Influence of GH genotype and feeding regime on reproductive parameters in Serra da Estrela ewes


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GROWTH HORMONE (GH):

- Involved in the processes of:
  - sexual differentiation and pubertal maturation
  - gonadal steroidogenesis, gametogenesis and ovulation

- **PITUITARY GH2-N** – endocrine role on granulosa, and luteal and thecal cells, oocyte, endometrium and mammary gland

- **PLACENTAL GH2-Z** – endocrine role on endometrium and mammary gland and local autocrine or paracrine effects in placenta – pregnancy maintenance, – lamb survival and lamb body weight
**Objective**

**STUDY THE EFFECTS OF:**

✧ **GH2-Z gene copy genotypes:**
  - **AA** (R9R/S63S)
  - **AB** (R9C/S63S)
  - **AE** (R9R/S63G)

✧ **Feeding regime** during pre-pubertal phase:
  - **Restricted Gr** – growth rate of 79 g/day
  - **Normal Gr** – growth rate of 106 g/day

on 90 ewe lambs reproductive parameters of Serra da Estrela primiparous ewes
ONSET OF OVARIAN CYCLICITY

- **Blood samples:**
  - once every 10 days, from 5 month of age till forty days after the first oestrous detection

- **Plasma progesterone levels (P4):**
  - Determined by RIA

- **Cyclic when:**
  - $P_4 \geq 0.5 \text{ ng mL}^{-1}$
  - Peak every 17 days

ONSET OF PUBERTY

- 1\textsuperscript{st} oestrous detected by rams with marking harness
Material and Methods

**OESTROUS SYNCHRONIZATION**

- 20 mg FGA intravaginal sponges - 12 days
- 500 UI eCG after sponge removal

**ARTIFICIAL INSEMINATION (AI)**

- Cervical AI - **55 h** after sponge removal
- **300x10⁶ spz** refrigerated semen (15 °C)
- **Natural mating** - 17 days after AI (during 30 days)
Results

PROGESTERONE LEVELS

Restricted Gr

Normal Gr

Cyclyc at 262 days

Cyclyc at 246 days

P4 (ng l⁻¹)

Day of age
Results

Cyclicity

Age at cyclicity – 251 days
Group R > Group N in AB genotype

<table>
<thead>
<tr>
<th>GH2-Z genotype</th>
<th>AA</th>
<th>AB</th>
<th>AE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restricted Gr</td>
<td>254</td>
<td>262</td>
<td>248</td>
</tr>
<tr>
<td>Normal Gr</td>
<td>252</td>
<td>246</td>
<td>249</td>
</tr>
</tbody>
</table>

\(a, b - P<0.05\)
**Results**

**Puberty**

Age at puberty - **273 days**

Not affected by genotype nor feeding regime

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<th>Normal Gr</th>
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<tr>
<td>AA</td>
<td>275</td>
<td>264</td>
</tr>
<tr>
<td>AB</td>
<td>288</td>
<td>269</td>
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<tr>
<td>AE</td>
<td>265</td>
<td>267</td>
</tr>
</tbody>
</table>
## Results

### Reproductive Parameters

<table>
<thead>
<tr>
<th></th>
<th>Fertility</th>
<th>Fecundity</th>
<th>Prolificacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artificial insemination (AI)</td>
<td>40</td>
<td>56</td>
<td>139</td>
</tr>
<tr>
<td>AI+Natural mating</td>
<td>88</td>
<td>99</td>
<td>112</td>
</tr>
</tbody>
</table>
Results

Gestation Body Condition Scores

37 kg LW 2.43 BCS

46 kg LW 2.67 BCS
Results

Reproductive Parameters
AI + Natural Mating by Feeding Regime

- Fertility
- Fecundity
- Prolificacy

Restricted Gr
Normal GR

%
Results

**Reproductive Parameters**

AI + Natural Mating by GH2-Z Genotype

- **Results**
  - a, b – P<0.05

[Bar chart showing Fertility, Fecundity, and Prolificacy percentages for genotypes AA, AB, and AE.]

Fertility: AA, AB, AE

Fecundity: AA, AB, AE

Prolificacy: AA, AB, AE

%
Conclusions

**ONSET OF OVARIAN CYCLICITY**
- 252 days of age
- Not affected by ewes’ GH genotype
- Group R > Group N in AB genotype

**ONSET OF PUBERTY**
- 273 days of age
- Not affected by genotype nor feeding regime
Conclusions

**Fertility**

- 40% for AI primiparous Serra da Estrela ewes
- GH2-Z genotypes AB and AE positively affect fertility
  96% AB = 95% AE > 77% AA GH2-Z genotypes
- Not affected by feeding regime

**Prolificacy**

- Tended to be higher in GH2-Z genotype AA ewes
  and in restricted feeding regime
Thanks for your attention!