Ethiopian Sheep and Goat Value Chain Development

Field solution for the Artificial Insemination of Ethiopian Sheep Breeds

Breeding for future generations…

Reproductive package to effectively vehicle improved genetics from the communities to the communities

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May 2016

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INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT

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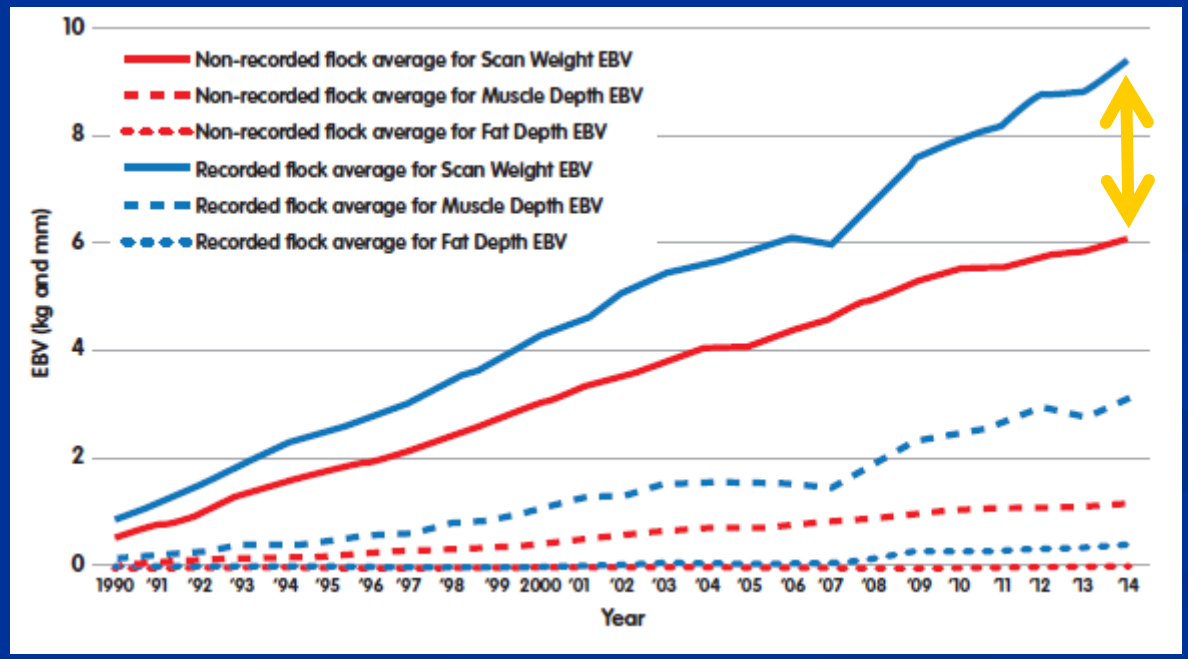
Artificial insemination: additional resource to a decade of supporting genetic progress in Ethiopian sheep breeds

$$(Rate\ of\ gain) = \frac{Intensity\ of\ selection\ X\ Heritability\ of\ the\ trait\ X\ Variation\ in\ the\ population}{Generation\ interval}$$

Artificial insemination

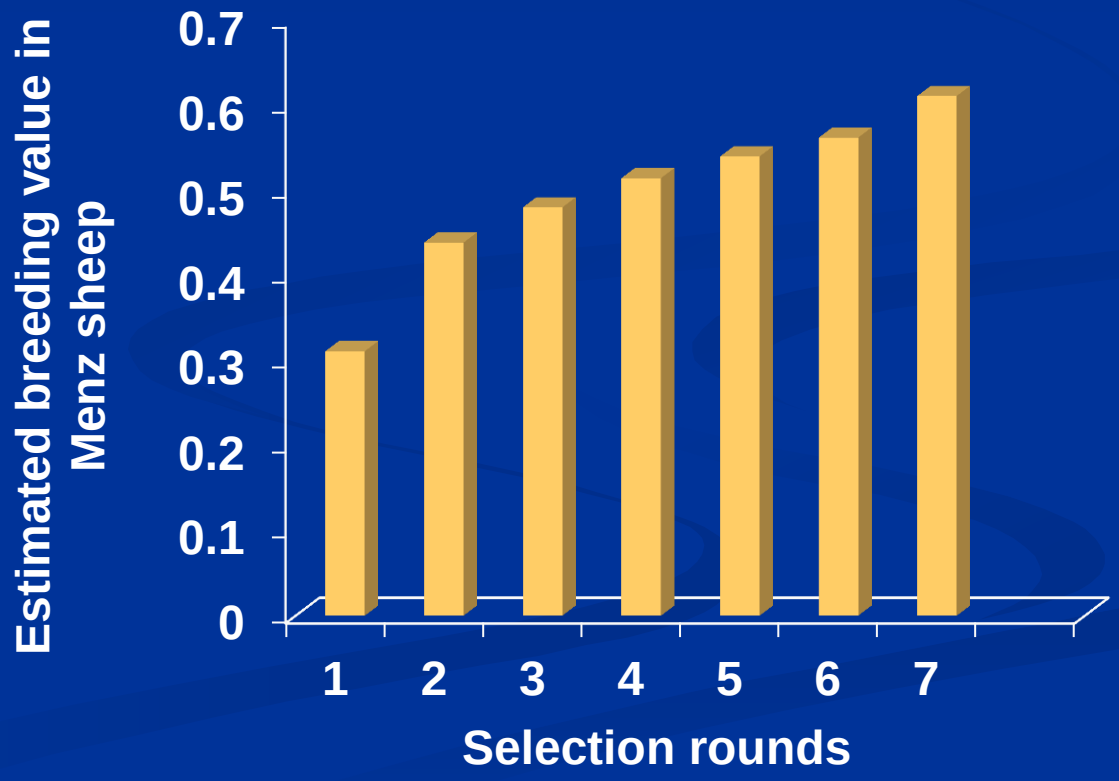


Genetic gain for live weight in recorded and unrecorded Suffolk sheep flock

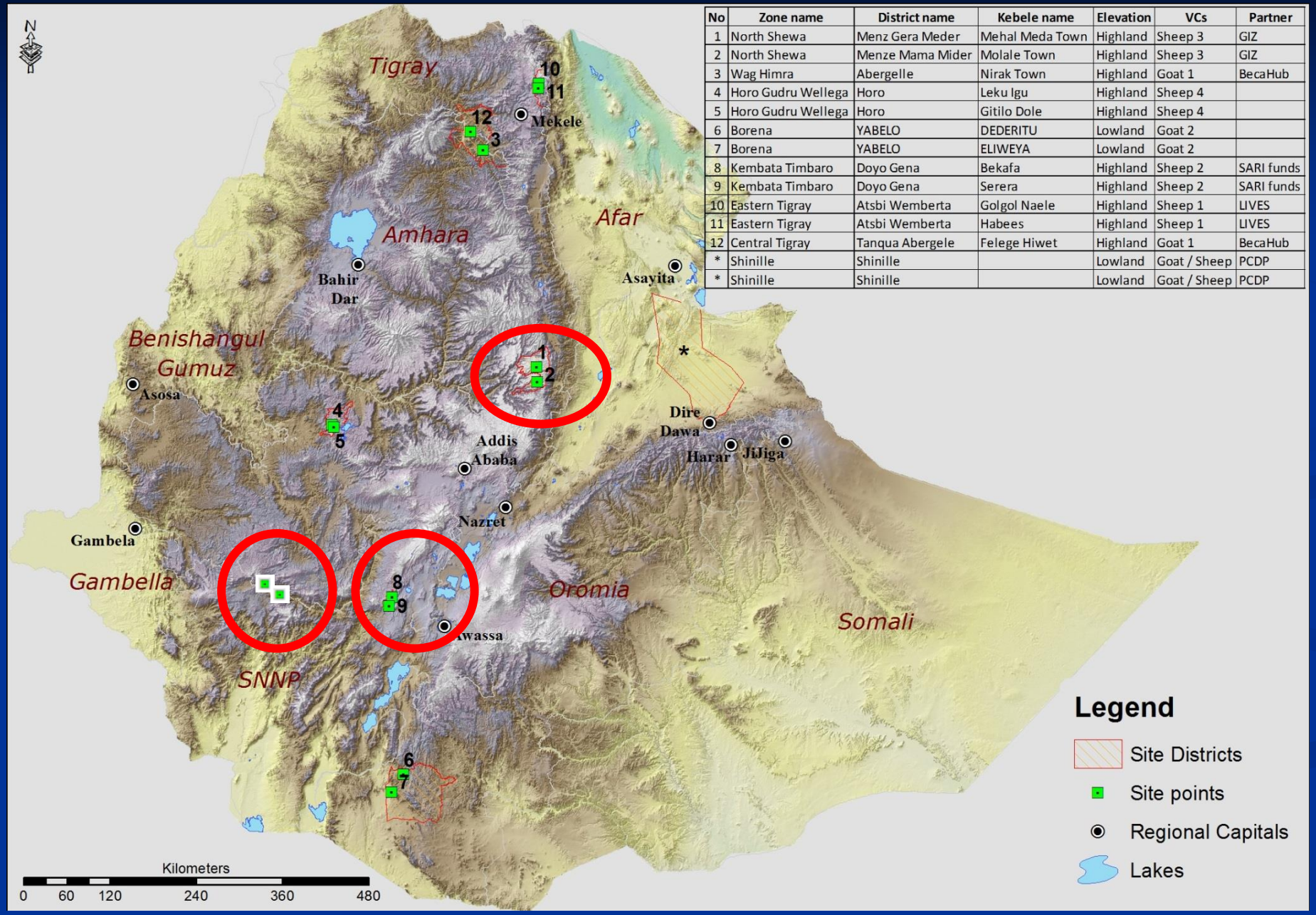
- Performance recording
- Intensive use of top 10% sires via artificial insemination

The community based breeding program in Ethiopia: not only a history of 6 years of community mobilization but also of a steady genetic progress

- Participatory breeding – decentralized breeding plans and programs;
- Improvement programs carried out by communities of smallholder farmers often at subsistence level;
- Community based breeding relies on proper consideration of farmers, breeding objectives, infrastructure, participation and ownership.



Selected sites for sheep and goat value chains



No	Zone name	District name	Kebele name	Elevation	VCs	Partner
1	North Shewa	Menz Gera Meder	Mehal Meda Town	Highland	Sheep 3	GIZ
2	North Shewa	Menze Mama Mider	Molale Town	Highland	Sheep 3	GIZ
3	Wag Himra	Abergelle	Nirak Town	Highland	Goat 1	BecaHub
4	Horo Gudru Wellega	Horo	Leku Igu	Highland	Sheep 4	
5	Horo Gudru Wellega	Horo	Gitilo Dole	Highland	Sheep 4	
6	Borena	YABELO	DEDERITU	Lowland	Goat 2	
7	Borena	YABELO	ELIWEYA	Lowland	Goat 2	
8	Kembata Timbaro	Doyo Gena	Bekafa	Highland	Sheep 2	SARI funds
9	Kembata Timbaro	Doyo Gena	Serera	Highland	Sheep 2	SARI funds
10	Eastern Tigray	Atsbi Wemberta	Golgol Naele	Highland	Sheep 1	LIVES
11	Eastern Tigray	Atsbi Wemberta	Habees	Highland	Sheep 1	LIVES
12	Central Tigray	Tanqua Abergele	Felege Hiwet	Highland	Goat 1	BecaHub
*	Shinille	Shinille		Lowland	Goat / Sheep	PCDP
*	Shinille	Shinille		Lowland	Goat / Sheep	PCDP

Year round breeding activity: accelerated reproduction & catalyzer to hasten genetic progress

	Bonga	Totally aseasonal	1.4 litter size	8 months lambing interval
	Doyogena	Totally aseasonal	1.3-1.4 litter size	8 months lambing interval
	Menz	Sexually less active during the wet season	1.1 litter size	10 months lambing interval

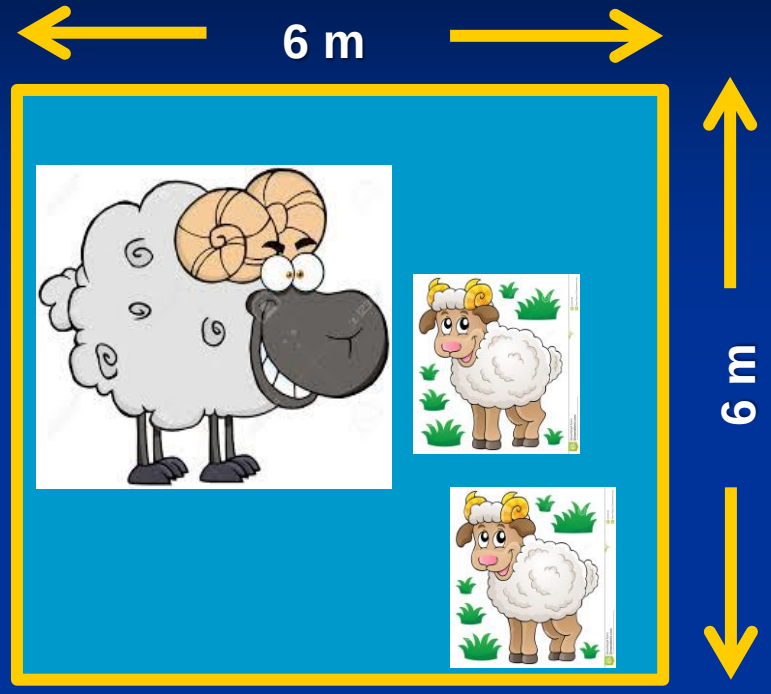
Development of a field solution for sheep insemination: Towards up/out-scaling the delivery system of CBBP's

- Rams' selection and training;
- Synchronization preceded by ultrasound pregnancy diagnosis in small-mixed flocks to discard pregnant females;
- Different synchronization options;
- Use of fresh semen, collected, assessed, diluted and used at 35 ˚C;
- Cervical AI of sheep after synchronization;
- Basic equipment needed: electricity generator, thermos flask, microscope (mass and individual motility), field spectrophotometer for the determination of semen concentration;
- Simple manual straw filling devices.

Rams' selection and training

- Selected best-ranked rams and ram lambs on the basis of their breeding value and preferred by the communities;
- General clinical and body condition examination;
- Detailed exam of the integrity of the reproductive organs;
- Semen and libido assessment;
- Training on ejaculating in an artificial vagina 2 times per week for at least a month prior to artificial insemination.

Rams' selection and training



Libido test

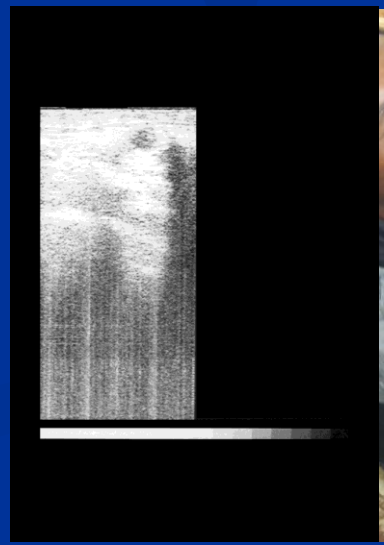
In the presence of 2 estrous females record during 10 minutes:

- Latency to first reaction (s)
- Total activity time (min)
- Vulva sniffing
- Flehmen
- Lateral approaches
- Mount attempts

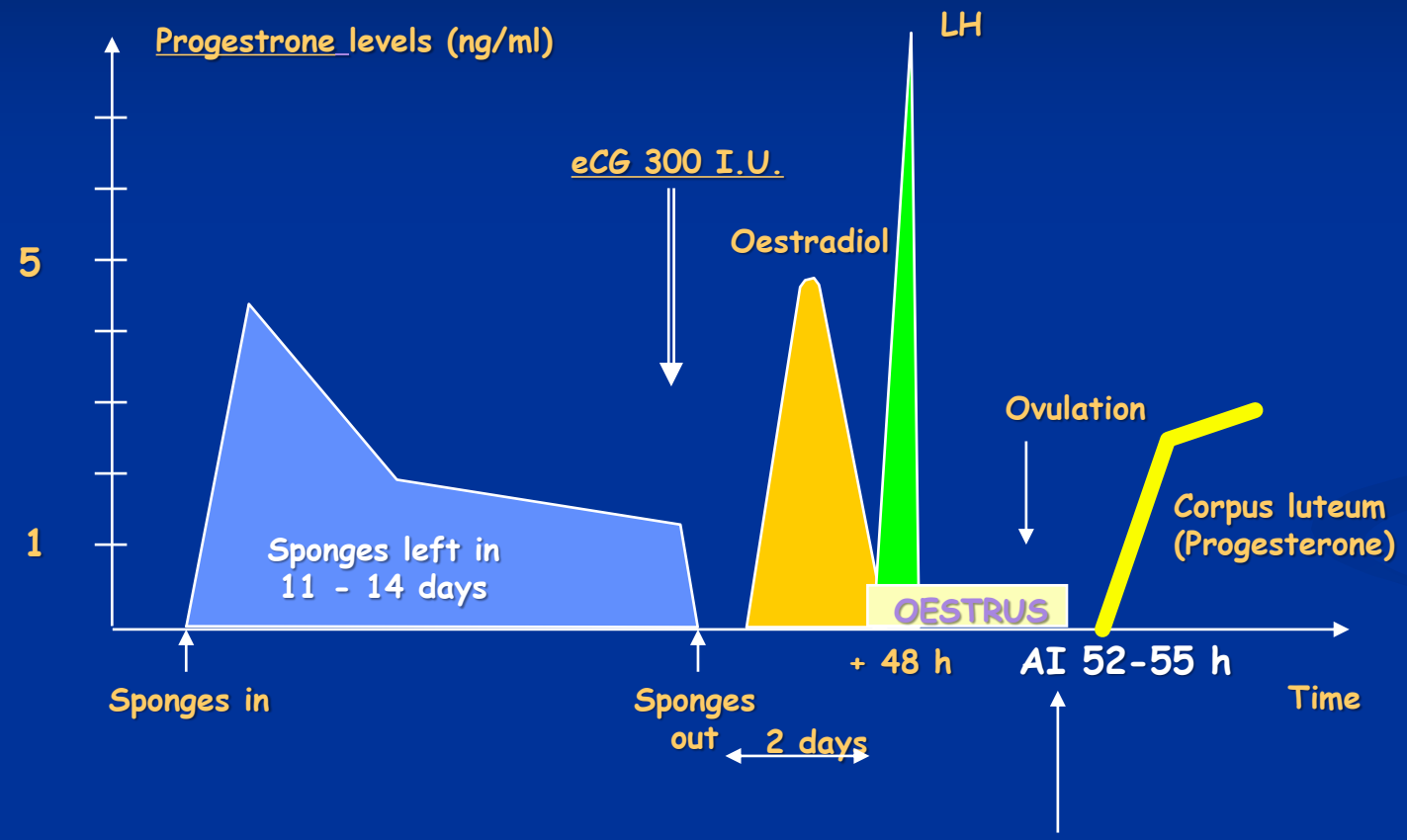
Training on semen collection in artificial vagina

Ewes’ selection for synchronization

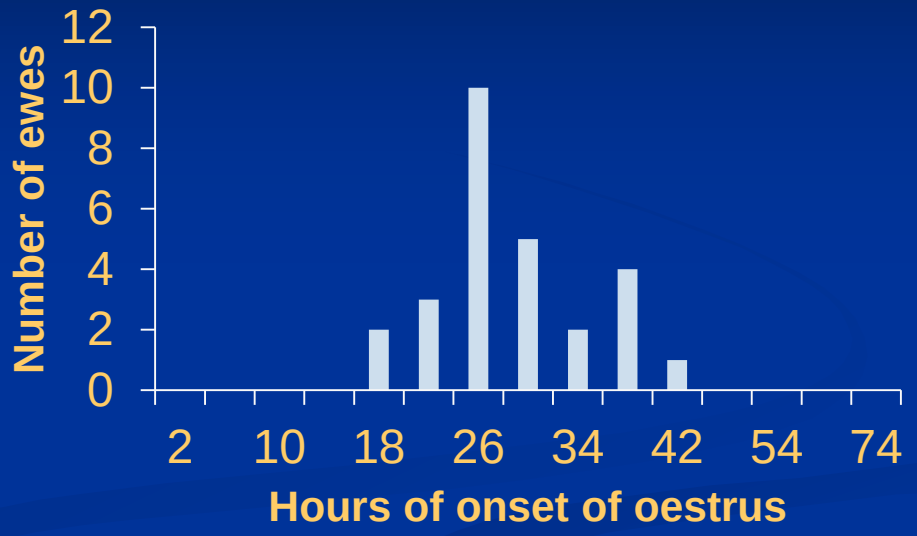
- Selection of adult ewes;
- No maiden sheep;
- Successfully lambed previous season;
- Not suckling;
- Body condition score > 2.5;
- Synchronization preceded by ultrasound pregnancy diagnosis in small-mixed flocks to discard pregnant females.



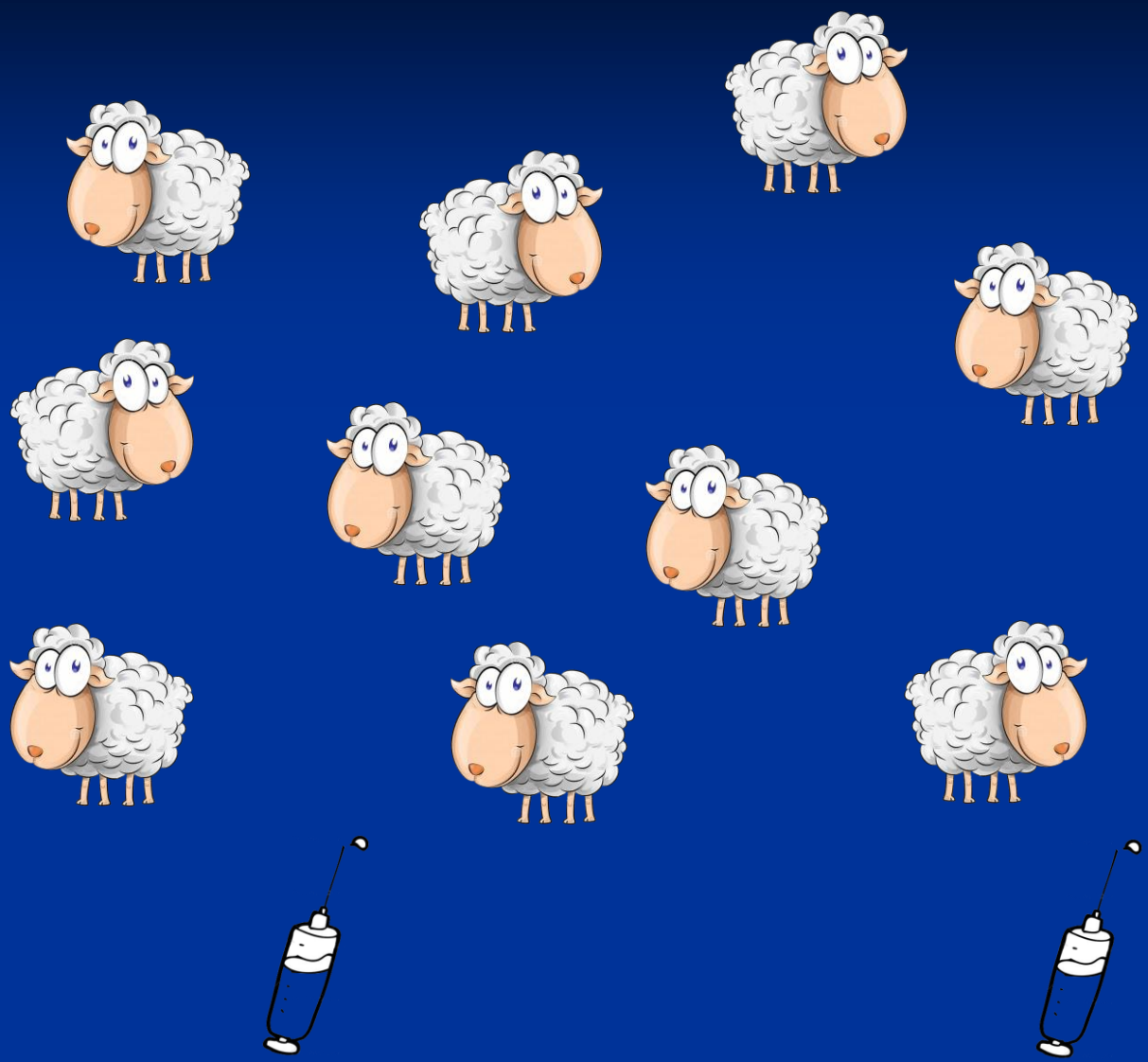
Different synchronization options

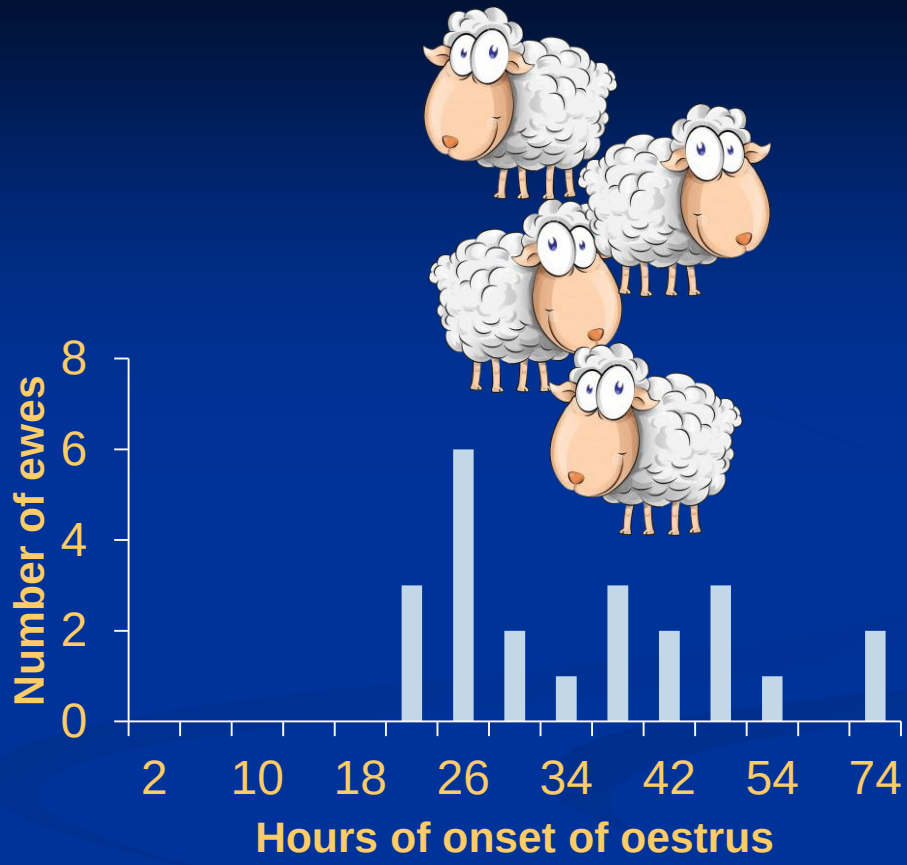


Conventional synthetic progestogen + eCG (PMSG)



Response of Menz ewes to a synthetic progestogen + eCG synchronization protocol

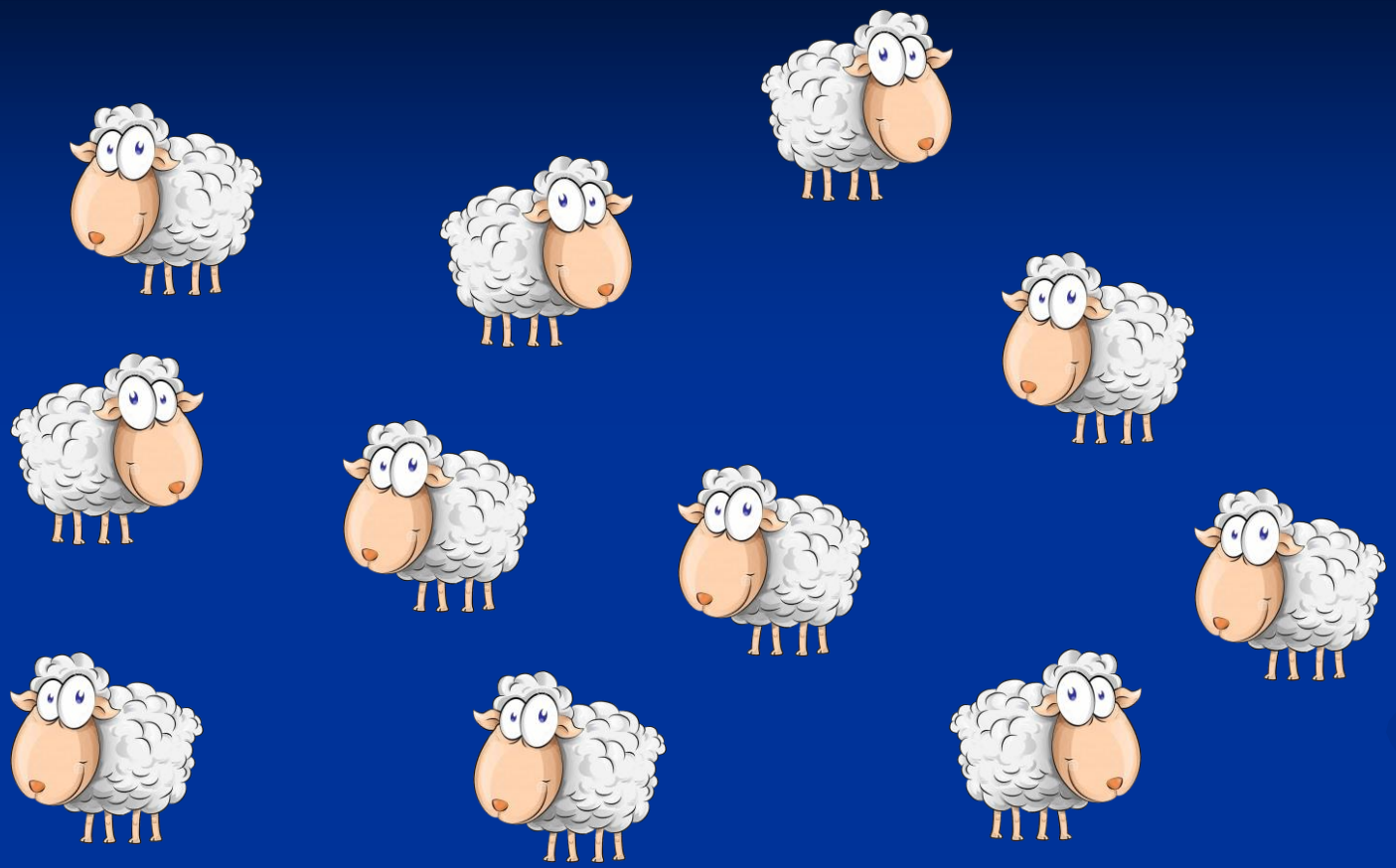


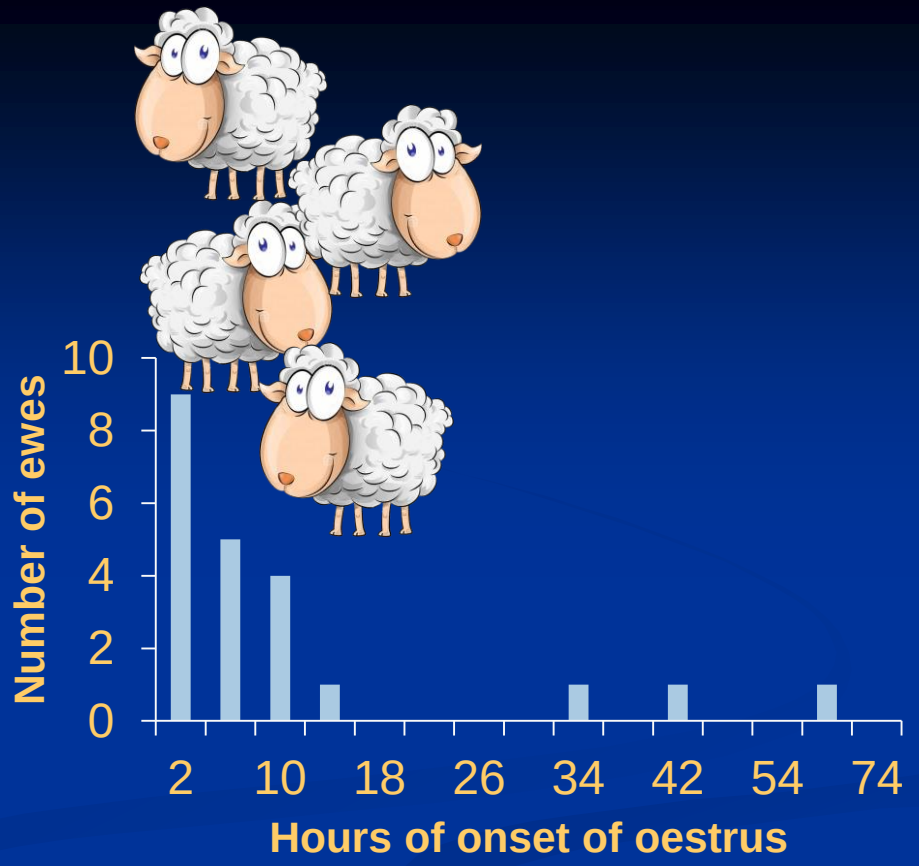


AI: 55-60 h after second injection

Day 0: PGF2α analogue dinoprost
1 ml Enzaprost (CEVA Labs)

Day 11: PGF2α analogue dinoprost
1 ml Enzaprost (CEVA Labs)





AI: 30-36 h after second injection of GnRH

Day 0: GnRH analogue gonadorelin
1 ml Cystoreline (CEVA Labs)

Day 6: PGF2α analogue dinoprost
1 ml Enzaprost (CEVA Labs)

Day 9: GnRH analogue gonadorelin
1 ml Cystoreline (CEVA Labs)

Semen collection

Allow enough sets of artificial vagina and accessories with graduated tubes and lubricant

Let the rams in with the estrous ewe one by one with the minimum disturbance

Let the rams express their full sexual behavior before ejaculating (1. vulva sniffing)

Use graduated tubes for a direct determination of the volume

Let the rams express their full sexual behavior before ejaculating (3. mounting attempts)

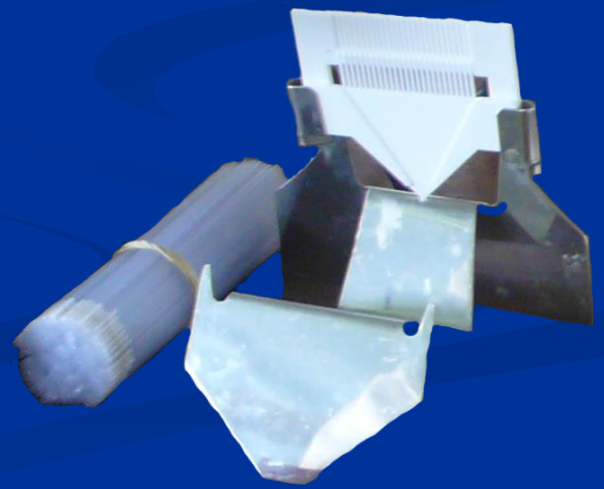
Let the rams express their full sexual behavior before ejaculating (2. lateral approaches)

Field semen assessment and processing

Field semen assessment and processing

- Collect, assess and process semen at 35 – 37 ˚C;
- Prepare straws and store at 35 – 37 ˚C;
- Use straws within 20 min of preparation;
- Dilute semen in extenders warmed at 35 – 37 ˚C;
- Use ejaculates with a mass motility > 3 – 3.5; (surging rapid waves) and a concentration > 3.5 10^9 spz/ml;
- Calculate number of straws and volume of extender to add so that every straw with a 0.25 ml volume contains a minimum of 200 10^6 spz/straw.

Fresh/Frozen ovine semen extender - flask of 100 ml; IMV technologies



Simple, manual straw filling

Cervical insemination

- Inseminate the ewes in the upright position;
- Most ewes should present mucus discharges in the vagina and this is a good sign;
- Do not inseminate ewes with clear signs of vaginal irritation and pus;
- Deposit semen at the entrance of the cervix; do not push the insemination gun deep into the cervix rings (permanent damage of the cervix and sterility);
- Gently down release the ewe after insemination.

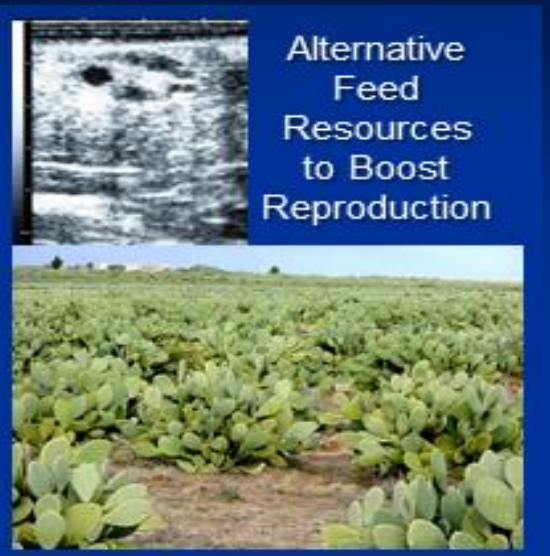
Post-insemination management

- Inseminated ewes should remain isolated from community rams;
- Reintroduce rams 10 days after insemination to ensure return estrus and guarantee flock fertility;
- No sharp change in the diet during the 2 weeks after insemination;
- Perform an ultrasound pregnancy diagnosis 30-35 days after insemination for preliminary conception rate;
- Ewes lambing between 150 ± 5 days after the date of insemination will be considered as conceiving to insemination.

The team...

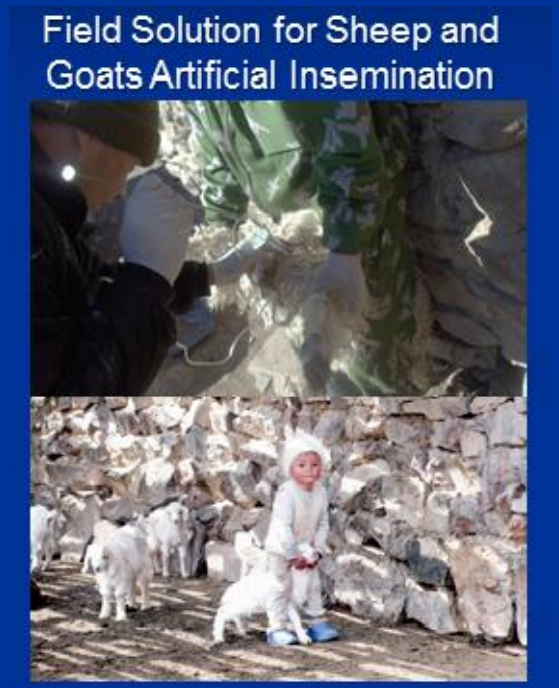
& others

ICARDA Sheep and Goats Reproduction Range



Rams' breeding soundness evaluation

Year round management for rams that are fit for successful reproduction



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