MATERNAL NUTRITION DURING PREGNANCY IN ETAWA GOAT
1. GROWTH PERFORMANCE OF THE OFFSPRINGS TO WEANING

PAKAN INDUK SELAMA KEBUNTINGAN PADA KAMBING PERANAKAN ETAWA
1. PERFORMA PERTUMBUHAN ANAK YANG DILAHIRKAN SAMPAI UMUR PENYAPIHAN

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ABSTRACT

This study investigated the life-long effects of maternal nutrition provided to the pregnant Etawa does at different ages of gestation on the growth performance of the offspring. Treatment of maternal nutrition consisted of T1 (d 0 – 50 of gestation), T2 (d 50 to 100 of gestation) and T3 (d 100 – parturation) in addition to negative control (T0) and positive control (T4). The results suggested that maternal nutrition during different stages of pregnancy of Etawa does resulted in better growth performance of the offspring as indicated by their birth and weaning weights and preweaning daily gain.

Key words: Etawa goat, pregnancy, maternal nutrition, growth

ABSTRAK

Penelitian ini mengkaji pengaruh nutrisi induk yang diberikan pada kambing Etawah bunting pada umur kebuntingan yang berbeda terhadap performa pertumbuhan anak-anak yang dilahirkan. Perlakuan nutrisi induk terdiri atas T1 (hari 0 s.d 50 kebuntingan), T2 (hari 50 – s.d 100 kebuntingan), T3 (hari 100 s.d melahirkan) di samping kontrol negatif (T0) dan kontrol positif (T4). Hasil penelitian menunjukkan bahwa perlakuan nutrisi induk pada kambing Etawa menghasilkan keturunan dengan performa pertumbuhan yang lebih baik, ditunjukkan oleh berat lahir, berat sapih dan pertambahan berat badan harian sampai umur panyapihan.

Kata kunci: Kambing Etawa, kebuntingan, nutrisi induk, pertumbuhan

INTRODUCTION

Maternal nutrition status during pregnancy is one of extrinsic factors playing a pivotal role in the regulation in utero growth and development of conceptus and placenta, and thereby affects the life-long performance of the offsprings (Wu et al., 2004; Greenwood and Cafe, 2007; Symonds, et al., 2010). In the past, greater emphasis has been placed on nutrition during late pregnancy, because during this period exponential foetal growth occurs, resulting in a significant increase in the dietary requirements of the animal. Actually, the prenatal growth is sensitive to
the direct and indirect effects of maternal dietary intake from the earliest stages of embryonic life, when the nutrient requirements for conceptus growth are negligible, but at this stages placental growth is exponential (Robinson, at al., 1999; Robinson, et al, 2013). Now, attention is turning to the important role of nutrition earlier in pregnancy.

Accordingly, the objective of the current study is to investigate the effect of maternal nutrition at different stages of pregnancy (early-, mid- and late-pregnancy) of mature does of Etawa on growth performance of the offsprings.

**MATERIALS dan Methode**

There were 25 multiparous of Etawa does (3 - 4 years of age) used in the study, and individually placed in specifically constructed cages of wooden materials, having food and water containers, and feces-urine separators beneath the cages. All animals were orally dosed with anthelmintic and intramuscularly injected with vitamin B-complex as well as a high dose of vitamin A shortly after placing them in the cages.

The treatments of nutrition in utero were given after mating in 3 different stages of pregnancy (T1 : d 0 – 50; T2 : d 50 – 100; T3 : d 100 to parturation) in addition to T0 (negative control or without maternal nutrition treatment) and T4 (positive control or maternal nutrition treatment during pregnancy).

Within 3 d intervals, 5 does (one of each treatment) were submitted to oestrus synchronisation procedures using prostaglandin injected intramuscularly, and all does were served by the same buck.

Basal diet consisted of mixed roughages (60% grass and 40% legume) and concentrate containing 8-9% crude protein. An additional food stuff for the treatment of in utero nutrition or maternal nutrition was 20% of fish meal (60% crude protein) and mixed with the concentrate, and then provided for a total daily consumption of dry matter was 4% of body weight.

Treatments were applied only to the does and no further treatments were given to their offsprings up to weaning. Body weight of the offsprings were weighed monthly.

There were 18 of 25 does delivered as twin kids (Table 1), and all offsprings from the treated does were observed.

Data were analysed using statistical package of Systat vs. 6 for Window (SPSS Inc., Chicago, USA; Wilkinson, 1996).
Table 1. Double and Single parturations resulted from maternal nutritional treatment at different stages of pregnancy

<table>
<thead>
<tr>
<th>Item</th>
<th>Pregnant stage of maternal nutrition treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T0</td>
</tr>
<tr>
<td>Twin</td>
<td>3</td>
</tr>
<tr>
<td>Single</td>
<td>2</td>
</tr>
<tr>
<td>Male</td>
<td>5</td>
</tr>
<tr>
<td>Female</td>
<td>3</td>
</tr>
</tbody>
</table>

RESULTS AND DISCUSSION

Maternal nutrition exposed at different stages of the pregnant Etawa does showed a clear and distinct differences on growth performance of the offsprings, as indicated by their birth and weaning weights, and their preweaning average daily gain (Table 2)

Birth weight of the male offsprings were not significantly differ among T0, T1 and T2, but these birth weights were significantly lower compared to those of T3 and T4; while birth weights of the female offsprings were not significantly affected by maternal nutritional treatment.

Weaning weights of the offsprings from the treated does were significantly havier compared to those from the control animals, which were particularly indicated by the male offsprings.

In addition to a significant effects of maternal nutrition treatments in both the male and female offsprings, preweaning daily gain of the male offsprings were significantly higher compared to those of the female offsprings

Table 2. Effects of maternal nutrition on the offspring performance to weaning

<table>
<thead>
<tr>
<th>Item</th>
<th>Pregnant stage of maternal nutrition treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T0</td>
</tr>
<tr>
<td>Birth weight (kg)</td>
<td>Male</td>
</tr>
<tr>
<td></td>
<td>Female</td>
</tr>
<tr>
<td></td>
<td>M vs F</td>
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<tr>
<td>Weaning weight (kg)</td>
<td>Male</td>
</tr>
<tr>
<td></td>
<td>Female</td>
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<tr>
<td></td>
<td>M vs F</td>
</tr>
<tr>
<td>Preweaning ADG (3moths), (g)</td>
<td>Male</td>
</tr>
<tr>
<td></td>
<td>Female</td>
</tr>
</tbody>
</table>

Means within a row with different superscripts differ (P<0.05)

The maternal nutritional and metabolic environment is critical in determining not only the reproductive success of pregnancy but also the long-term performance of the offspring. Changes
in maternal diet at defined stages of gestation coincident with different stages of development can have pronounced effects on development and function of organ and tissue in later life.

The birth weights of the offsprings from the does of T1 and T2 were unaffected by the treatment. However, these offsprings were growing faster compared with those from the does of T0. Moreover, the weaning weight of the offsprings of T1 was about the same as those of T4 which having higher birth weight.

During early gestation, it may apparently be unimportant because of the limited nutrient requirements of the conceptus for growth and development during the first one-half of gestation. From study on ewe, Funston et al. (2010) reported that this is accentuated by the fact that 75% of the growth of the conceptus occurs during the last 2 mo of gestation During the early phase of fetal development, however, maximal placental growth, differentiation, and vascularization occur, as well as organogenesis of the conceptus, all of which are critical events for normal conceptus development. Recent studies have highlighted the importance of early life events in determining further aspects in postnatal performance (Saymonds, et al., 2010). Attributed with organogenesis, it can be interpreted that the treatment of maternal nutrition at different stages of gestation will be manifested by alter the epigenetic state of the fetal genome (stable alterations of gene expression through DNA methylation and histone modifications) (Perdiguero, et al., 2009; Meuwissen, et al., 2013).

Accordingly, to boost the small herder incomes and to improve the rural farmer livelihood in this region, this presentation is a part of the results, and the authors are still continuing doing the research of life-long effects of maternal nutrition to develop economic traits of Etawa goats – in the aspects of reproduction, meat or milk production.

ACKNOWLEDGEMENTS
This work was supported by a grant from the Ministry of National Education – Directorate General of Higher Education – Indonesia within the scheme of National Strategy Research.

REFERENCE


