

## The Effects of Hair Colors Differences on the Performance of Etawah Grade Doe

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**ABSTRACT:** The research was conducted to identify the performances of Etawah grade does based on the hair color differences. The materials of the research were consisted of 27 Etawah grade does aged on 1.5-2.0 years old. Basal diets were groundnut leaves and elephant grass, and concentrate feed as additional feed. Twenty seven of Etawah grade does were divided into three treatments based on hair color, black head colors (T1), brown head color (T2) and mixed color (T3), each treatment was consisted of 9 Etawah grade does. Feed was given 3.5% on dry matter based, the ratio between forages and concentrate feed was 60% and 40%. Does were raised for 8 months, feed was offered twice a day. Feed offered was weighted, while the rest was weighted the day after. The doe was mated with buck according to their head color. The data were consisted of feed and nutrient intakes, absolute and relative average daily gain (ADG), feed cost per gain, service per conception, litter size, and kids birth weight. One way analysis of variance was applied to identify the mean differences. The result indicated that brown head color of Etawah grade does had the highest ( $P < 0.05$ ) feed intake (3.35 vs 3.02 vs 2.2 kg/h/d), dry matter intakes (3.11 vs 2.80 vs 2.53 kg/h/d), crude protein intakes (0.59 vs 0.53 vs 0.48 kg/h/d), absolute ADG (90.68 vs 64.34 vs 55.01 g/h/d) and relative ADG (0.26 vs 0.20 vs 0.18%), and the lowest feed cost per gain (15,780.03 vs 19,477.29 vs 18,877.78 IDR/kg) respectively, compared to black and mixed head colors of Etawah grade does. There were no significant differences were found on the *service per conception*, *litter size* and birth weight of kids. It can be concluded that the brown head color of Etawah grade does had the best performances as indicated by highest feed and nutrient intakes, highest absolute and relative average daily gain and the lowest feed cost per gain.

**Keywords:** Etawah grade doe, Head color differences, Performances

### INTRODUCTION

The population of goats in Indonesia has increased gradually at an average rate of 4.6% in the last ten years, involving 3.5 million households. Nearly 99% of small ruminants are in hand of small-holders (Knipscheer *et al.*, 1984; Soedjana 1993). The main reason why the majority of famers keep small ruminants in particular goat are they are easy to manage, have a ready market, act as a savings account in case farmers have urgent cash requirements, have socio-cultural roles and they produce manure to fertilize the land (Devendra 2002; Budisatria *et al.*, 2010). In Indonesia there are many goat breeds kept by famers, one of them is called Etawah grade. Etawah Grade is the results of cross mating between Kacang goat and imported Etawah goat. Etawah Grade goats have been adapted to the Indonesian natural condition and habitat, and are widely found in Java island spreading to all over Indonesia. Goats of this type are considered having double function as meat producing type as well as milk producing type, although in Indonesia its function as milk producer has not been appreciated much yet (Williamson and Payne, 1993).

Farmers like to classify Etawah grade based on the length of its' ears, which leads to an understanding of three types of Etawah grade goats. Type A goats have ears of more than 30 cm long, type B have ears between 20 to 30 cm long, and type C are less than 20 cm long ears. Another

interesting phenomenon is that farmers have preference on hair color, they believe that Etawah grade having black color on head, and combination of black and white have high productivity compared to other color and they have more expensive prices. Theoretically, this opinion come out might be caused by genetic variation of the ancestors, blood profile of Etawah Grade has been closer to Etawah rather than to Kacang goats and so its productivity is also closer to Etawah. This fact has been clarified by Sumadi (2001), who found out that Etawah grade of A type had dominant color of black – white or white-black as much as 95.6%, while those of B type have black-white or white-black and white-brown or brown-white had been 55% and 45%, respectively. Etawah grade of C type on the other hand dominated by brown-white and brown had been 86% and 20%. Etawah grade had better productivity compared to Kacang goats or Bligon in respect of its body weight, birth weight, weaning weight, and daily body weight gain. Budisatria (2006) found out that daily weight gain of males at zero to 3 month old kept by farmers at lowland, moderate, and highland agro-ecology zones in Yogyakarta province were 100.2 g/day/goat, 114.4 g/day/goat, and 122.1 g/day/goat.

There was little information available with regard to the productivity of Etawah grade based on their differences hair colors. That information is necessary required, so the stakeholders have the right information in order to select or keep the Etawah grade goat. Therefore, the research was conducted to identify the effects of hair colors differences on the performance of Etawah grade doe, in terms of feed and nutrients intake, bodyweight, average daily gain, feed conversion, feed cost per gain and reproduction performances.

## MATERIALS AND METHODS

The study was conducted for eight months. In total, 27 heads of Etawah grade does of 1.5-2.0 years old were used for this study, it was divided into three groups based on their color, namely black head color, brown head color and mixed color, therefore, each group consisted of nine Etawah grade does. Basal feed offered were consisted of groundnut straw and concentrate feed, the ratio was 40:60%. Feed were given 3.5% on dry matter based.

The data collection were consisted of feed (as feed) and nutrient intakes, feed conversion, feed cost per gain, absolute and relative daily gain, and reproduction performances including service preconception, litter size and birth weight. Feed intake was measured for every day. Feed were given twice a day in the morning and afternoon, feed offered and refused was weighed. Feed analyses were done to calculate dry matter (DM), crude protein (CP), crude fibre (CF), crude fat (EE) and nitrogen free extract (NFE) intakes.

Etawah grade does were weighed every two weeks, absolute and relatives daily gain were calculated. Based on dry matter intakes and gain, feed conversion was calculated while the price of feed (groundnut straw and concentrate) and the gain of does used to calculate feed cost per gain. The does were mated naturally using buck with the same color pattern. The service per conception was recorded. At the parturition stage, the numbers of kid per parturition (litter size) were recorded and kids born were weighed during 24 hours.

One way analysis of variance were applied to calculate the effect of hair color differences on feed intake and performances of does and continued by *Duncans' New Multiple Range Test* (DMRT) for significant differences.

## RESULTS AND DISCUSSION

The results indicated that Etawah grade doe with brown head color tend to have better feed intakes, dry matter, crude protein and crude fibre intakes compared to black or mixed color, while

crude fat and nitrogen free extract intakes did not significantly differs, as presented in Table 1. Feed and nutrients intakes are varied widely, its depend on the species, early body weight, age and physiological status, type and palatability of feed (Arora, 1995; Pond *et al.*, 1995).

Table 1. Feed and nutrients intakes of Etawah grade doe

Variables	Hair colour		
	Black	Brown	Mixed
Feed intakes as feed (kg/head/day)			
Grass ns	2.44	2.72	2.25
Concentrate	0.57 <sup>a</sup>	0.64 <sup>a,b</sup>	0.48 <sup>a,c</sup>
Total intakes	3.02 <sup>a</sup>	3.35 <sup>a,b</sup>	2.72 <sup>a,c</sup>
Dry matter intake (kg/head/day)	2.80 <sup>a</sup>	3.11 <sup>a,b</sup>	2.53 <sup>a,c</sup>
Crude protein intake (kg/head/day)	0.53 <sup>a</sup>	0.59 <sup>a</sup>	0.48 <sup>b</sup>
Crude fibre intake (kg/head/day)	0.57 <sup>a</sup>	0.63 <sup>a,b</sup>	0.51 <sup>a,c</sup>
Crude fat intake (kg/head/day) <sup>ns</sup>	0.15	0.16	0.13
Extract free nitrogen intake (kg/head/day) <sup>ns</sup>	1.18	1.31	1.07

<sup>a,b,c</sup>Different superscripts denote significant differences between means within rows (P<0.05)

<sup>ns</sup>Non significant.

Absolute, relative average daily gain and feed cost per gain of Etawah grade does with brown head color was significantly better than black or mixed head color, while feed conversion was remain the same, as presented in Table 2. The high daily gain of brown head color of Etawah grade does might be caused by high feed and nutrient intakes (Table 1), as Parakkasi stated that dry matter and organic matter intakes will significantly affect the daily gain, the higher feed intakes, higher daily gain will be achieved, while Mucra (2005) stated that when animal consume feed with relatively same crude protein and total digestible nutrients contents, the average daily gain will also the same. Gain will only be achieved whenever feed consumed by animals are higher than basic requirements for their live (Tillman *et al.*, 1998).

Etawah grade does with brown head color had the lowest feed cost per gain compared to black and mixed colors (P<0.05), which indicated that those goat much more efficient on using feed and converted to gain. The lowest feed cost per gain of brown head color of Etawah grade caused by efficient feed conversion and high average daily gain.

Table 2. Bodyweight, average daily gain, feed conversion and feed cost per gain

Variables	Hair colour		
	Black	Brown	Mixed
Initial bodyweight (kg)	33.10	32.20	30.88
Absolute daily gain (g/head/day)	64.34 <sup>a</sup>	90.68 <sup>b</sup>	55.01 <sup>c</sup>
Relatives daily gain (%)	0.20 <sup>a</sup>	0.26 <sup>b</sup>	0.18 <sup>a</sup>
Feed conversion	15.17	12.95	14.27
Feed cost per gain (IDR/kg)	19,477.29 <sup>a</sup>	15,780.03 <sup>b</sup>	18,877.78 <sup>a</sup>

<sup>a,b,c</sup>Different superscripts denote significant differences between means within rows (P<0.05)

<sup>ns</sup>Non significant.

Reproduction is main indicator for doe productivity and will significantly affect the economic condition of keeping goat especially for animal industry purposes (Atta *et al.*, 2012). In terms of reproduction aspects, the result indicated that there were no significant differences on service per conception, litter size and birth weight among Etawah grade does with different head color, as presented in Table 3. All does only need once time mating to be pregnant. Devendra and Burns (1994) stated that service per conception of goat in Indonesia normally around 1.5 times, while Budisatria and Udo (2012) found that service per conception of goat kept by small farmers in rural areas was 1.8-1.9 times.

**Table 3.** Doe reproduction performances

Variables	Hair colour		
	Black	Brown	Mixed
<i>Service per conception</i> (time) <sup>ns</sup>	1.00	1.00	1.00
<i>Litter size</i> (head) <sup>ns</sup>	1.36	1.67	1.33
<i>Birthweight</i> (kg) <sup>ns</sup>	2.41	2.60	2.10

<sup>ns</sup>Non significant.

The litter size of Etawah grade does in this study varied from 1.36 up to 1.67 head. Widi (2002) found that litter size of does were 1.40-1.45 head, while Budisatria dan Udo (2012) found that does kept by small farmers had relatively high litter size, it was 1.7 head. Many factors affect the numbers of kid born per doe, the main factor was feed, especially the rate of feed intakes, feed with high nutrient content mainly when it offered before ovulation will increase the numbers of ova being ovulated (Inounu,1996). Birth weight of kid in this study did not significantly differs, however, kids delivered by Etawah grade does with brown head color tend to had the highest birth weight compared to kid delivered by black and mixed head color of Etawah grade does. The variation on birth weight mainly caused by genetic and environmental factors, including feed resources, feed availability, and feed offered, which directly will affect the efficiency of does to convert nutrient into fetus weight during pregnancy period (Devendra and Burns, 1994).

## CONCLUSIONS

The study concluded that brown head color of Etawah grade does had better feed and crude protein intakes, and produce the highest absolute and relative average daily gain, also they had the most efficient conversion of feed to gain, in terms of feed cost per gain. Reproduction performances (service per conception, litter size and birth weight) amongst Etawah grade does with different head color remain similar.

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