New Zealand Society of Animal Production online archive

This paper is from the New Zealand Society for Animal Production online archive. NZSAP holds a regular annual conference in June or July each year for the presentation of technical and applied topics in animal production. NZSAP plays an important role as a forum fostering research in all areas of animal production including production systems, nutrition, meat science, animal welfare, wool science, animal breeding and genetics.

An invitation is extended to all those involved in the field of animal production to apply for membership of the New Zealand Society of Animal Production at our website www.nzsap.org.nz

The New Zealand Society of Animal Production in publishing the conference proceedings is engaged in disseminating information, not rendering professional advice or services. The views expressed herein do not necessarily represent the views of the New Zealand Society of Animal Production and the New Zealand Society of Animal Production expressly disclaims any form of liability with respect to anything done or omitted to be done in reliance upon the contents of these proceedings.

This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

You are free to:

- **Share** — copy and redistribute the material in any medium or format

Under the following terms:

- **Attribution** — You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.
- **NonCommercial** — You may not use the material for commercial purposes.
- **NoDerivatives** — If you remix, transform, or build upon the material, you may not distribute the modified material.

http://creativecommons.org/licenses/by-nc-nd/4.0/
BRIEF COMMUNICATION: Variability in growth rates of goat kids on 16 New Zealand dairy goat farms

LE Deeming¹,², NJ Beausoleil², KJ Stafford², JR Webster¹, and G Zobel¹*

¹AgResearch Ltd., Ruakura Research Centre, 10 Bisley Road, Private Bag 3123, Hamilton 3214, NZ. ²Institute of Veterinary, Animal and Biomedical Sciences, Massey University, Private Bag 11 222, Palmerston North 4442, NZ

*Corresponding author. Email: gosia.zobel@agresearch.co.nz

Keywords: dairy goats; weaning; average daily gain; management

Introduction

Average daily weight gains (ADG) in early life are associated with health, welfare and future production potential of dairy animals. While this has yet to be established for goats, research in cows demonstrates a positive relationship between growth in early life and milk production (Shamay et al. 2005, Soberon et al. 2012). Early growth rates are largely determined by the management practices from birth onwards. It is therefore unsurprising that large differences in ADG under different management systems have been reported. In lambs, Mahgoub et al. (2000) reported a large range in ADG (84-154 g/day). Similarly, in calves, Bartlett et al. (2006) reported ADGs ranging from 251 g/day to 703 g/day. The ADGs reported in goats have not been as variable (152-170 g/day: Galina et al. 1995; 167-173 g/day: Goetsch et al. 2001); however, these were small, controlled studies. To our knowledge, no research has yet quantified variability in the ADG of goat kids on a large, multi-farm scale. Therefore, the aim of this study was to describe the variation in growth rates on multiple dairy goat farms in the Waikato region of NZ, providing a benchmark for dairy goat farmers.

Materials and methods

This study was approved by AgResearch Ltd, Ruakura Animal Ethics Committee (13478). Sixteen Dairy Goat Cooperative (DGC) farmers from the Waikato region (NZ) agreed to participate in an on-going three year study. Between May and August 2015, 1269 Saanen Alpine cross kids (between 70 and 83 kids/farm) were enrolled. Kids were weighed four times: at enrolment (between 24 and 48 h after birth), two weeks after enrolment, at weaning, and two weeks after weaning. Weaning weights were variable, even among farms with similar weaning ages. For example, the farm with the lowest weaning weights (14.7 ± 2.2 kg) weaned at 10.0 ± 0.9 weeks old, while the farm with the highest weaning weights (24.2 kg ± 3.0 kg) weaned at 11.2 ± 0.3 weeks old. This suggests that factors other than age at weaning impact growth at this critical time. Overall energy intake pre-weaning (Bartlett et al. 2006), dictated by the quality and quantity of feed provided, is a determinant of young ruminant growth (Mahgoub et al. 2000). Most farms offered milk ad libitum, while two restricted feedings to twice a day; types of milk fed included whey, goat milk, and cow milk powders, as well as fresh goat and cow milk. All farmers provided hard feeds, but the type provided, as well as the timing of its provision varied amongst farms.

Weaning weights were variable, even among farms with similar weaning ages. For example, the farm with the lowest weaning weights (14.7 ± 2.2 kg) weaned at 10.0 ± 0.9 weeks old, while the farm with the highest weaning weights (24.2 kg ± 3.0 kg) weaned at 11.2 ± 0.3 weeks old. This suggests that factors other than age at weaning impact growth at this critical time. Overall energy intake pre-weaning (Bartlett et al. 2006), dictated by the quality and quantity of feed provided, is a determinant of young ruminant growth (Mahgoub et al. 2000). Most farms offered milk ad libitum, while two restricted feedings to twice a day; types of milk fed included whey, goat milk, and cow milk powders, as well as fresh goat and cow milk. All farmers provided hard feeds, but the type provided, as well as the timing of its provision varied amongst farms.

From enrolment to weaning, ADG (Table 1) were consistent with pre-weaning ADG previously reported (e.g. 167-173 g/day: Goetsch et al. 2001). Interestingly, the variability across farms was more pronounced in the period between weaning and two weeks after weaning (Table 1). Five farms achieved consistent ADG after weaning compared to before weaning, and three of these farms achieved post-weaning ADGs > 200 g/day (Figure 1). However, ADG on the remaining 11 farms decreased after weaning. Of these, five farms experienced large decreases in ADG, achieving growth of < 100 g/day, and one farm had a negative ADG. While this latter farm reported cases of pneumonia, reduced ADG or even weight loss occurring after weaning is well documented regardless of health status (calves: Sweeney et al. 2010; goat kids: Ugur et al. 2004).
Figure 1 Mean (± SD) average daily gain (ADG) of goat kids (n = 80 ± 3 per farm) on 16 New Zealand dairy goat farms from enrolment until weaning (light grey) and weaning until 2 weeks after weaning (dark grey).

Table 1 Mean (± SD) age, weight and average daily gain (ADG) of goat kids on New Zealand dairy goat farms (n=16) at four weigh points.

<table>
<thead>
<tr>
<th>Weigh point</th>
<th>Enrolment</th>
<th>Two weeks after enrolment</th>
<th>Weaning</th>
<th>Two weeks after weaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (days)</td>
<td>1.6 ± 0.4</td>
<td>15.9 ± 4.0</td>
<td>87.2 ± 13.0</td>
<td>101.3 ± 13.0</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>3.7 ± 0.6</td>
<td>6.2 ± 0.9</td>
<td>19.2 ± 2.7</td>
<td>21.3 ± 3.2</td>
</tr>
<tr>
<td>ADG (g/day)</td>
<td></td>
<td></td>
<td>177 ± 32</td>
<td>180 ± 40</td>
</tr>
<tr>
<td>ADG (g/day)</td>
<td></td>
<td></td>
<td>-</td>
<td>184 ± 24</td>
</tr>
</tbody>
</table>

1calculated between each weigh point
2calculated relative to enrolment weigh point

This growth lag may be a consequence of stress induced by coping with a new diet (Magistrelli et al. 2013), or due to inadequate rumen development from insufficient hard feed consumption prior to weaning (Khan et al. 2007).

The findings of this study indicate that there is large variability in growth rates of dairy goat kids on NZ farms. Further analysis will aim to quantify how farm-specific factors (e.g. weight at birth, colostrum/milk feeding management, weaning management), may be causing these differences in ADG. It should be noted that one farm consistently achieved ADG > 200 g/day from birth through to two weeks after weaning. This provides a benchmark for NZ dairy goat farmers and suggests that high, stable weight gains, immediately following weaning, are possible.

Acknowledgements

Funding for the research and a student stipend is provided by the NZ Ministry of Business, Innovation & Employment (MBIE), and the Dairy Goat Cooperative (NZ) Ltd (DGC). Special thanks goes to the 16 participating DGC farmers.

References


Variability in growth rates of goat kids on 16 New Zealand dairy goat farms

Deeming, LE

2016-07-07