Recommendations for an optimal start of rearing

Gert van Trierum
International Product Manager
milk repacers for rearing
What is your approach?
Do you already have all pieces for rearing of goat kids correctly arranged?
Goat kids as a basis of your operations
Objectives

- Genetic improvement of goats
- Genetic programming of goat kids
- Low mortality and high uniformity
- Minimum requirement of medication
- Well-functioning immune system
- Sound respiratory and intestinal system
- Well-functioning rumen
- Balanced growth
- High efficiency of labor
- Economically sustainable
- Pleasure
Hidden losses

- Rearing of unnecessarily high number of goat kids because of too high mortality and/or bad results of rearing

- Low annual and lifetime production of dairy goats because of introduction of goat kids with poor production capacity, vitality and immunity
Preparation: 4-way commitment

Farmer

Veterinarian

Feed supplier

Milk replacer supplier
Features of goat kids

Vitality

Hygiene status

Iron / Vit. E status

Immune system

Oesophageal groove reflex

Development of rumen and abomasum

Ruminant

Feed and water intake
Birth – care for the goat kid

Focus ➡️ Minimum infection

• Problems affecting the goat reduce the vitality of the lamb
• Check for blockage of respiration by mucus or foetal membranes
• Ensure proper hygiene around lambing: manure, goat and environment contain all causative agents for diarrhea (e.g. E. coli, Cryptosporidium)
• Correctly disinfect the umbilical cord
• Disinfectants prevent diarrhea and umbilical infections
Birth – care for the goat kid

- Dry place for parturition
- Minimal assistance
- Immediate separation from the mother
- Disinfection of the umbilical cord
Disinfection of the umbilical cord
Ear tagging and disinfection!
Reception facilities 1st day

Reception fist day

- Hygiene
- Climate
- Labor efficiency

Reception protocol

- Prevention of infections (e.g. of navel)
- Colostrum supply
- Medication?
- Vitamins/Minerals/Trace elements
Care, colostrum & heat for a perfect start

Or even better cardboard boxes on a heating floor
Functionality of colostrum

- Initiate intestinal motility
- Expel meconium
- Source of energy
- Build up passive immunity
Fast
Fit (high) volume
Frequent
Fresh
As early as possible
Total of 15 % of BW
3 times daily
Check quality
Check quality
Method of application
Heating of colostrum: Be careful!
Permeability of the intestinal wall
Fast
Results of Hb-analysis at 3 and 43 days in 21 goat kids fed with Denkamilk Caprimel

![Graph showing level of hemoglobin with frequency for first and second samples.]

- **First sample**
  - 4,0-4,4: 2
  - 4,5-4,9: 1
  - 5,0-5,4: 2
  - 5,5-5,9: 5
  - 6,0-6,4: 6
  - 6,5-6,9: 2
  - 7,0-7,4: 1
  - 7,5-7,9: 1
  - 8,0-8,4: 1

- **Second sample**
  - 4,0-4,4: 2
  - 4,5-4,9: 1
  - 5,0-5,4: 2
  - 5,5-5,9: 5
  - 6,0-6,4: 6
  - 6,5-6,9: 2
  - 7,0-7,4: 1
  - 7,5-7,9: 1
  - 8,0-8,4: 1
Extra vitamines, minerals and trace elements can be necessary

- Directly starting from day 1 mixed into the milk (replacer)
  - 0-10 dys: 2.5 g/animal/day

- As top-dressing on the feed/concentrate around weaning
  - 7-10 days 2.5 g/animal/day

- After antibiotic treatment
  - 7-10 days

- Vitamins:
  - A, B-complex, C, D3, E, K

- Minerals & Trace elements
  - Fe, Cu, Zn, Co, Se, Mn, Mg, I
Training pen

Sufficient intake
• Short distance to teat
• Connect to teat 2-3 times daily
• High concentration (180 g/liter)

Easy intake
• Max. 10 - 15 goat kids per teat
• Min. 2 teats at 35 - 40 cm height
• Close to the automatic feeder
• Vertical teat opening (optimum milk yield)

Avoid (re)contamination
• In training pen until day 4 of life
• Replace/separate animals with insufficient intake to a separate pen
• Temperature (bedding), climate (humidity)
Training pens for at least 4-5 days
Training pens
Feeding strategy

• Prompt and safe start
• Harmonious / optimal growth
  – Maximum does not necessarily mean optimum!
  – Growth from milk and concentrates
    • Correct protein / fat balance
    • Concentration
• Optimum weanability:
  no post-weaning growth check
  – Sufficient intake of concentrates and roughage
  – Avoid too low age / too low weight / insufficient buildup of immunity
Speaking about Milk replacer

Denkamilk
Denkavit

- Dutch family owned company (since 1929)
- Specialized in:
  - Feed for young animals (± 420.000 MT feed/year)
  - Special ingredients for compound feed industry
  - Veal calves (± 500.000 calves in integration in Europe)
- International active:
  - Export: > 50 countries worldwide
- Research facilities in the Netherlands and France for calves, piglets, kids and lambs
- Turnover of € 600 million/year
Research station The Netherlands and in France.

3040 calves
230 sows
6500 piglets
1,300 calves in France
Capacity digestion tract is starting point.

Digestibility studies kids & lambs
Research capacity of ca. 700 kids per year feed and feedsystem trials.
Denkamilk goat kid milk replacer

Corresponding factors:

• Origin of raw materials:
  – Selected for taste / solubility / digestibility

• Production process

• Structure and free flowing characteristics

• Compositions proven in practice

• Safety concept (acidification, prebiotic, mixture of essential oils)

• Correct vitamin levels

• Based on extensive digestibility trials
Research of weight development
Research of weight development

`Institut expérimentale Caprine du Pradel` France
Female and male goat kids

<table>
<thead>
<tr>
<th>Time</th>
<th>0% SMP</th>
<th>60% SMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 dgn</td>
<td>4,19</td>
<td>4,25</td>
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<tr>
<td>20 dgn</td>
<td>8,22</td>
<td>8,02</td>
</tr>
<tr>
<td>40 dgn</td>
<td>12,24</td>
<td>13,01</td>
</tr>
<tr>
<td>70 dgn</td>
<td>18,62</td>
<td>18,71</td>
</tr>
<tr>
<td>130 dgn</td>
<td>26,99</td>
<td>27,11</td>
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</table>
## Analysis of technical results

<table>
<thead>
<tr>
<th></th>
<th>0% SMP</th>
<th>60% SMP</th>
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</thead>
<tbody>
<tr>
<td><strong>ADG (gram)</strong></td>
<td>236</td>
<td>228</td>
</tr>
<tr>
<td><strong>Weaning age (days)</strong></td>
<td>50.32</td>
<td>49.29</td>
</tr>
<tr>
<td><strong>Weaning weight (kg)</strong></td>
<td>14.93</td>
<td>14.89</td>
</tr>
<tr>
<td><strong>FCR</strong></td>
<td>1.298</td>
<td>1.367</td>
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</table>
## Technical results male goat kid fattening

<table>
<thead>
<tr>
<th></th>
<th>0% SMP</th>
<th>60% SMP</th>
<th>Ns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>34</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Birth weight (kg)</td>
<td>4.72</td>
<td>4.89</td>
<td>Ns</td>
</tr>
<tr>
<td>Age at slaughter (days)</td>
<td>26.06</td>
<td>24.45</td>
<td>Ns</td>
</tr>
<tr>
<td>Live weight (kg)</td>
<td>10.94</td>
<td>10.56</td>
<td>Ns</td>
</tr>
<tr>
<td>ADG (gram)</td>
<td>241</td>
<td>232</td>
<td>Ns</td>
</tr>
<tr>
<td>Carcass weight (kg)</td>
<td>7.30</td>
<td>6.98</td>
<td>Ns</td>
</tr>
<tr>
<td>Carcass efficiency</td>
<td>66.73</td>
<td>66.12</td>
<td>Ns</td>
</tr>
</tbody>
</table>
Carcass quality
Research of concentrate intake

0-28 days

MR with SMP

MR without MMP
Milk replacer: whey vs smp

• No/less risk of coagulation disorders
  – Milk without SMP does not require coagulation
  – One less risk factor

• Lower risk of scours

• Earlier intake of concentrates and roughage
  – Facilitates earlier weaning!

• Possibility to acidify the milk
  – Better hygiene
Recent fattening trial with essential oils

Average growth S92

<table>
<thead>
<tr>
<th></th>
<th>Week 0</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4,4</td>
<td>5,5</td>
<td>7,0</td>
<td>8,9</td>
<td>10,5</td>
</tr>
<tr>
<td>B</td>
<td>4,4</td>
<td>5,8</td>
<td>7,3</td>
<td>9,1</td>
<td>10,4</td>
</tr>
</tbody>
</table>

Growth (g/day):
A: 220
B: 216

Feed intake (kg):
A: 7.4
B: 7.8

FCR:
A: 1.19
B: 1.29

2 x180 kids
Denkavit Capri Concept

<table>
<thead>
<tr>
<th>Week</th>
<th>Treatments</th>
<th>cp / cf</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Caprimel (±12 kg)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CapriOvi (±2 kg)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Caprimel (±10 kg)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Caprimel (±8 kg)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CapriPlus (±4 kg)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>CapriOvi (±2 kg)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Caprimel (±6 kg)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CapriPlus (±4 kg)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Caprimel (±8 kg)</td>
<td>23/19</td>
</tr>
<tr>
<td></td>
<td>CapriPlus (±8 kg)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>CapriOvi (±2 kg)</td>
<td>22/18</td>
</tr>
<tr>
<td></td>
<td>Caprimel (±6 kg)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CapriPlus (±8 kg)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vitalcure topdressing</td>
<td></td>
</tr>
</tbody>
</table>

Weeks: 1 to 9
Application

Concentration
- 175-200 gr / litre of water
- For fattening 200-240 g/l water

Ad libitum feeding at the lamb bar: CapriOvi
- Prepare and apply at room temperature
- Refresh several times daily

Restricted feeding: Caprimel / CapriPlus / CapriOvi
- Dissolve in water of 45 - 50 °C
- Drinking temperature 41 – 42 °C

Automatic feeder: Caprimel / CapriPlus / CapriOvi
- Set preparation temperature at 43 – 44 °C
Portfolio (NL)

**Caprimel**
- Alround milk replacer for rearing purposes
- Highly palatable, highly digestible
- Excellent and safe juvenile growth
- Crude protein 23 %, crude fat 19 %
- Suitable for automatic feeders

**CapriPlus**
- Attractive alternative with lower energy level
- Perfect for final weeks before weaning
- High intake of concentrates, easy weaning
- Excellent digestibility
- Crude protein 22 %, crude fat 18 %
- Suitable for automatic feeders
Portfolio (NL)

CapriOvi
- High energy content for the first 10 - 14 days
- Also suitable for fattening of male goat kids
- 1st phase rearing
- Highly stable in solution
- High degree of safety
- Universally applicable
- Crude protein 21.5 %, crude fat 24 %

Caprifit
- Attractive alternative
- High energy content
- Fattening of male goat kids
- 1st phase rearing
Portfolio (NL)

CapriOvi Royal

- With 50 % skimmed milk powder
- High energy content
- Also suitable for fattening of male goat kids
- Highly stable in solution
- High degree of safety
- Universally applicable
- Crude protein 22 %, crude fat 25 %
Features of goat kids

Oesophageal groove reflex
Flow of feed in the animal

Concentrates/water → Rumen

Milk → Abomasum

Intestines

STOP
Oesophageal groove reflex

Milk

Abomasum

Rumen

Omasum

Reticulum

Oesophageal groove
Causes of rumen drinking

- Lumps in the milk
- Excessive milk intake
- Variation in concentration
- Teat height < 15 cm
- Damaged teats (sucking air)
- Tube feeding
- Variable drinking temperature, too low temperature in no-teat feeding systems
- Composition of milk replacer
- Stress (e.g. transport / competition)
- Poor health (e.g. respiratory disease)
Features of goat kids

- Development of rumen and abomasum
- Ruminant
- Feed and water intake
Rumen development

Rumen papillae

Rumen muscular wall
Rumen development

- Small quantities
- Easily digestible
- Always (!) fresh
- 10 % chopped hay, straw or alfalfa
- Dry
- Tasty
- Hay: chopped
Difference in rumen development in 7 weeks
**Weaning**

Supply as from day 7:
- Unlimited fresh and palatable water
- Highly digestible and palatable goat kid pellet
- Chopped alfalfa/ hay / straw

Weaning without growth check:
- Minimum 6 weeks of age
- Body weight 12 to 14 kg
- Consumption of pellet 250 gr/day
Setup of weaning method trial

• Methods:
  – Influencing ease of drinking via mounted taps
  – Application of cold milk (room temperature)
  – Decreasing concentration by 50 % (down to 95 g/l water)
  – Once a day supply of milk
Results weaning method trial

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Influencing drinking ease</th>
<th>½ concentration</th>
<th>Cold milk</th>
<th>Milk 1 x daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-56 days (gram)</td>
<td>179</td>
<td>226</td>
<td>166</td>
<td>174</td>
<td>201</td>
</tr>
<tr>
<td>Weight gain (kg)</td>
<td>10.02</td>
<td>12.47</td>
<td>9.27</td>
<td>9.78</td>
<td>11.28</td>
</tr>
<tr>
<td>Difference (index)</td>
<td>100</td>
<td>126</td>
<td>93</td>
<td>97</td>
<td>112</td>
</tr>
</tbody>
</table>
## Results weaning method trial

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Influencing drinking ease</th>
<th>½ concentration</th>
<th>Cold milk</th>
<th>Milk 1 x daily</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intake of concentrates (gram)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-28 days (gram)</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>28-35 days (gram)</td>
<td>70</td>
<td>102</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>35-42 days (gram)</td>
<td>107</td>
<td>124</td>
<td>107</td>
<td>107</td>
<td>110</td>
</tr>
<tr>
<td>42-49 days (gram)</td>
<td>191</td>
<td>324</td>
<td>257</td>
<td>203</td>
<td>318</td>
</tr>
<tr>
<td>49-56 days (gram)</td>
<td>484</td>
<td>536</td>
<td>467</td>
<td>480</td>
<td>562</td>
</tr>
<tr>
<td>0-56 days (gram)</td>
<td>129</td>
<td>163</td>
<td>136</td>
<td>130</td>
<td>158</td>
</tr>
<tr>
<td><strong>Total (gram)</strong></td>
<td>6312</td>
<td><strong>7968</strong></td>
<td>6662</td>
<td>6371</td>
<td>7752</td>
</tr>
<tr>
<td><strong>Difference (index)</strong></td>
<td>100</td>
<td>126</td>
<td>106</td>
<td>101</td>
<td>123</td>
</tr>
</tbody>
</table>
Development of concentrate intake 0-28 days
Development of concentrate intake 28-56 days

Intake of kid starter day 28-56

Time (days)

Intake (grammes)

Avance 549D
Avance 549A
Supply of drinking water

Water = key nutrition
FRESHLY available AT ALL TIMES

- Number of drinking reservoirs
  - 3-4 drinking reservoirs / 100 goat kids
- Location
  - Close to concentrates and roughage
  - Away (far) from teats
- Type of water reservoir
- Water quality
  - Municipality / own water source (well)
Application of milk replacer: an art
Application of milk replacer. Attention points:

- Concentration
- Mixing temperature
- Mixing time
- Drinking temperature
- Water quality
- Hygiene
Feeding systems

Automatic feeder

Restricted feeding

Ad lib stockfeeding
Restricted feeding (trough)
Restricted feeding (lamb bar)

- Mount a sufficient number of teats
- Do not overfeed
- Feed according to schedule
Ad lib stockfeeding (lamb bar)

- Always milk available
- Always at constant temperature
- Milk replacer 24 hour stability
- Milk replacer soluble in warm or cold water
- Verify milk intake
- Hygiene
Automatic feeder
Pitfalls automatic feeder

- Infection pressure at the automatic feeder
- Incorrect installation and settings
  - Setting concentration / calibration
  - Cleaning of powder orifice
  - Mixing temperature (43 / 44 ºC)
- Hygiene of teats, tubes, mixing cup
- Stress of goat kids in group
  - Correct training
  - Group size
- Difficult setup regarding general treatment
Avoid too large group size
Improper preparation, $T$ has to be $> 40$ degrees

Many badly dissolved fat particles

$1 = 83.2 \text{ m}$
$2 = 45.4 \text{ m}$

Watery solution
$x 200$
Too high mixing temperature

> 65°C

Frequently encountered in case of 2-step preparation/mixing

Effect:

- Denaturation of protein:
  - Less soluble
  - Less digestible/undigestible
- Loss of vitamin activity (breakdown)
- Negative impact on fat emulsification

Consequence: poor growth and digestive disorders!
Group housing

Focus: High growth and rumen development

Group size
- Not too big (heterogeneity)

Pen surface for each goat kid
- More space for moving around
- Lower infection pressure
- Less stress
- Water
- Supply of concentrates and roughage
- Freshness of feed(s)
- Automatic feeder
Example of setup
The ideal rearing unit ?
Why the attention to climate?

Climate has serious impact on:

• Respiratory disease (2x)
• Medical treatment
• Development and capacity of the respiratory system
• Feed intake and growth
• Uniformity
• Infection pressure
• Future results !!!!
Successful rearing

- Colostrum
  - 1st day
  - Correct quantity/type applied by teat

- Training pen
  - Max. 10 - 15 goat kids per teat
  - Min. 2 teats at 35 - 40 cm height
  - Close to the automatic feeder
  - Vertical teat opening (optimum milk yield)

- Milk intake
  - Check 2 times per day

- Regular checks
  - Replace damaged teats
  - Clean orifice daily
  - Check concentration once a week

- Weighing
  - Determine correct moment of weaning
Thanks for your attention!