Feasibility of RFID identification for tracing bull semen

Louise MARGUIN

Institut de l'Élevage

The context: the process from production to insemination

- ✓ **Production :**

  from bull to straws,

- ✓ **Distribution**

  to prepare the orders : AI technician receive cups with the number of frozen straws of each bull he ordered.

- ✓ **Insemination**

  the id number of the bull and of the cow have to recorded and to be transmited to data bases.

Production

At semen production level in the centre

- ✓ **Identification system and data of the ejaculate of one bull (= one cup with 800 straws)**
  - → National identification number of the bull
  - → Reference number of the ejaculate : example 08 120 (year and day)

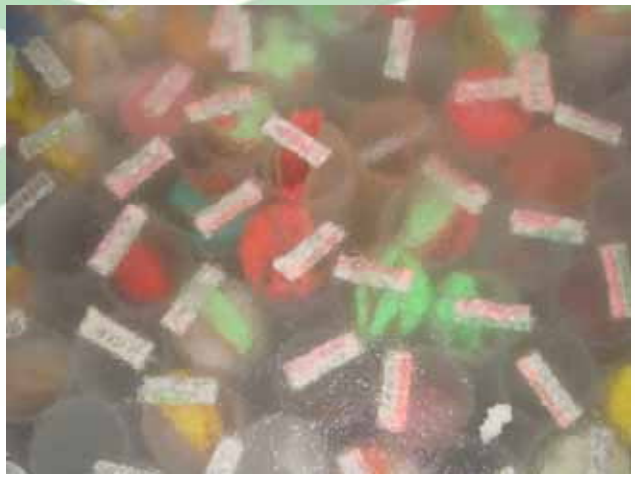
  If there is more than one ejaculate on a day : 1, 2… after the day (from 100 to 1 000 straws in one ejaculate)
  - → Production centre code
  - → Date of production
  - → Cup number (in case of more than one cup of straws)
  - → Bull name
  - → Breed
  - → Agreement code of the bull
  - → Number of straws in the ejaculate
  - → Place code in a tank (1 million of straws)

Current system with paper cards corresponding to the circle of cups in the tank

Example : tank 1, fourth circle, order number 7 is the bull ARDENT

Each cup in a tank has a label on a stick, with the bull (name, national number, agreement code)

one colour for one breed (Charolais, Holstein…)



Possible use of RFID for production

- ✓ **Use RFID for each cup (= one ejaculate)**
  - ➔ Some RFID chips (high or low frequency) can be read in the liquid nitrogen (- 160 °C)
  - ➔ To be read the chip has to be fixed on each cup (like today with a stick) and not deep in the nitrogen

Recorded data by the chip

- ✓ **Chips, will be written with the identification number of each bull and the reference of the ejaculate, at the straws filling.**

Distribution

At semen distribution level, in the centre

To prepare in the centre an order for the AI technician :

- ✓ **A person has to find the straws of each bull ordered (which tank number and which position).**
- ✓ **After, this person has to put the ordered straw in a cup with the name of the technician on a stick (the place in the cup for the AI technician has to follow a defined plan)**

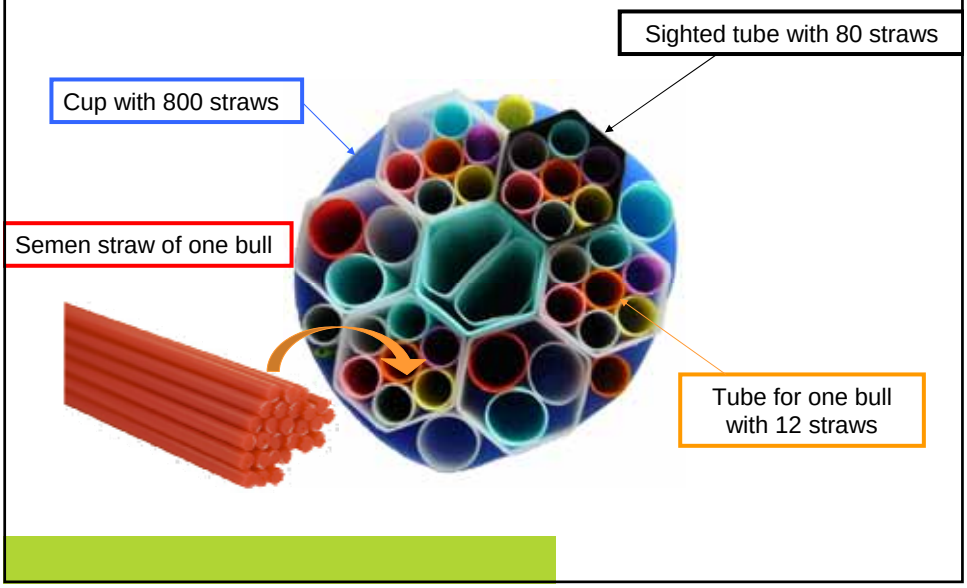
Preparation of 2 cups ordered by an AI technician

Stick with the name of the AI technician

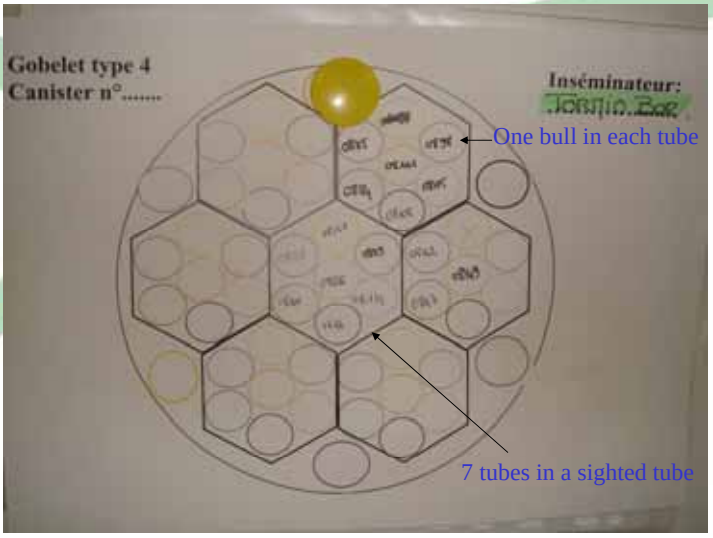
Plan of the bulls ordered

Sighted tubes with straws of different bulls

A cup for an AI technician



The plan of a cup for the AI technician



Possible use of RFID

- ✓ **Tube with a top with the RFID of the bull ?**
  - ➔ **How to transfer the bull RFID from the stock tank to the few straws of each bull ordered ?**

Insemination

At cow insemination level

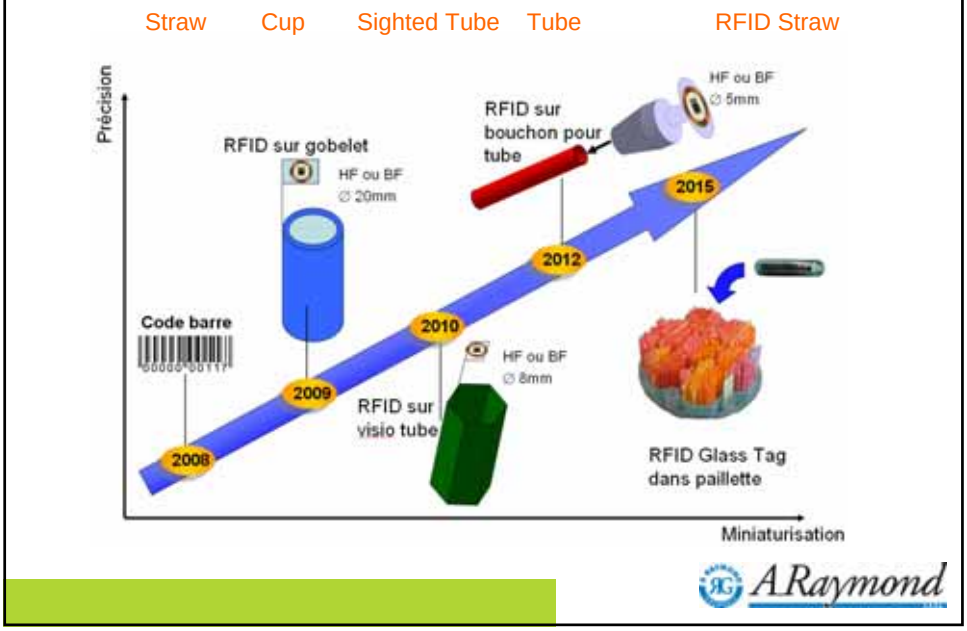
When the AI technician is on the field with the cow to inseminate and his small tank with the straws :

- ✓ **He has to find in his tank the right bull chosen for this cow, with the defined plan.**
- ✓ **He has to record the identification number of the bull (and the cow) :**
  - ➔ **he could use an RFID bull number in the straw (as today he can read the barcode on the straw).**

Possible use of RFID

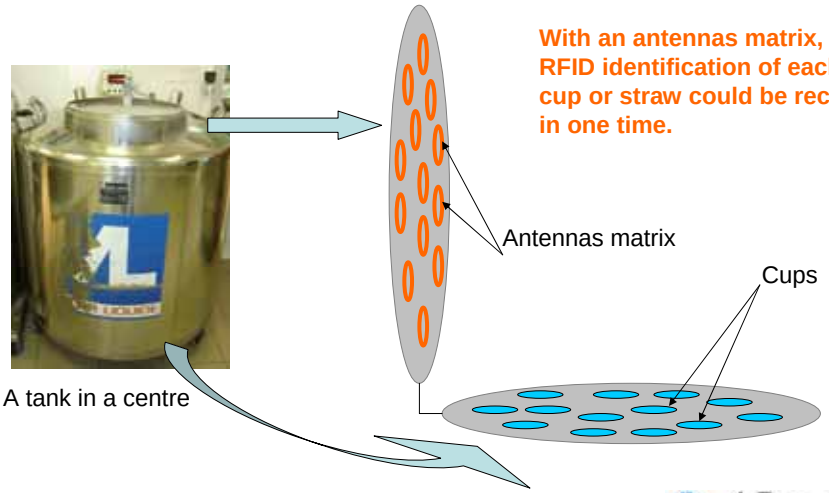
- ✓ **The first step would be at production level, for CUP identification of CUP.**
- ✓ **In the next years at the distribution level, with updated technologies it could be:**
  - ➔ **RFID for the tube with the straws of only one bull (or fixed on the tube, so not to have to close the tube),**
  - ➔ **RFID for the straw, on the side where the semen is not going out (how to put in the straw…)**

Possible use of RFID in the future



ARaymond

A matrix of RFID identifications in a tank with one reading



A Raymond

Conclusions

- ✓ **In France, the traceability of semen is sound and operational:**
  - ➔ **Identification of the straw by bar code (bull id + day of production).**
  - ➔ **Records which allow to identify where are the semen from one ejaculate from production to insemination.**
- ✓ **In this context RFID could replace visual identification of cup, sighted tube, tube and straw in order to make the existing traceability more efficient.**