

Oestrus synchronization and AI as tools for rapid dissemination of improved sheep genotypes

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Outline

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- Merits of oestrus synchronization
- Common oestrus synchronization agents
- AI in shoats
- Experiences in oestrus synchronization & AI in shoats
- Lessons drawn and conclusion

Introduction

- Naturally, mating & lambing in a flock occurs in scattered manner
- Reduces production, productivity & profitability
- Artificial manipulation of reproduction is very important
- Oestrus synchronization & Artificial insemination major management & breeding tools

Merits of oestrus synchronization

- Reduces time & labour for heat detection
- Facilitates application of fixed time AI
- Enables programed mating
- Enables programed lambing (targeting feed availability, market, health)
- Improves life time productivity of the ewes by inducing ovarian activity in anoestrus ewes & pre-pubertal ewe lambs

Merits ...

- Age uniformity in lambs (for selling, feeding & healthcare)
- Physiological similarity of ewes (for feeding management)
- Enables efficient use of few genetically superior rams

Common oestrus synchronization agents

➤ *progesterone/progestagens and Prostaglandins/analogues*

❖ Progestagen impregnated intravaginal sponges



MAP sponges



FGA sponges

❖ **Controlled Internal Drug Releasing (CIDR)**



CIDR with applicator

➤ *prostaglandins / analogues*

- **Lutalyse®:** Natural prostaglandin
- **Synchromate®:** Synthetic
- **Estrumate®:** Synthetic



Advantages & limitations of two major forms of hormones

Hormone type	Advantages	Limitations
Progesterone/ progestagens	Induces ovarian activity in anoestrus females	Expensive
	More compact synchrony	Complicated application procedures
	Does not induce abortion	Environmental contamination with residues
Prostaglandins/ analogues	Cheaper	Not effective in anoestrus ewes
	Easy to apply	Not effective from 0-4 days of oestrous cycle
	Treat luteal cyst	Induces abortion if pregnant ewe is injected
		Less compact synchrony

Artificial insemination in sheep

- **AI** : Key breeding tool for efficient use of superior rams
- Two forms of semen are used:
 - ❖ **Frozen semen**
 - Effective when trans-cervical or uterine insemination used (laparoscopy technique)
 - Low fertility when cervical insemination is used
 - Difficulty in penetrating cervical canal in sheep

❖ Fresh diluted semen:

- Effective for cervical insemination
- Can be used for about 10 hrs at +15⁰c
- Fixed time insemination at 48 and 60hrs if double or at 55±1hr post sponge removal if once.
- Insemination at observed heat (15-17hrs after onset of heat)



Experience in oestrus synchronization & AI of shoats



1. Comparing type of Progestagen sponges, time and route of PMSG administration on synchronization efficiency & fertility in Dorper ewes

- Conducted in 202 ewes
- Fresh diluted semen collected from 4 rams
- Fixed time (53-55h) cervical AI with 0.1ml diluted semen



Results



Variables	Minimum (%)	Maximum (%)	Overall (%)
Oestrus response (# of ewes showing heat/# of ewes injected X 100)	86.7	100	<u>97 (196/202)</u>
Pregnancy rate (# of ewes lambing/# of ewes inseminated X 100)	38.5	93.3	<u>72.3 (146/202)</u>
Lambing rate (# of lambs born/# of ewes inseminated X 100)	46.2	131.3	<u>91.1 (184/202)</u>

2. Effect of progestagen type, priming period and PMSG administration on the efficiency of oestrus synchronization in Blackhead Ogaden sheep

- Experiment conducted in 84 ewes
- MAP & FGA Sponges Used
- Duration of sponge treatment tested
- All ewes inseminated with fresh diluted semen at fixed time 55-57hrs post sponge removal



Results



Variables	Minimum (%)	Maximum (%)	Overall (%)
Oestrus response (# of ewes showing heat/# of ewes injected X 100)	25	100	<u>91.7% (77/84)</u>
Pregnancy rate (# of ewes lambing/# of ewes inseminated X 100)	0	100	<u>63.1% (53/84)</u>
Lambing rate (# of lambs born/# of ewes inseminated X 100)	0	100	<u>64.3% (54/84)</u>

3. Effect of type and duration of intravaginal progestagen treatment on efficiency of oestrus synchronization and fertility in Somali goats

- Two intravaginal sponges (MAP & FGA)
- Does used for the experiment = 117
- Fresh semen collected from bucks used
- All does inseminated with 0.1ml at 48 & 60h post sponge withdrawal



Results:

- Overall oestrus response = 97.4% (114/117); range: 92.9-100%
- Overall pregnancy rate = 31.5%; range: 14.3-46.2%
- Overall kidding rate = 35.2%; range: 14.3-53.9%



4. Oestrus response and fertility of Menz and crossbred ewes to single prostaglandin injection protocol

- Two forms of Prostaglandin ([Lutalyse](#) & [Synchromate](#)) with different doses tested (December 2013)
- A total of **160** ewes (80 local and 80 crossbreds used)
- Conducted at DSBMC
- **Natural mating was used**

Results:

- Oestrus response: [65%](#)
- Maximum pregnancy rate: [84.62% \(range 33.3-84.62\)](#)



5. Oestrus response and fertility of local sheep to prostaglandin based oestrus synchronization protocol in south Wollo zone

- Superimposed on CBBP (May, 2015)
- A total of 80 ewes, owned by 30 HHs
- Pregnancy checked using **preg-tone**
- **Lutalyse 2.5ml with & without flush feeding tested**
- Four rams used for mating (**hand mating**)



Results:

- Overall oestrus response= 82.5% (66/80); range: 75-90%
- Overall pregnancy rate: 93.9% (62/66); range: 86.7-100%
- Overall litter size: 1.4



6. Oestrus response and fertility of Washera ewes prostaglandin treatment

- Nineteen ewes synchronized using Lutalyse (in June 2014) at Yilmana densa district
- Oestrus response: 94.4%
- Pregnancy rate from hand mating: 88%



7. Oestrus response and fertility of Washera sheep to Prostaglandin treatment

- Total of 66 ewes synchronized at Mecha district using Lutalyse
- Conception rate: 67% (44/66)
- Not yet lambed
- Challenge shortage of rams

8. Tigrai region

- Number of ewes synchronized: 125
- hormone used: Synchromate
- Oestrus response: 44% (55/125)
- Pregnancy rate: 50.1% (28/55)
- Lambing not yet completed

9. Debre Berhan Sheep Research Center

- Number of ewes synchronized: 86
- Progestagen and prostaglandin used in conjunction with GnRH
- Lambing rate: 82.6% (71/86) (range: 70.4-89.7)

Lessons drawn and conclusion

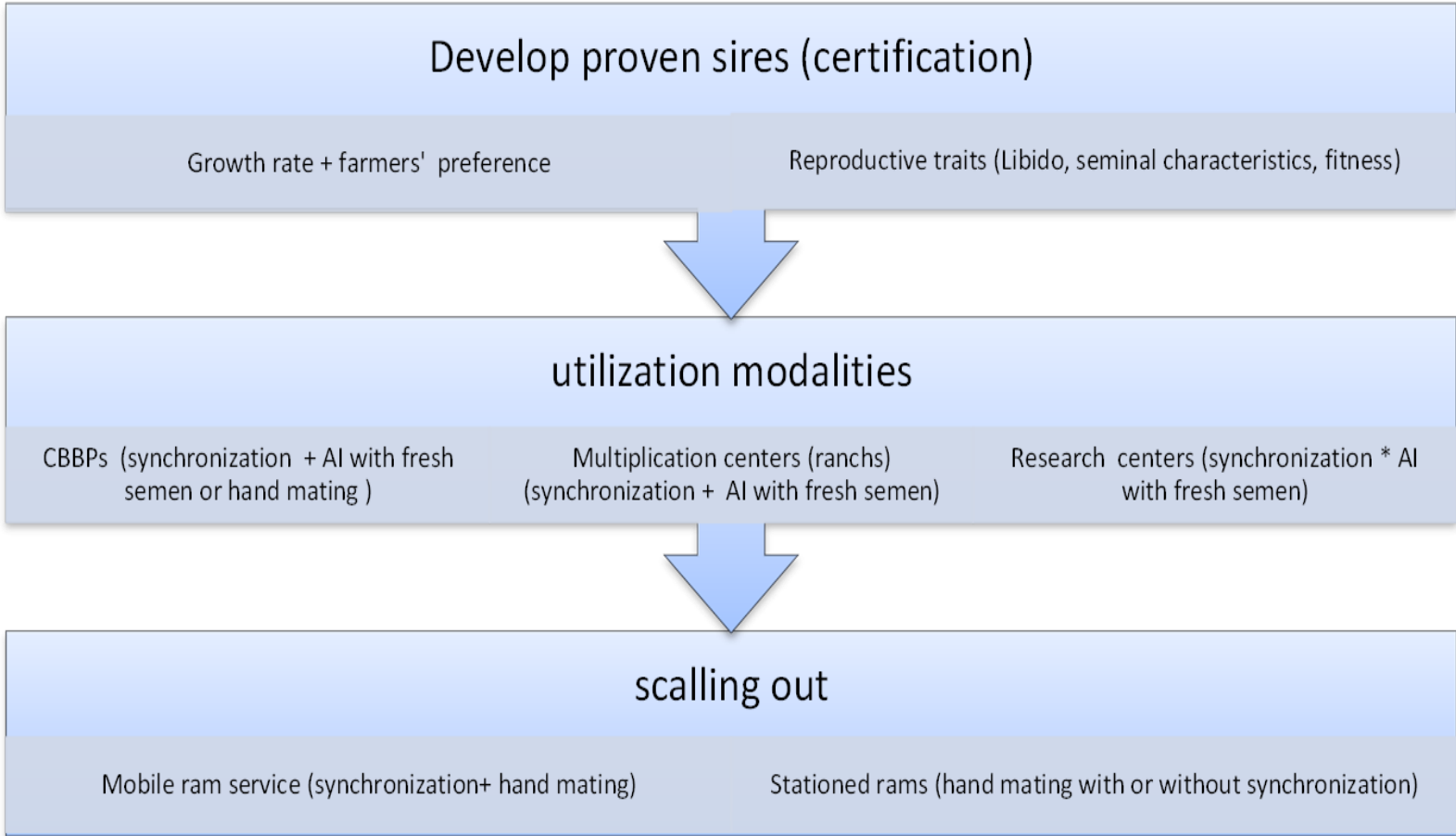
- Local ewes & does are responsive to prostaglandin or progestagen treatments
- Use of prostaglandin is preferable to Progestagen (cheaper, easy to apply, more available)
- Accurate early pregnancy detection technologies are mandatory
- Availing proven breeding rams/bucks for the community is important (Appropriate ram/buck service delivery modalities need to be developed)
- Hand mating is preferable to random mating since it enables economic use of few superior sires
- Flush feeding improved oestrus response, pregnancy rate and litter size



Lessons drawn...

- Insemination using fresh diluted semen has a potential role in speeding up genetic gains provided that:
 - Facilities for semen collection & insemination fulfilled
 - Capacity of technicians built
 - Facilities being constructed for cattle can be used with few additions
- Use of frozen semen may be an alternative strategy only for introducing new genotypes from abroad since it is cheaper than introducing live rams





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