# Certification of milk meters for small ruminants: challenges and possibilities

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# Milk meters market for small ruminants

- **Only 5 milk meters certified for small ruminants** (2 of them are not sold anymore). No mechanical meter ICAR certified recently.



- **More than 30 are certified for dairy cows** (>100 if the different controllers are included)

# Market context

- The dairy small ruminants market is much smaller than the dairy cows market (FAO 2016)



Pie chart legend:
- Cow: 83%
- Buffalo: 14%
- Goat: 2%
- Sheep: 1%
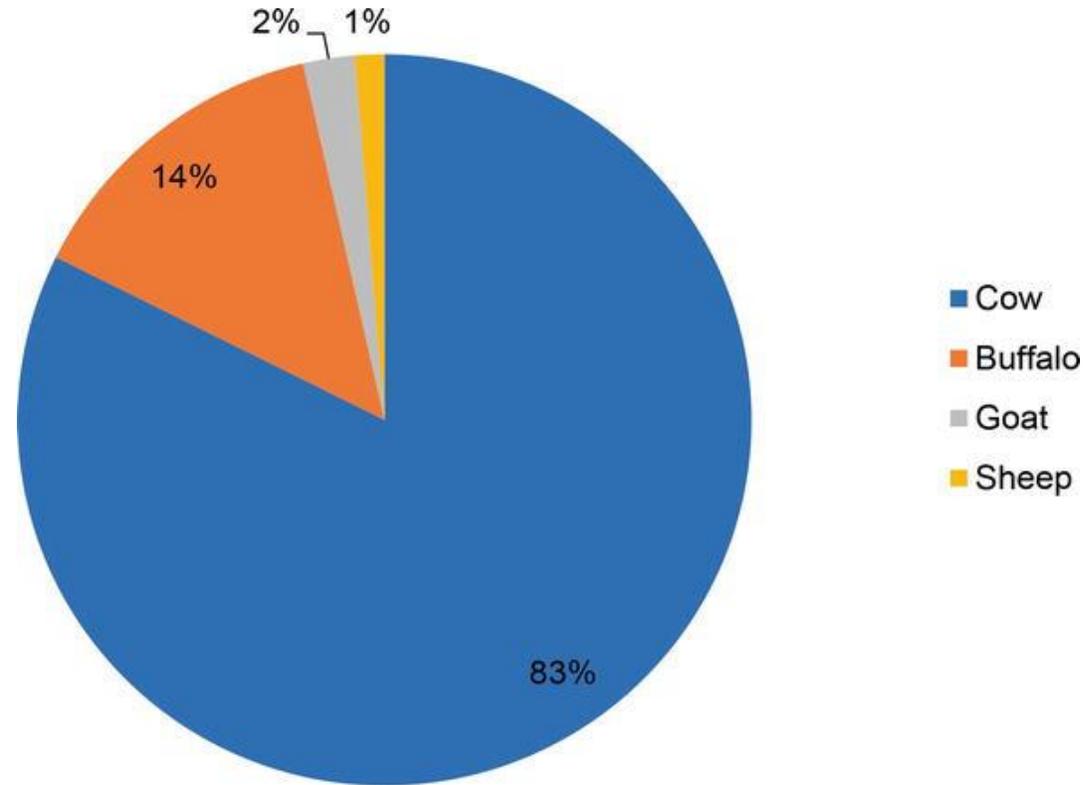
# Farm systems context

- More animals per farm in small ruminants (Exemple for France)
  - Sheep (2021) : 313 dairy sheep in average
  - Goats (2020) : 237 dairy goats (except cheese producers)
  - Cows (2021) : 60-80 dairy cows in average

- Productivity (in France) : Sheep – 280L (1L/treat), Goat – 960L (1.5L /treat) but the equipment need (milk meters) is similar and the cost is close than for cows.

- Higher frequency of high line parlour in
  sheep and goat than for cows

# Small ruminants characteristics

Small ruminants are **not small cows!**

Not the same **format** …

… but also

- **richest milk** composition for sheep (fat and caseines),

- **lowest milk flow levels** (0.8 to 1.3 L/min for ISO 5707:2007 at least),

- often opposite **milk delivering characteristics**

alveolar vs cisternal milk distribution: Cow 70/30 vs Goats 30/70… and Sheep in between

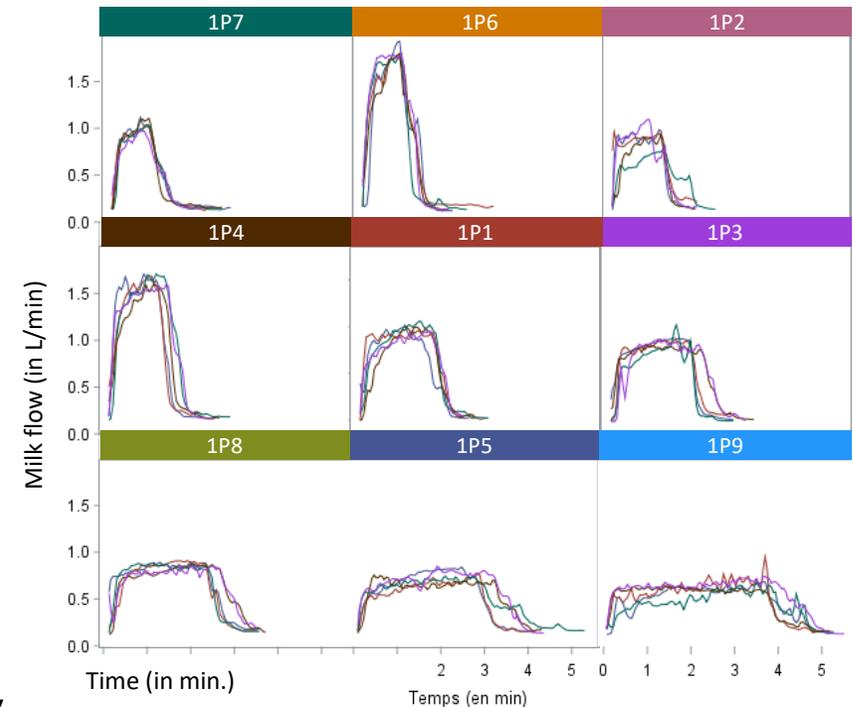- different **teat shapes**, with even large **compliance for goats**…

# Small ruminants characteristics

Huge **diversities**:

✓ mammary and teat **shapes** (at least and mainly in goats),

✓ milk **ejection curves**,

✓ **milking clusters** conception and matching,
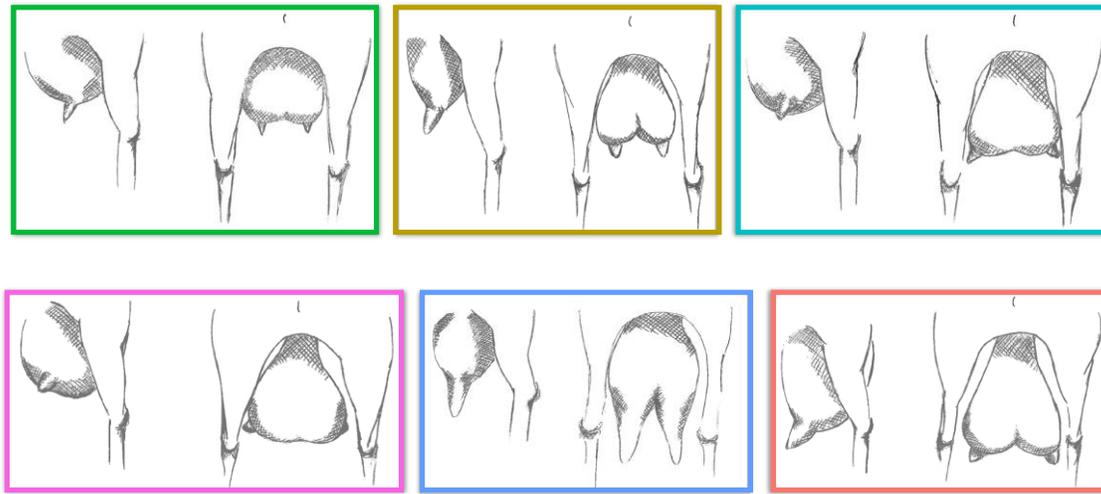


*Mamary and milk ejection curves diversity
(from MamOviCap project)*

# Milk recording context

- Treat frequency : cow 60 Hz, goat 90 Hz and sheep 120-180 Hz.

- The size of the herd and the particularity of the animals oblige the performance control bodies to use different means of identification (example : electromagnetic chip attached to a leg to trace the samples)
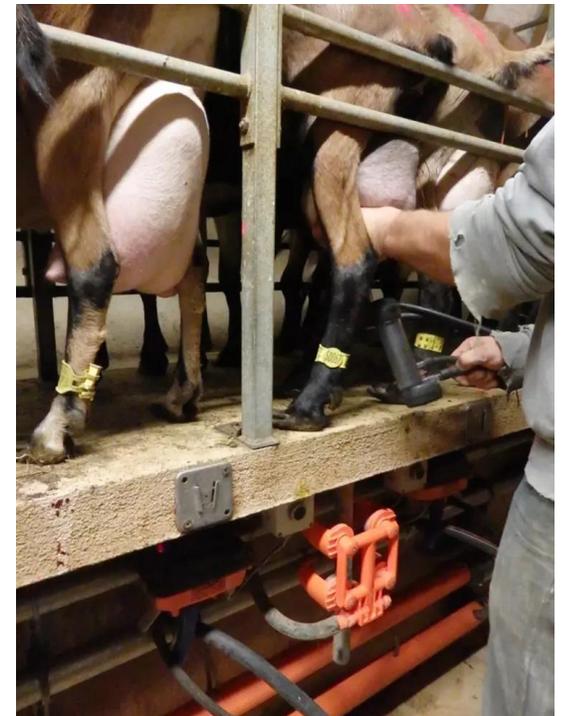
# Milk composition

| Proximate | Water % | Protein % | Fat % | Ash % | Lactose % |
|-----------|---------|-----------|-------|-------|-----------|
| Camel | 86-88 | 3.0-3.9 | 2.9-5.4 | 0.6-0.9 | 3.3 |
| Cow | 85-87 | 3.2-3.8 | 3.7-4.4 | 0.7-0.8 | 4.8-4.9 |
| Buffalo | 82-84 | 3.3-3.6 | 7.0-11.5 | 0.8-0.9 | 4.5-5.0 |
| Sheep | 79-82 | 5.6-6.7 | 6.9-8.6 | 0.9-0.1 | 4.3-4.8 |
| Goat | 87-88 | 2.9-3.7 | 4.0-4.5 | 0.8-0.9 | 3.6-4.2 |
| Human | 88-89 | 1.1-1.3 | 3.3-4.7 | 0.2-0.3 | 6.8-7.0 |

**Source:** (Al haj Omar *et al* 2010).

Proximity between goats and cows in terms au milk composition, but sheep milk very different

# Summary of the main issues

- Milking frequency and high line → difficulty to sample

- High number of milking stalls → cost for farmer

- Milk specificities → difficult to estimate weight and representative sample with similar technologies than for cows

- Mammary and teat **shapes** → Includes air inlets and therefore additional difficulty in measurement and sampling.

# Impact on milk meters certification

- Results examples for the same milk meter (high SD for fat content in sheep) → remettre sur la même échelle
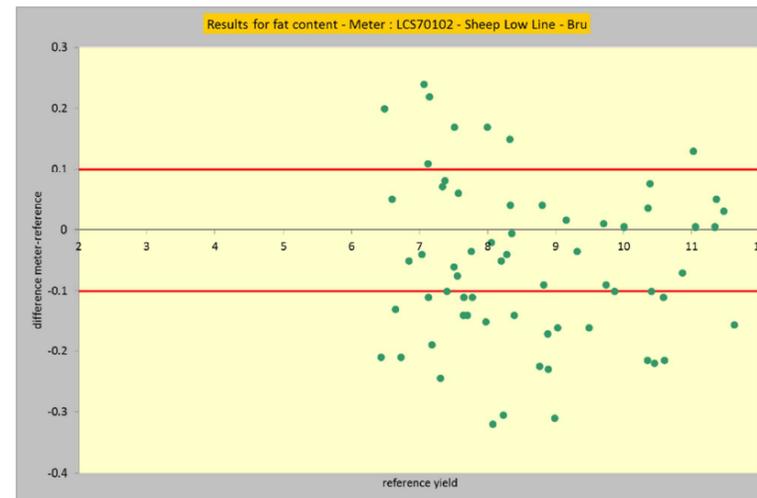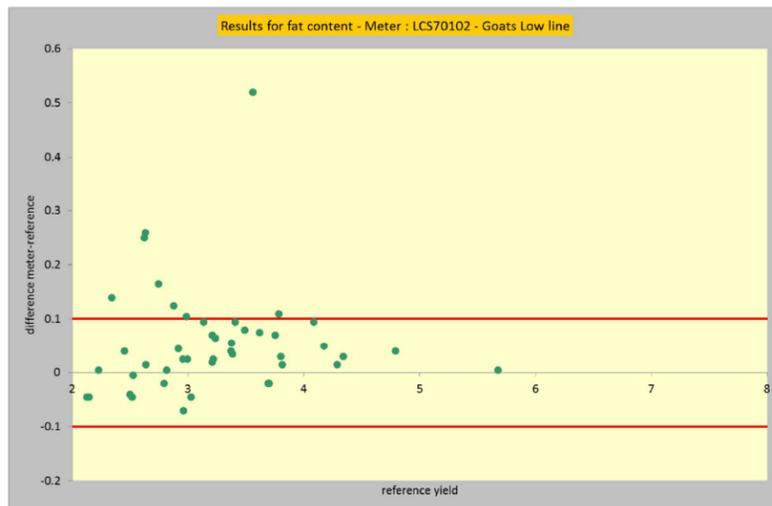


→SD limits have been extended for sheep.

# Which needs ?

- **For milk recording organisations**

sustainability of the genetic performance  facilitated system monitoring
amortizable cost

- **For dairy farmers**

information on their production management    amortizable cost
sustainability of the genetic performance

- **For manufacturers**

market  return on investment  sustainability of a business model

# Which solutions ?

- From ICAR perspective : we mooved the limits
- AutoSample or easy sampling
- Gather whole milk production
- Low cost (even mechanical milk meters)
- Be carefull with large mechanical sampleur : Not without consequences on milk circulation, load losses and cleaning
- Equipping 30 or 50% of the farm only with milk meters
- Co-construction and co-management of solutions between ICAR, farmers and equipment manufacturers