



Grazing in a dairy goat farm to design sustainable production systems in France

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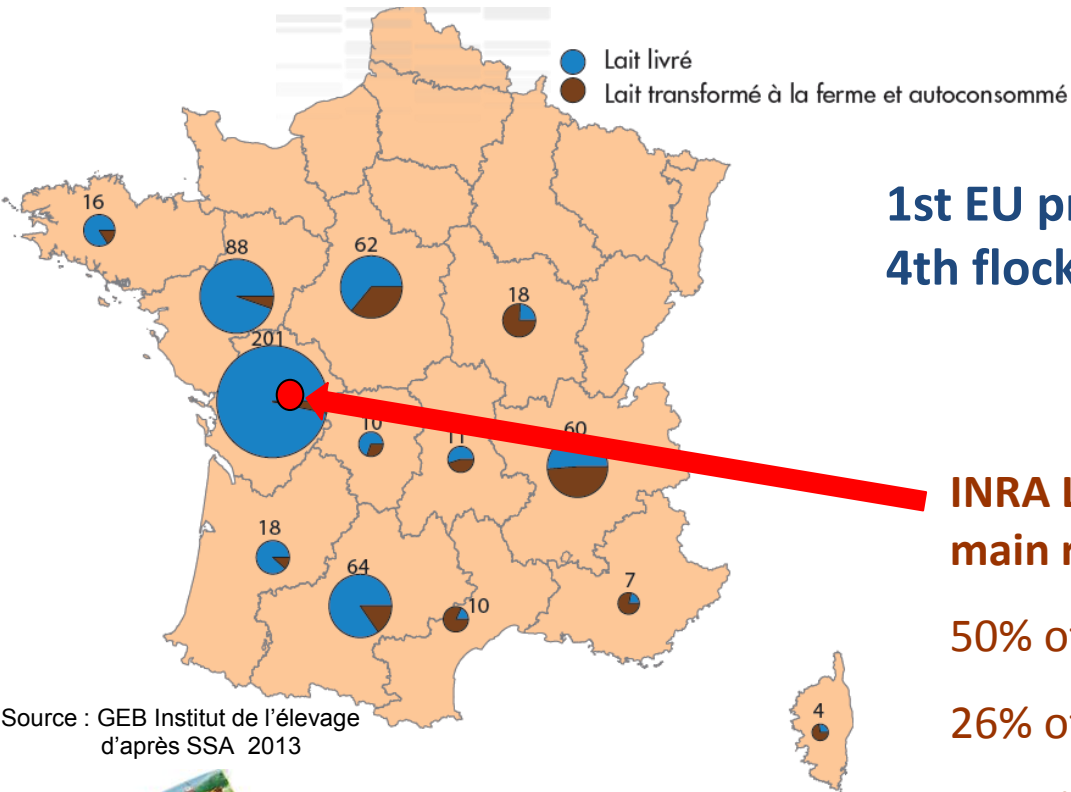
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FRANCE: the country of goat's milk in EU



1st EU producer: 550 millions liters collected
4th flock: 1.2 million of goats

INRA Lusignan research center is based in the main region of goat milk industry

50% of national delivered milk collection

26% of French goat flock

Mixed farming systems region

Oceanic climate with dry summers



...but a low feed self-sufficiency!

Feed self-sufficiency = 53 % $\pm$ 26% (88% in French dairy cows systems)

Due to :

- ↳ Intensification of dairy goat systems
- ↳ Stopping of grazing because of parasitism



Today, only 5% of goats graze in the main region of production!!!

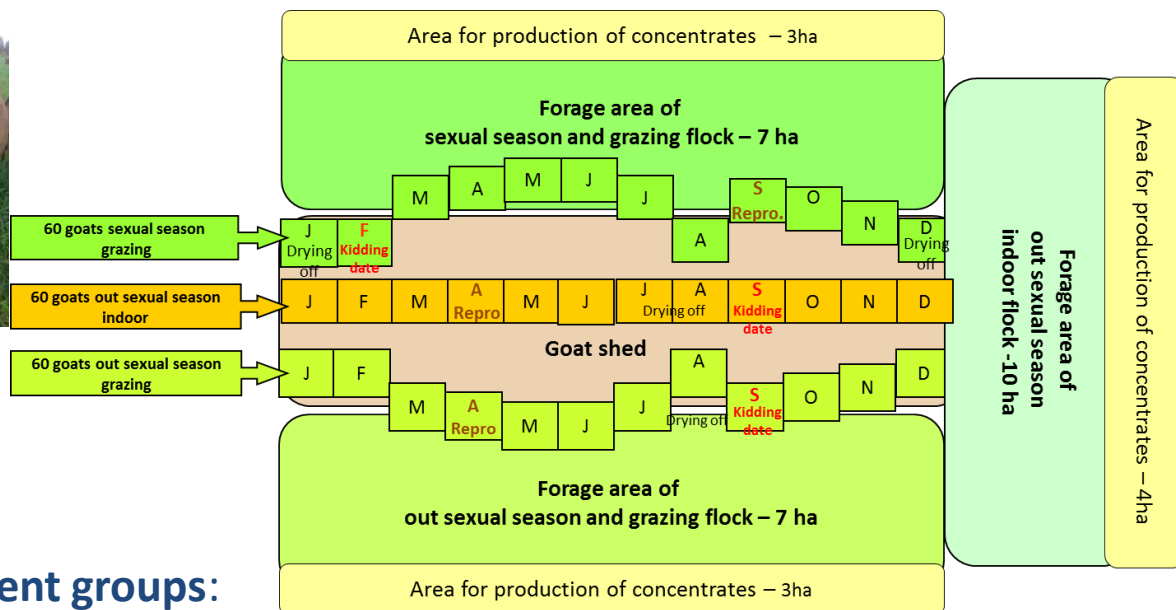
Main challenges of goat sector: develop sustainable dairy goat systems

- ✓ Develop grazing and/or herbage utilization in ration
- ✓ Optimize self-sufficiency of goat systems
- ✓ Integrate grasslands in cropping systems

To find a **compromise between economy and environment**

PATUCHEV : THE NEW EXPERIMENTAL GOAT PLATFORM OF INRA

A system-experiment to assess goat breeding systems using cultivated grasslands



- **30 hectares** of cultivated area
 - **180 French Alpine goats**
- divided into **3 balanced independent groups**:

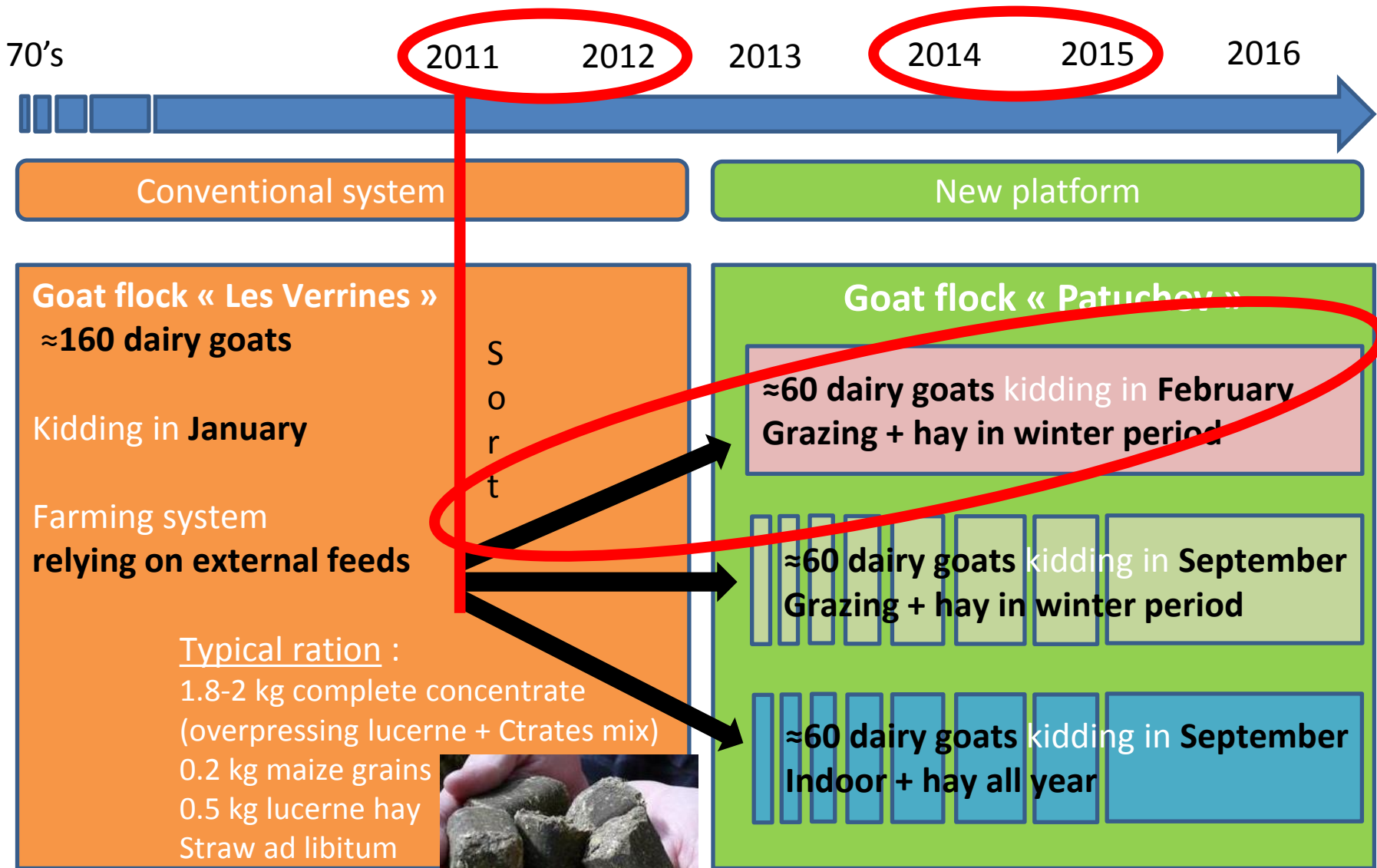
- ➔ **Forage use** : grazing + hay or exclusive hay
- ➔ **Reproduction**: in or out sexual season

- Solar-heated air dried hay



❖ **Systemic and multidisciplinary approach**

The system's transition & studied period



A multi-challenges grazing

- maximize herbage intake
- manage parasitism
- high yield and high qualities herbage

} **Dynamic rotational grazing**

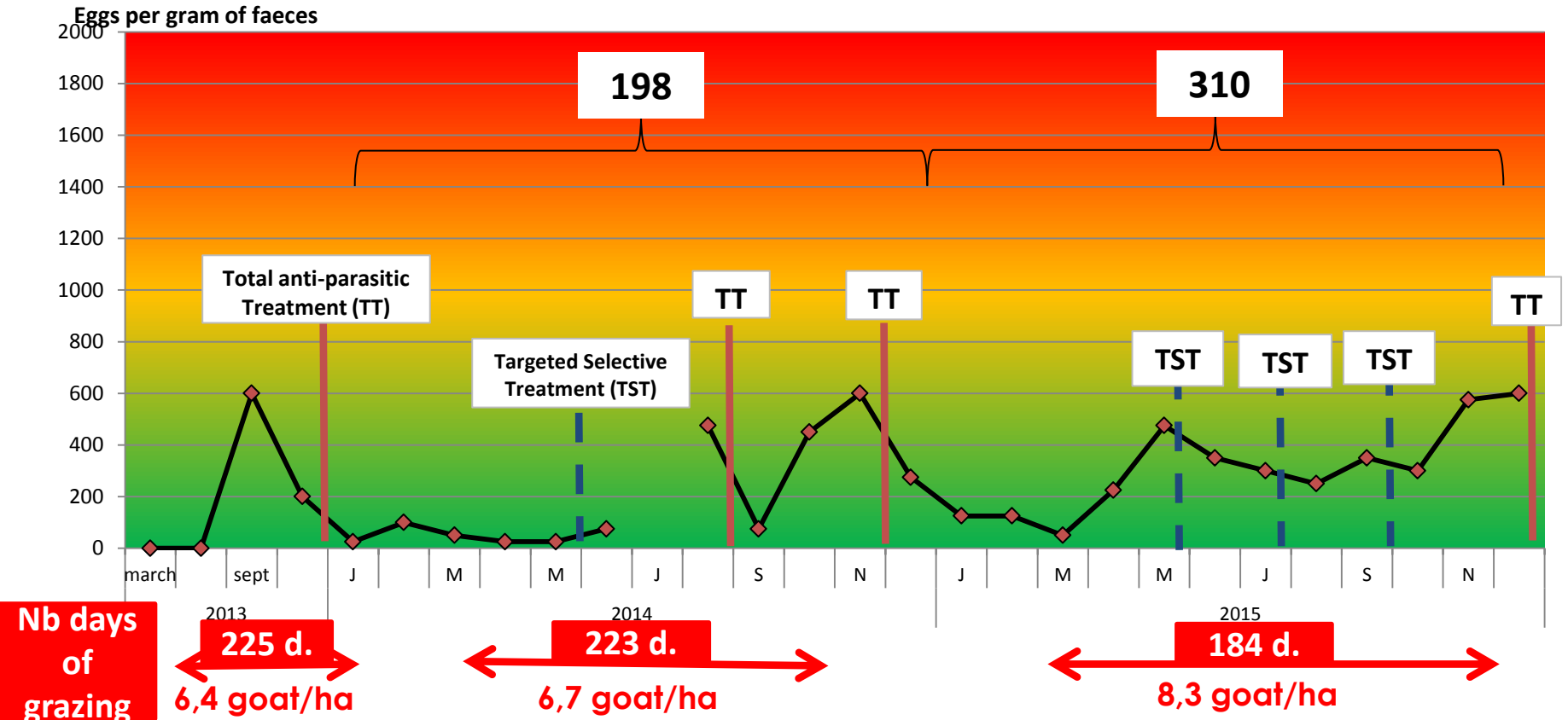


- **Offer:** 3 kg DM/goat/day ↔ 21 m²/goat/day
- **Paddocks** of 0.5 ha → daily alternate use during 7 days with another
(changes in paddocks stimulates goat intake)
- **Sward height objectives** → initial: 13-14 cm / final: more 7-8 cm
(« high » to limitate parasites intake)
- After grazing → make hay **alternate grazing /cutting** to provide a rest period of more 45 days between 2 grazings. *(break parasite's cycle)*
- When goats **graze more 9 h/day**, the ration is **only about 700 g** of self-produce grains complements
 - Herbage average yield (2014-2015): 10 Tons DM/ha
(only organic fertilizer)

Cutting: 6.5 T DM/ha + Grazing*: 3.5 T DM /ha

*(estimated by feed intake method from Inra 2007 tables)

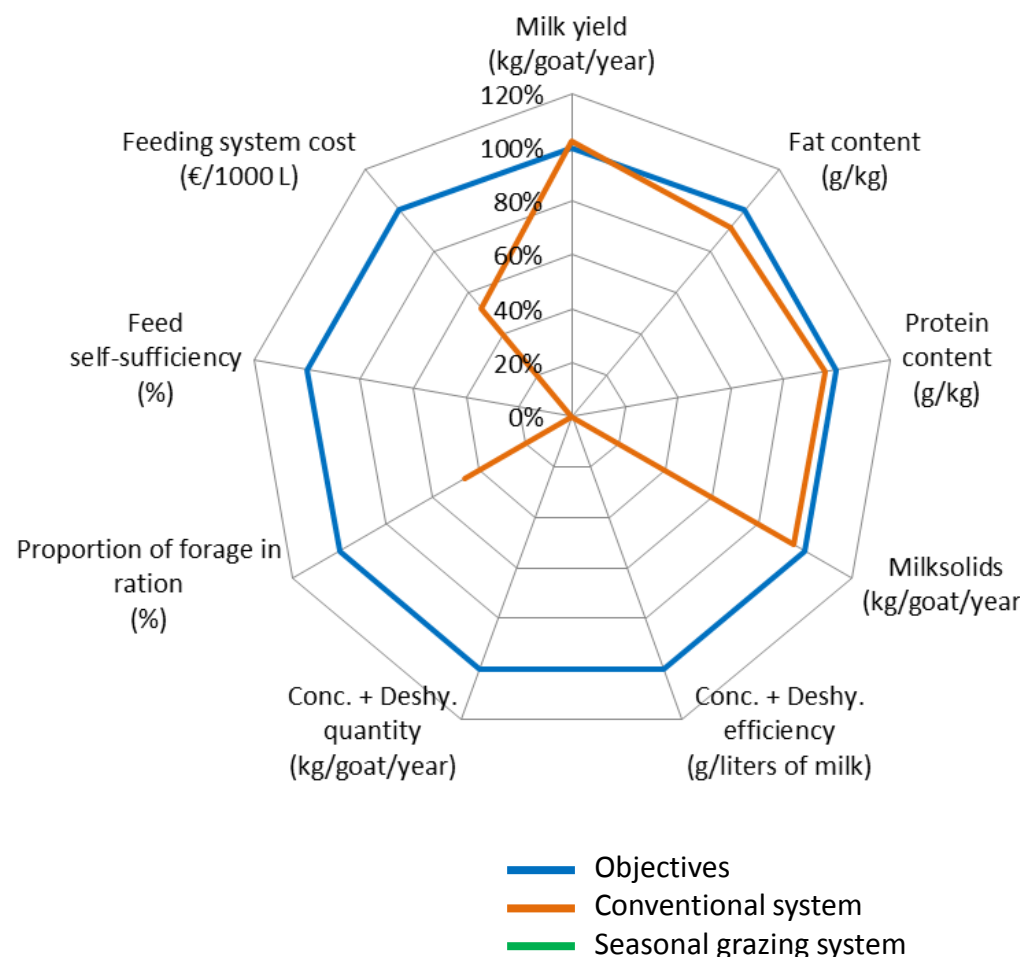
A rapid but controlled GIN infestation



- Main GINs : *Oesophagostomum* and *Teladorsagia/Trichostrongylus*
- TST + alternating AH molecules : only 2 to 15% of goats (*FEC individual level*)
 ➔ reduces costs, AH resistance and negative impacts on the environment

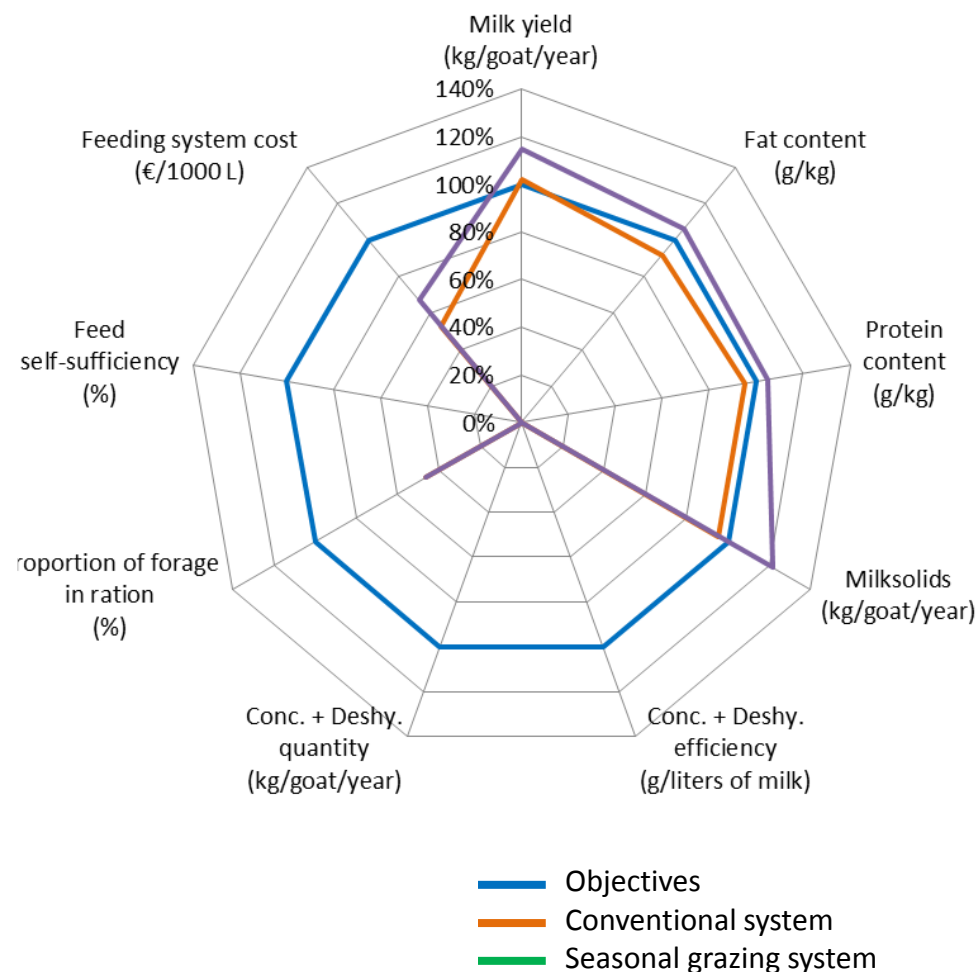
Lower milk performances but cheaper feed costs

Techno-economic criteria	Objectives for a more sustainable goat system	Conventional system
Milk yield ¹ (kg/goat/year)	850	868
Fat content ¹ (g/kg)	38	34.9
Protein Content ¹ (g/kg)	33	31.5
Milksolids ¹ (kg/goat/year)	60	57
Conc. + Deshy. efficiency ² (g/liters of milk)	360	918
Conc. + Deshy. quantity ² (kg/goat/year)	300	790
Proportion of forage in ration (%)	65	30
Feed self-sufficiency (%)	80	0
Feeding system cost ² (€/1000 L)	290	428



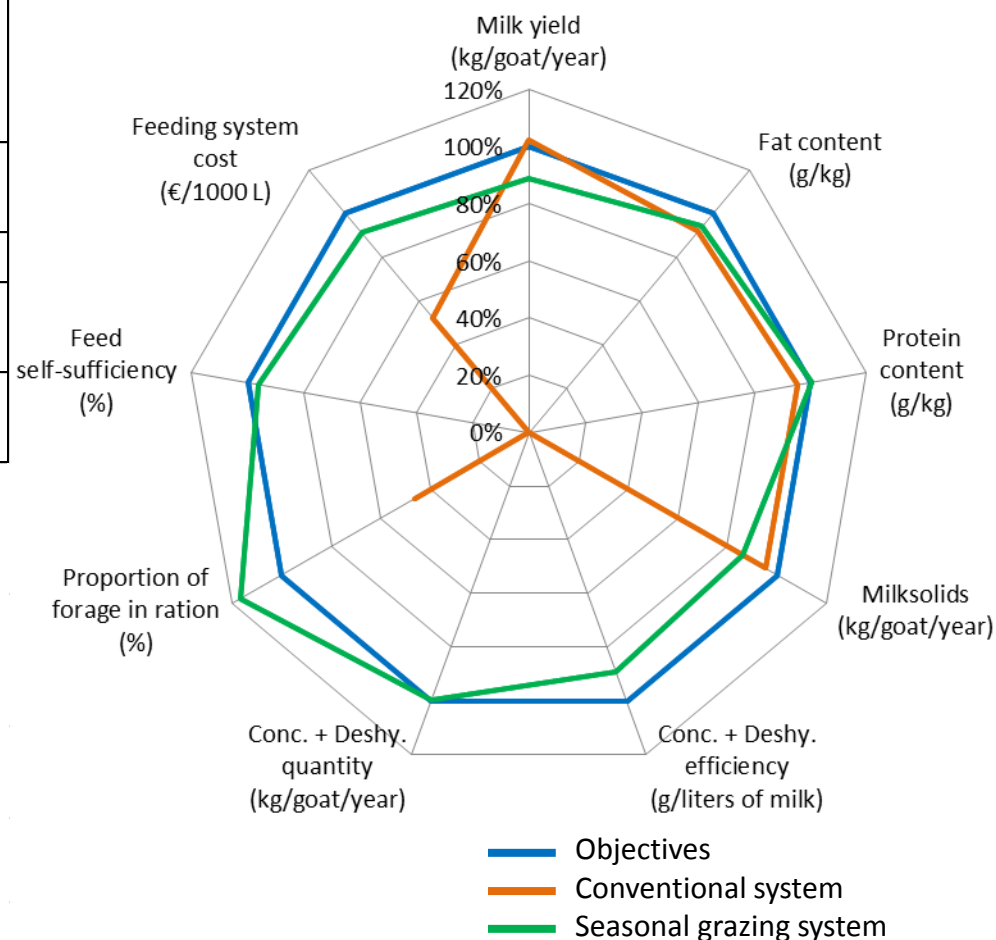
Lower milk performances but cheaper feed costs

Techno-economic criteria	Objectives for a more sustainable goat system	Conventional system (references of case study)
Milk yield ¹ (kg/goat/year)	850	868 (975)
Fat content ¹ (g/kg)	38	34.9 (40.4)
Protein Content ¹ (g/kg)	33	31.5 (34.7)
Milksolids ¹ (kg/goat/year)	60	57 (73)
Conc. + Deshy. efficiency ² (g/liters of milk)	360	918 (921)
Conc. + Deshy. quantity ² (kg/goat/year)	300	790 (875)
Proportion of forage in ration (%)	65	30
Feed self-sufficiency (%)	80	0
Feeding system cost ² (€/1000 L)	290	428 (386)



Lower milk performances but cheaper feed costs

Techno-economic criteria	Objectives for a more sustainable goat system	Conventional system (references of case study)	Seasonal grazing system "Patuchev"	Stat test ³
Milk yield ¹ (kg/goat/year)	850	868 (975)	755	***
Fat content ¹ (g/kg)	38	34.9 (40.4)	35.8	NS
Protein Content ¹ (g/kg)	33	31.5 (34.7)	33.2	***
Milksolids ¹ (kg/goat/year)	60	57 (73)	52	**
Conc. + Deshy. efficiency ² (g/liters of milk)	360	918 (921)	399	
Conc. + Deshy. quantity ² (kg/goat/year)	300	790 (875)	301	
Proportion of forage in ration (%)	65	30	76	
Feed self-sufficiency (%)	80	0	77	
Feeding system cost ² (€/1000 L)	290	428 (386)	315	



Despite a lower milk yield, feeding system cost is decreased and the objectives of self-sufficiency are reached

¹data from monthly individual milk recorder

² data from systemic approach

³Stat test: PROC GLM SAS - *** <0.001, ** <0.01, NS: No significant

Conclusion

- For goat systems, grazing is a real opportunity to improve their feeding self-sufficiency and their sustainability

- ➔ Milk production is lower but lower feed prod. costs

- ➔ No major problem on metabolic or health aspects

BUT...

- It is essential:
 - to choose swards and grazing management adapted to goats
 - to respect rules for integrated gastro-intestinal parasitism management

and evidently, to **have access to land areas...**

We need still to improve knowledge on

- impacts on environment, qualities of milk and cheeses, ...
- simulations according to economic situations
- herbage intake under grazing (grazing time and offered area)
- interactions between herbs and complements

THANK YOU FOR YOUR ATTENTION



<http://www.poitou-charentes.inra.fr/en/patuchev>

Aknowledgments to experimental staff for measures and fundings

