M-BoSs project “Out scaling of community-based breeding programs: attractive and innovative approach to improving the lives of smallholder producers in low input systems”

TALIRI – Kilimanjaro, 4-6 January 2019

Reproduction of Sheep and Goats: Fecundity Improvement Packages

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ICARDA
Science for resilient livelihoods in dry areas
Control Means

- Introduction
- Synchronisation of oestrus and induction of ovulation
- Natural method
- Hormonal treatments
- Improvement of litter size
Physiological causes of reduced reproductive efficiency in sheep and goats

• Long seasonal anoestrus: 2-6 mois
• Pregnancy: 5 months
• Postpartum anoestrus: 1-3 months
• An inherent low prolificacy

In most production systems, sheep and goats give birth once a year, produce single litters and the production is seasonal.
Improvement of fertility

Control over the events of the oestrous cycle

Breeding season → Synchronisation

Anoestrous season → Induction, Synchronisation
Mating Synchronisation
Lambing Compactness

Choose

The best mating time
(Maximise fertility)

Adjust

Nutritional requirements
and provision from cheap natural feed

Produce

According to the market requirements and to access improved genetics
Natural method: The «male effect»

How it works

Olfactory senses → hypothalamus → Pituitary gland → ovary

Male stimuli (Pheromones) → Central nervous system → Reproductive tract

GnRH
Socio-sexual responses in goat and sheep

- Breeding out of season
- Breeding postpartum
- Advancing puberty
- Synchronised pregnancies
Variation Factors

• Age: Maiden/Adults (75% vs 95%)
• Breed: Temperate/Meridional
• Season
  – Stage of seasonal anoestrous
  – Association seasonal and postpartum anoestrous
• Body condition: Females in depressed BC do not respond
• Male sexual aggressiveness: sex ratio and maturity
INDUCTION AND SYNCHRONIZATION OF OESTRUS AND OVULATION
PROGESTAGENS: Long protocol

Days 0 16 18
PROGESTAGENS: Short protocol

Days

0  9  11  13
PROGESTAGENS

LIMITING FACTORS

EXOGENOUS

Origin of the hormone
Protocol of administration

ENDOGENOUS

Age
Nutritional status
Season
Reproductive status
Improvement of prolificacy
Selection

• Possible but difficult

• Low genetic progress: low heritability of the trait

• Indirect selection on prolificacy: ovulation rate, embryo mortality

• Several generations: 20

• Tunisia: W strain of the Barbarine breed: 160% vs 120% for ordinary Barbarine
Crossbreeding with prolific breeds

Fast way to improve litter size
Heterosis: 3% for prolificacy

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<tr>
<td>Nb.</td>
<td>36</td>
<td>31</td>
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<tr>
<td>LW (Kg)</td>
<td>45.7±5.7</td>
<td>40.5±5.9</td>
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<tr>
<td>Fertility(%)</td>
<td>77.7</td>
<td>90.3</td>
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| Prolificacy(%)    | 1.14±0.35         | 1.43±0.50         | + 20%
Nutritional method: Flushing

Short feeding supplementation

Distribution of concentrates or grazing good pastures (60% above maintenance)

Ovulation rate

2 weeks prior

Mating

2 weeks after

Embryo losses

Between 20 and 40 % in terms of lambs born
Conclusions

• Several methods There is no best method
• Options are dependent upon:
  • Physiological stage
  • Potential of the production system
  • Objectives, know how and financial asset of farmers
  • Products availability and effectiveness
Thank you