Pre-Weaning Growth of Bali Calf from Cows that Kept Semi-Intensive in Palm Oil Plantations

H. Maulana\textsuperscript{a}, Panjono\textsuperscript{a}, E. Baliarti\textsuperscript{a}, B. A. Atmoko\textsuperscript{a}

Department of Animal Production, Faculty of Animal Science, Universitas Gadjah Mada, Jl. Fauna No 3, Yogyakarta, Indonesia 55281.
e-mail: hamdamem@gmail.com

Abstract

The success of the cattle-oil palm plantations integration can be measured from several production parameters, one of which is the quality of calves produced. This study aim to determine the growth of pre-weaned calves of cows that was kept in oil palm plantations. The research was conducted using 20 calves produced from 20 cows and 1 bull that were kept semi-intensive in Rokan Hulu oil palm plantation, Riau. The colony was grazed in oil palm plantation area from 08.00 to 17.00 without additional feeding. The forages in the plantation contain dry matter 22.29%, crude protein 10.67%, crude fiber 36.85%, and total digestible nutrients 54.37%. Cows and calves were measurement at birth and every month until weaning (5 month old), including body weight (BW). The results showed that the average BW of cows after partus and at weaning were 250.17 ± 24.27 and 240.39 ± 21.82 kg, respectively. The BW of the calf from birth, 1\textsuperscript{st}, 2\textsuperscript{nd}, 3\textsuperscript{rd}, 4\textsuperscript{th}, and 5\textsuperscript{th} month old were 15.08 ± 4.12, 25.86 ± 3.49, 33.58 ± 6.96, 44.42 ± 8.56, 53.89 ± 10.59, and 62.41 ± 14.07 kg, respectively. The body frame of calves at birth was body length 42.59 ± 3.96, shoulder height 57.76 ± 4.31, hip height 58.52 ± 5.25, and chest size 58.35 ± 5.89 and reached 65.71 ± 4.64, 84.64 ± 6.41, 85.59 ± 6.20, and 95.82 ± 7.47 cm, respectively at weaning. Bali calf growth produced in oil palm plantations integration with semi-intensive system is good enough.

Keywords : Pre-weaning growth, Bali calf, Semi intensive, Oil Palm plantations integration

Introduction

The semi-intensive management system of cattle is one of the most common methods used by smallholder farmers in Indonesia. Semi-intensive provides the animal to free feeding when grazed during the day and intensively monitored when housed at night. This method gives two benefits for the smallholder farmers, i.e. there did not need for feeding because the cattle had a chance to grazed, and had the fecal for their farm when it housed. Integrated cattle-palm oil plantation allows animal for grazing, this makes 8\% of the smallholder farmers of the Teluk Merbau, Siak, Riau, who is a palm oil farmer of PT Perkebunan Nusantara V kept their cattle with semi-intensive methods (Baliarti et al., 2017). The success of the cattle-oil palm plantations integration can be measured from several production parameters, one of which is the
quality of calves produced. Pre-weaning was an important period for animal growth. Pre-weaning management can be affected by the growth and mortality of livestock (Gyofai et al., 2003). This study aims to determine the growth of pre-weaned Bali calves of cows that were kept semi intensify in oil palm plantations. The results would be useful for the development of integrated cattle-oil palm plantation in the future.

**Materials and Methods**

Twenty Bali calves from 20 cows (body length (BL) 110.10±5.55 cm, shoulder height (SH) 119.00±5.70 cm, hip height (HH) 109.20±5.15 cm, and chest size (CS) 160.40±4.16 cm) mated with 1 bull (BL 121 cm, SH 137 cm, HH 125 cm, CS 182 cm) kept with semi-intensive in oil palm plantation Rokan Hulu, Riau since 2015 till 2017. The colonies grazed in the area of 10 years oil palm plantation from 8 a.m. to 5 p.m. without additional feeding. The forages in the oil palm plantation contain dry matter (DM) 22.29%, crude protein (CP) 10.67%, crude fiber (CF) 36.85%, and total digestible nutrient (TDN) 54.37% (Baliarti et al., unpublished). Measurement of cattle (cows and calves) is done at birth and every month until weaning (age 5 months). Parameters of cows include body weight, and for calves are body weight and body size (BL, SH, HH, and CS). Data were analyzed descriptively.

**Results and Discussion**

The result of this study about growth body weight and body frame of the Bali calves and cows are presented in Table 1. Bali cows that kept semi intensify in oil palm plantations has not been able to restore body weight during the pre-weaning period (lactation period). Semi-intensive models had a direct impact on feeding behavior. Bali cows that kept semi intensify in oil palm plantation Sei Rokan, Riau had 3.61 h for feeding and 1.63 h for browsing when grazed (Baliarti et al., 2016). The amount of feeding time is less than that reported by Baliarti et al., (2017) that Bali cows in the lactating period that were kept intensive in palm oil plantations can feeding up to 8.06 h a day. Less feeding time had an impact on nutrient intake can be absorbed by livestock. Lack of nutrient intake during lactation periods could have an impact on the body's nutrients resuffle to produce milk seen from the cows average daily gain (ADG) during lactation (Figure 1). Furthermore, fewer feed nutrients intake would have an impact on the recovery of reproduction organs so that the reproductive cycle will be longer.

The weight of weaning Bali's calf, age 150 days, from the parent which is kept in oil palm plantation in semi-intensive, is 62 ± 14 kg. The weaning weight from this study is almost same as the weight of Bali calf weaning at age 205 days reported by Hafsah (2013) which is also kept semi-intensive in Makassar, 62.6 - 66.7 kg. Birth and weaning weight is an interrelated matter, the calf which had higher birth weight would be had a higher weaning weight too (Hasfsah, 2013). Bali calves developed in BPTU Bali have an average birth weight of 18 kg and reach the weaning weight at age 205 d of 87 - 93 kg (Tavares et al., 2012). Mudhita et al. (2016) reported that Bali
cattle maintained with a complete feed from oil palm plantations can produce calves with a birth weight of 15-18 kg, whereas in this study, the weight of Bali cattle births that were kept semi-intensive in oil palm plantations amounted to 13 kg. The smaller birth size affects the size of the weaning of cattle. Cows condition during pregnancy can be the cause of low birth weight of calf related to nutrient adequacy. Further research on the adequacy of the mother nutrient during pregnancy and lactation needs to be done.

### Table 1. Body weight and frame of Bali cows and calf on pre-weaning period

<table>
<thead>
<tr>
<th>Traits</th>
<th>Birth</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Body weight (kg):</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cows</td>
<td>250±24</td>
<td>246±22</td>
<td>243±22</td>
<td>236±21</td>
<td>238±22</td>
<td>240±21</td>
</tr>
<tr>
<td>Calf</td>
<td>13±2</td>
<td>25±3</td>
<td>33±7</td>
<td>44±9</td>
<td>54±11</td>
<td>62±14</td>
</tr>
<tr>
<td><strong>Body Frame (cm):</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calf body length</td>
<td>42±4</td>
<td>43±4</td>
<td>48±6</td>
<td>58±9</td>
<td>66±4</td>
<td>66±5</td>
</tr>
<tr>
<td>Calf shoulder height</td>
<td>58±4</td>
<td>58±4</td>
<td>64±4</td>
<td>72±8</td>
<td>81±6</td>
<td>85±6</td>
</tr>
<tr>
<td>Calf hip height</td>
<td>59±5</td>
<td>59±5</td>
<td>66±6</td>
<td>75±8</td>
<td>82±5</td>
<td>86±6</td>
</tr>
<tr>
<td>Calf chest size</td>
<td>58±6</td>
<td>58±6</td>
<td>69±7</td>
<td>82±11</td>
<td>93±6</td>
<td>96±8</td>
</tr>
</tbody>
</table>

The ADG of pre-weaning Bali calf up to age 5 months in this study were 0.39 to 0.40 kg. ADG in this study is similar to that of Tavares et al. (2012) who reported that the pre-weaning ADG of Bali calf in BPTU Bali was 0.34-0.37 kg. The results of this study are also not much different from the ADG of Ongole Crossbreed (PO) cattle maintained under low external input conditions in the pre-weaning period of 0.33 - 0.35 kg (Hartatik and Dikman, 2007). Factors affecting ADG of pre-weaning calves are the parent body's condition for producing milk (Pasambe et al., 2000). Bali cows that were kept semi-intensive in oil palm plantations are able to maintain their body condition to produce milk needed by calves.

Body frame is used as the visual identification and measured growth of a livestock. Some commonly used as an indicator of body frames such as shoulder height, chest size, and body length can be used to predict body weight and describe livestock performance (Widi et al., 2016). Weaning Bali calf in this study can reach BL 58 cm; SH 72 cm; HH 75 cm; and CS 82 cm at 3 months. Body frame is not much different from the research was reported by Hardiono et al. (2016) in pre-weaning calves aged 3 months were maintained intensively that feeding with native grass in southern Konawe district, BL 65,5 cm; SH 72,6 cm; and CS 83 cm.
In Figure 1. ADG of pre-weaning Bali calf down with age approaching weaning. These results are in line with the statement Hardiono et al. (2016) that pre-weaning Bali calf tended to decrease ADG until the age of three months. Reduced pedaling of bovine calves maintained semi-intensive in oil palm plantations followed by increased ADG of the mother to weaning age. The decline ADG of Bali calf were reared semi-intensive in oil palm plantations, followed by an increase in ADG of cows until the age of weaning.

Conclusions

The growth of Bali calf produced from cows that kept in oil palm plantations with semi intensive management system has good productivity.

Acknowledgement

This research was funded by Ministry of Research, Technology, and Higher Education (KEMENRISTEK DIKTI) with Penelitian Terapan Unggulan Perguruan Tinggi (PTUPT) program Research Grant no 1851/UN1/DITLIT/DIT-LIT/LT/2018. This research was supported by PTPN V Riau and cattle-oil palm plantation integration riset team, Faculty of Animal Science, Universitas Gadjah Mada.

References

The Association of animal Production Societies Animal Science Congress (AAAP).


