

CONTEXT

A significant **rise in herd-level somatic cell counts** in recent decades in French dairy goat herds has led to a great deal for research.

The main etiology of mastitis has been identified as ***Staphylococcus spp.***, which suggests an **important role of all aspects of milking management** :

- hygiene, passive or active contamination,
- cluster and liner fit to udder and teat morphologies,
- aggression associated with machine setting, over-milking,
- rough-handling of the udder.

OPERATIONAL OBJECTIVES

The CapriMam3D project investigates different ways to **improve milking conditions in order to minimize the risk of intramammary infections development**.

It deals with the animal-machine diptych as a central element of milking and is based on three-dimensional technologies (3D imaging and printing).



Fig. 1 : 3D image of goat udder

To develop a mobile device for three-dimensional phenotyping of goat udders

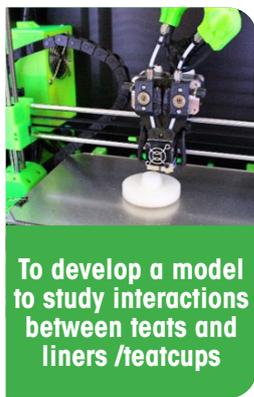


Fig. 2 : 3D printer for artificial teats

To develop a model to study interactions between teats and liners /teatcups

at idele "Milking and Milkometers" laboratory (ICAR approved)

Timetable :
January 2020
to December
2022

First step :
Development of flexible artificial teats, representative of goat mammary conformations

Second step :
Adaptation of the methods applied for cow teatcup characterization to the specific characteristics of goats (shape, milk emission characteristics, teat reactions)

EXPECTED RESULTS AND USE

Prototyping of Mobile device for 3D phenotyping of goat udders

- ➔ **Replace visual scoring** : measurement and observation by approved technicians
- ➔ **Objective automated phenotypes of udder and teat conformations**
- ➔ **Propose new traits of interest and adapted measurements (dimensions and volumes)**
- ➔ **Assess the udder and teat shape changes** :
 - . during milking, suspected to cause incidents (especially air intakes) that contribute to the transmission of infections
 - . during the carrier of goats for an improved productive lifespan

Modeling interactions between teats and liners/teatcups

- ➔ **First: to compare current liners/teatcups efficiency on milking parameters and goat teat tissue reactions and udder inflammation**
- ➔ **Second : to help future fitting of milking equipment to animal characteristics**

The tools and methods developed are intended to be **deployed for a large-scale implementation at the end of the project.**

PARTNERSHIP

Technical Institute : Institut de l'élevage (Idele)

Research / education : INRAE UMR GenePhySE, INSTITUT AGRO et le Pradel experimental farm

Breed society : Capgènes

Specialized company (new technologies) : 3D Ouest



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