

# Sheep reproduction RD&A alert

---

**This sheep reproduction RD&A alert is an initiative of the Sheep Reproduction Strategic Partnership (SRSP).**

An interesting international review article this month which looks at the impact of the gut microbiome in neonatal ruminants on gut development and subsequent performance. Although this article draws from research on calves, the information presented may well be relevant to rumen development and microbiota establishment in lambs.

The SRSP aims to help sheep producers to profitability and sustainably increase lamb production through increasing lamb survival and weaning rates and will coordinate a national approach to improving sheep reproductive performance.

#### **Program coordinator**

Dr Sue Hatcher

M: 0407 006 454

E: [sue@makinoutcomes.com.au](mailto:sue@makinoutcomes.com.au)

## **Review papers**

### **Gut microbiome colonization and development in neonatal ruminants: Strategies, prospects, and opportunities**

Muhammad A. Arshad, Faiz-ul Hassan, Muhammad S.Rehman, Sharon A. Huws, Yanfen Cheng and Ahmad U.Din ([ahmadnwa@swmu.edu.cn](mailto:ahmadnwa@swmu.edu.cn))

Animal Nutrition, 29 May 2021, In Press

DOI <https://doi.org/10.1016/j.aninu.2021.03.004>

#### **Abstract**

Colonization and development of the gut microbiome is a crucial consideration for optimizing the health and performance of livestock animals. This is mainly attributed to the fact that dietary and management practices greatly influence the gut microbiota, subsequently leading to changes in nutrient utilization and immune response. A favorable microbiome can be implanted through dietary or management interventions of livestock animals, especially during early life. In this review, we explore all the possible factors (for example gestation, colostrum, and milk feeding, drinking water, starter feed, inoculation from healthy animals, prebiotics/probiotics, weaning time, essential oil and transgenesis), which can influence rumen microbiome colonization and development. We discuss the advantages and disadvantages of potential strategies used to manipulate gut development and microbial colonization to improve the production and health of newborn calves at an early age when they are most susceptible to enteric disease. Moreover, we provide insights into possible interventions and their potential effects on rumen development and microbiota establishment. Prospects of latest techniques like transgenesis and host genetics have also been discussed regarding their potential role in modulation of rumen microbiome and subsequent effects on gut development and performance in neonatal ruminants.

## Scientific papers

### Prediction of vitality and survival of newborn lambs using a modified Apgar score

José Victor Pronievicz Barreto ([joseproni.vet@gmail.com](mailto:joseproni.vet@gmail.com)), Simone Fernanda NedelPertile, Fabíola Cristine de AlmeidaRego, Thais Helena Constantino Patelli, Sheila Tavares Nascimento, Elis Lorenzetti and Luiz Fernando Coelhoda Cunha Filho

Applied Animal Behaviour Science Volume 238 - May 2021

DOI <https://doi.org/10.1016/j.applanim.2021.105281>

#### Highlights

- The modified Apgar score identifies lambs at risk of mortality.
- Serum gamma glutamyltransferase  $\leq 462.4$  IU/L indicates immunity transfer failure.
- Low Apgar score suggests passive immunity transfer failure in newborn lambs.
- The ewes body condition does not influence the newborn lambs Apgar score.
- Lambs that are born healthy and with high Apgar score have faster colostrum ingestion.

#### Abstract

The Apgar score is widely used for global evaluation of the neonate in a minimally invasive way, it assesses neonatal vitality through a range of scores on clinical signs of health and vitality, such as reflexes, respiration rate, and mucosal coloration. The neonatal period is fundamental for lambs survival, that is dependent on complex interactions between maternal ability and newborn viability, as newborn lambs require milk and immunological protection that are dependent of mutual maternal-filial behaviour. The aim of this study was to determine the vitality of Suffolk newborn lambs by the modified Apgar method. Thirty-seven ewes were used and their lambs were classified at 5 min of age by the modified Apgar method. The ewes' body condition score, number of lambs born, and birth weight were recorded. Behaviour was evaluated by measuring, in minutes, the intervals between birth and sternal recumbency, the adoption of quadrupedal position, time until first suckling, and duration of first suckling. Blood samples were collected from the lambs between 24 and 36 h of age to determine gamma-glutamyltransferase activity. Of the 37 births observed, 20 were singles and 17 twins, resulting in 54 newborn lambs, which 27 were classified as high, 11 as moderate and 16 as low Apgar, and the percentages of deaths were 8% (n = 1), 10 % (n = 2) and 81.25 % (n = 13), respectively. The causes of death were: starvation-hypoglycemia-hypothermia complex (10/16, 62.5 %), pneumonia (3/16, 18.75 %), and stillbirth (3/16, 18.75 %). The concentration of gamma-glutamyltransferase in the lamb's serum with low Apgar was significantly (p-value 0.0027) lower (462.4 IU/L) than in lambs born with moderate (1616.8 IU/L) and high (3177.7 IU/L) Apgar. Birth weight (r = 0.39 and p = 0.0015) and APGAR (r = 0.61 and p < 0.0001) were correlated with survival. The vitality evaluation did predict survival ability and passive immunity transfer characteristics.

---

### Ewes prefer subordinate rather than dominant rams as sexual partners

Arisvet Díaz, Agustín Orihuela, Virginio Aguirre, Neftalí Clemente, Mariana Pedernera, Iván Flores-Pérez, Reyes Vázquez and Rodolfo Ungerfeld

Applied Animal Behaviour Science Volume 238 - May 2021

DOI <https://doi.org/10.1016/j.applanim.2021.105306>

#### Highlights

- Ewes moved more frequently toward subordinate than dominant tethered rams.
- Ewes remained longer time close to subordinate than dominant rams.
- Subordinate rams mounted and mated estrous ewes more than dominant rams.
- One-fourth of the ewes mated exclusively subordinate rams, others mated both rams.
- When estrous ewes can choose, they select subordinate rather than dominant rams.

### Abstract

When rams and ewes interact freely, dominant rams perform the greatest number of copulations. However, the sexual preference of the female might influence the final distribution of ejaculations, and preference for subordinate rams could be evolutionary advantageous. To determine the sexual preference of the ewe for dominant (DOM) or subordinate (SUB) rams when rams' activity is restricted, 28 ewes and 8 rams were used. Rams were classified into DOM and SUB by competition in pairs for an estrous ewe and were kept in dyads until the end of the experiment. Ewes were induced into estrus using progestagen-impregnated intravaginal sponges, and 24 h after sponge withdrawal, the sexual preference of the ewe for DOM or SUB rams was determined individually. Both rams were tethered with a 4 m long lasso in opposite corners of a 4m × 12m pen, and all the interactions were video-recorded. The test was repeated with seven ewes for each dyad of rams. The evaluation period started when the ewe allowed her first mount and ended with the last. At the end of each test, each ewe was removed from the pen and the location of the rams were exchanged. The time the ewe received the first to the last mating averaged 16:55 ± 1:25 h:min. Overall, ewes entered more times and remained longer in the zone of the SUB (entrances: 68.9 vs 29.1; pooled SEM = 9.0; P = 0.001; time into the zone: 3.66 ± 0.56 h vs 1.04 ± 0.51 h; P < 0.0001, for SUB and DOM rams, respectively). In 25 % of the tests, only the SUB ram mated the ewes. The number mounts and mates were significantly greater in SUB than DOM rams (mounts: 22.35 ± 3.07 vs 10.86 ± 2.84; P = 0.0005; mates: 10.50 ± 0.94 vs 3.79 ± 1.07; P < 0.0001 for SUB and DOM rams respectively). It was concluded that estrous ewes prefer to interact and be mounted and mated by subordinate rather than by dominant rams when rams' activity is restricted.

### Speaking from experience: reduced dietary neophobia of lambs through early life experience

Matt R. Beck ([matt.beck@lincolnuni.ac.nz](mailto:matt.beck@lincolnuni.ac.nz)), K. Garrett, C. J. Marshall, A.E. Fleming, A.W. Greer, C.R. Bunt, K.J. Olejar, T.M.R. Maxwell and P.Gregorini

Applied Animal Behaviour Science Volume 239 - June 2021

DOI <https://doi.org/10.1016/j.applanim.2021.105336>

### Highlights

- Lambs may experience food neophobia which can limit their feed intake.
- We studied preference in lambs from ewes given seaweed only, a seaweed + terrestrial plant extract, or nothing (control).
- Previous experience to plant extract reduces dietary neophobia of the plant species.
- Despite initial dietary neophobia, lambs learn through exposure over time.
- This research provides a tool for managers to reduce dietary neophobia of livestock.

### Abstract

The objective of this experiment was to determine how early life exposure to plant extracts would influence grazing behavior and dietary preference. This experiment used ram lambs (n = 60; initial body weight = 41.8 ± 3.8 kg, mean ± standard deviation). Their dams were either provided no plant extract (CON), a seaweed (*Ecklonia radiata*) extract (10 mL/ram/d; SWE), or an extract of seaweed, chicory (*Cichorium*

*intybus*), plantain (*Plantago lanceolata*), lucerne (*Medicago sativa*), and dock (*Rumex obtusifolius*; 10 mL/ram/d; SWP). Treatments were provided to the dams starting in late gestation ( $63.9 \pm 6.5$  d before lambing), through to weaning of the lambs. After weaning ( $94 \pm 6.5$  d old), lambs received the respective treatments of their dams until the initiation of the current experiment (66 d after weaning). At the initiation of the current experiment, the lambs were placed into a paddock containing spatially separated strips of ryegrass (*Lolium perenne*), chicory, plantain, lucerne, and dock, of which they received a fresh break, weekly. During week 1, SWP had more ( $P < 0.05$ ) scans spent grazing than SWE and CON. Also, during week 1, SWP had a greater ( $P < 0.05$ ) number of grazing bouts and a shorter ( $P < 0.05$ ) grazing bout duration compared with SWE and CON. In week 1, SWP had 78.6 % and 167.3 % more ( $P < 0.05$ ) proportion of grazing scans spent in chicory than CON and SWE, respectively. Concomitantly, SWP had 33.5 % and 59.7 % less ( $P < 0.05$ ) grazing scans in ryegrass than CON and SWE, respectively. At the observation weeks 4 and 7, the grazing behavior and dietary preference between treatments was reduced, indicating learning occurred by CON and SWE. Overall, these results indicate that early life exposure to a plant extract alters dietary preference to the species contained in that extract and also changes grazing behavior, which suggests that the extract provided familiarity to the plants and thereby reduced dietary neophobia.

## Upcoming events

Date	Event	Location
3 June 2021	<a href="#">Arthritis – a problem in the young ones</a> Sheep Connect NSW	Webinar
3 June 2021	<a href="#">Capturing life data using EID</a> Agriculture Victoria	Webinar
8 June 2021	<a href="#">To wean or not to wean</a> Agriculture Victoria	Webinar
9 June 2021	<a href="#">‘Feeding despite the late rain’</a> Sheep Connect SA	Webinar
9 June 2021	<a href="#">Making the most of your winter feed</a> Central West Local Land Services	Workshop
9 - 11 June 2021	<a href="#">Recent Advances in Animal Nutrition</a> RAAN Committee	Gold Coast. QLD & online
16 June 2021	<a href="#">MerinoLink 2021 Conference</a> MerinoLink	Wagga Wagga
16 June 2021	<a href="#">Pastures in Practice</a> Riverina Local Lands Services	Webinar
23 June 2021	<a href="#">Meat Up Forum</a> Meat & Livestock Australia	Broken Hill
25 June 2021	<a href="#">Meat Up Forum</a> Meat & Livestock Australia	Post Augusta
12 July 2021	<a href="#">Livestock Forum</a> Sheep Connect SA	Naracoorte
14 July 2021	<a href="#">Livestock Forum</a> Sheep Connect SA	Jamestown
15 July 2021	<a href="#">Livestock Forum</a> Sheep Connect SA	Kimba
30 July 2021	<a href="#">Graham Centre Livestock Forum</a> Charles Sturt University	Wagga Wagga