCR with increasing the protein and energy ratio in commercial breeder pullet diets at growing phase.

As shown in Table 2, the age at first lay of female Cihateup duck was 150 – 153 days. Cihateup ducks to begin lay earlier than Tegal Ducks 168.8 days (Subiharta et al., 2002). Analysis of variance showed that energy-protein level in the ration was significantly ($P<0.05$) effect on the age of fist lay. By adding the 2,200 kcal/kg ME and 12 percent protein in the ration of Cihateup duck still gave a good result on the age of first lay (154 day) than if adding 2,500 kcal/kg ME and 14 percent protein in the ration (150 day). This is because if the pullets mature earlier, can be lay smaller eggs at start of egg production and the pullets lay at lower rate and over a shorter period after they begin their production cycle (Bell and Weaver, 2002).

CONCLUSIONS

1. The result indicated that efficiency utilization protein (EUP) dietary as big as 54.14%. The Protein and Energy requirement of female Cihateup ducks for starter, grower I and grower II phase were respectively need 17.75 percent of protein, 2,454.57 Kcal/kg; 11.79 percent of protein, 2,122.81 Kcal/kg; and 7.17 percent of protein and 2,207.30 Kcal/kg.
2. Based with the two phase period, it can be concluded that female Cihateup ducks can be raised with the low energy (2,200 kcal/kg ME) and low protein (12%) in the growing (20 weeks) diet without any ill-effects on feed intake, body weight gain, feed conversion and the age of first lay.

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REPRODUCTION, PHYSIOLOGY, ANATOMY