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# Rabbits: breeding and animal welfare Current situation and research in progress

Valerie Fillon

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INRAE

➤ Rabbits: breeding and animal welfare  
*Current situation and research in progress*

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**01 – What is animal Welfare ?**

**02 – What is a Rabbit ?**

**03 – How are raised rabbits ?**

**04 – What about animal welfare in rabbit farming ?**

**05 – Rabbit welfare improvement**

**\_01**

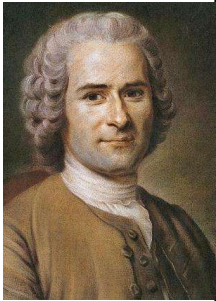
**What is animal Welfare ?**

# ➤ Philosophy and ethics

## Rousseau (1755)

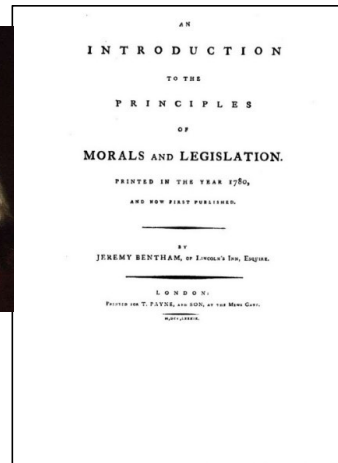
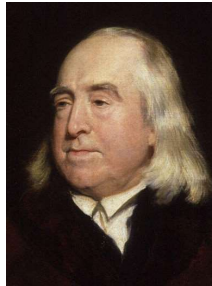
Sentient nature of animals

Moral concern



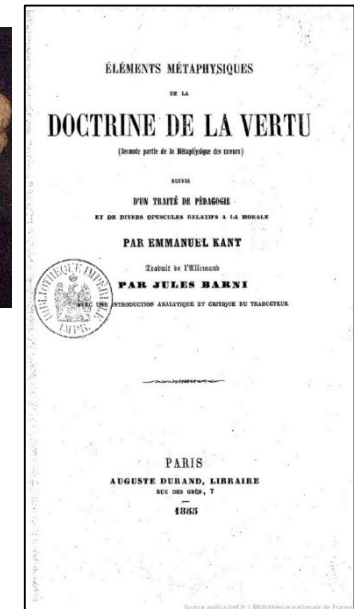
## Bentham (1789)

The question is not: Can they reason? or can they speak? but can they suffer?



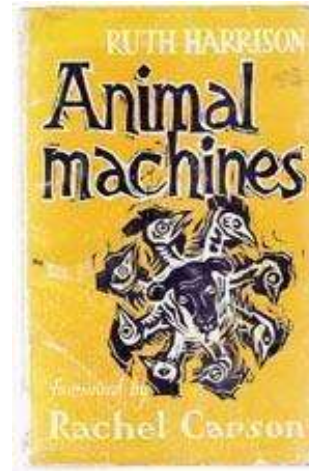
## Kant (1795)

Human duties towards animals



## Ruth Harrison (1964)

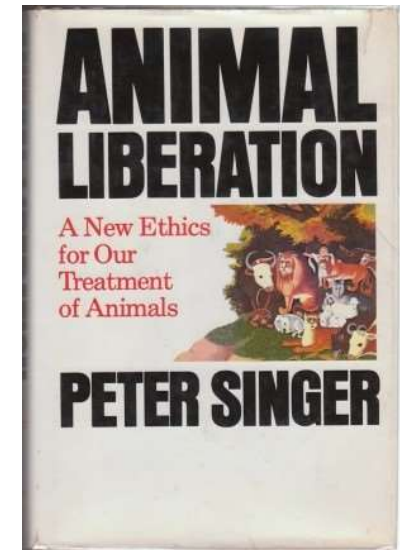
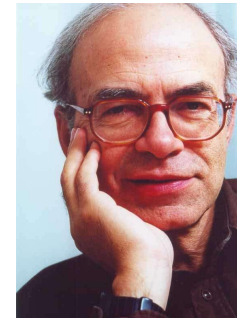
Revealing the suffering inflicted on animals exploited for food production in intensive farming.



## Peter Singer (1975)

Animal rights

Antispecicism



Rq: Welfarism vs Abolitionism

# ➤ Intensive farming

- Brambell Committee

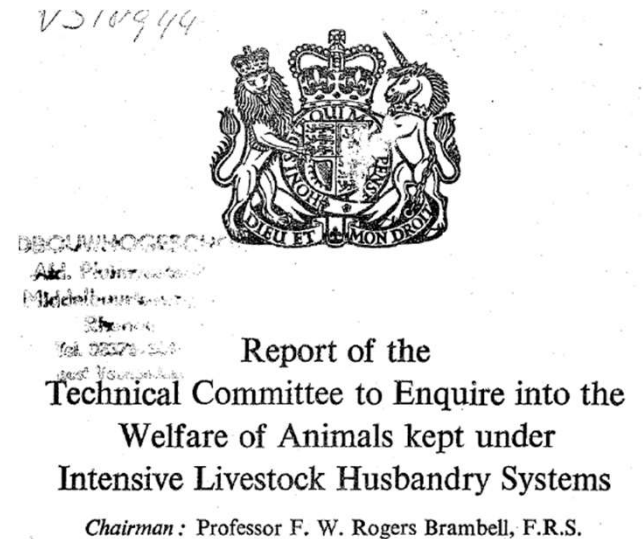
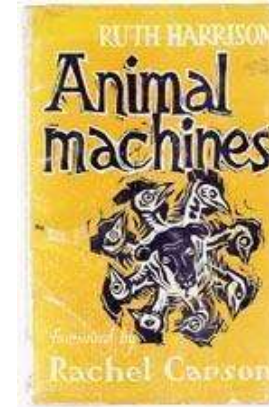


Government committee to investigate animal welfare in order to define minimum standards for acceptable welfare taking into account the basic needs of animals.

- Brambell report (1965)

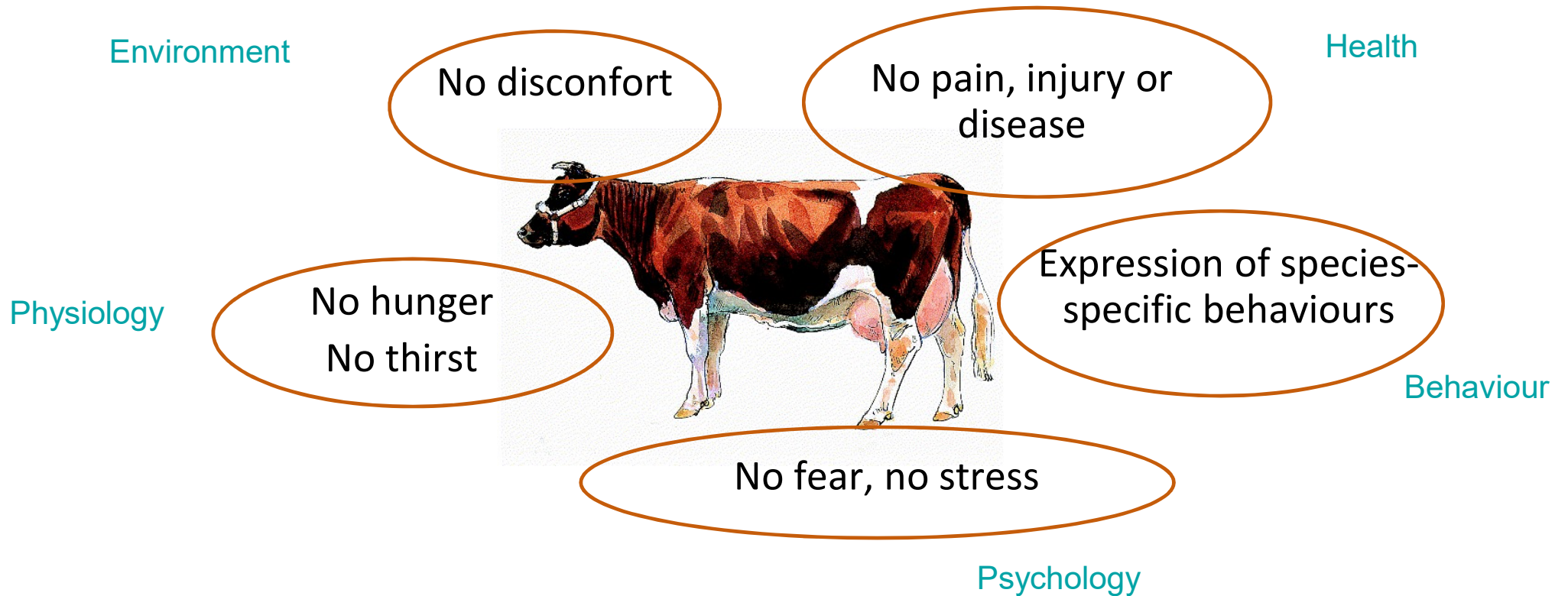
Concepts of animal welfare => Farm animal welfare council

*“Any attempt to assess welfare must take into account **scientific knowledge** about the **feelings of animals** that can be deduced from their structure and functioning as well as **their behaviour**”*



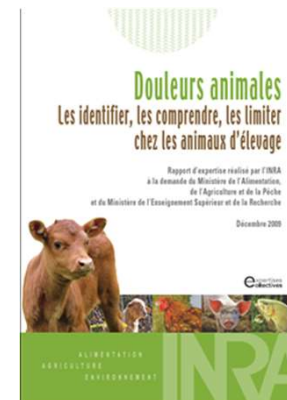
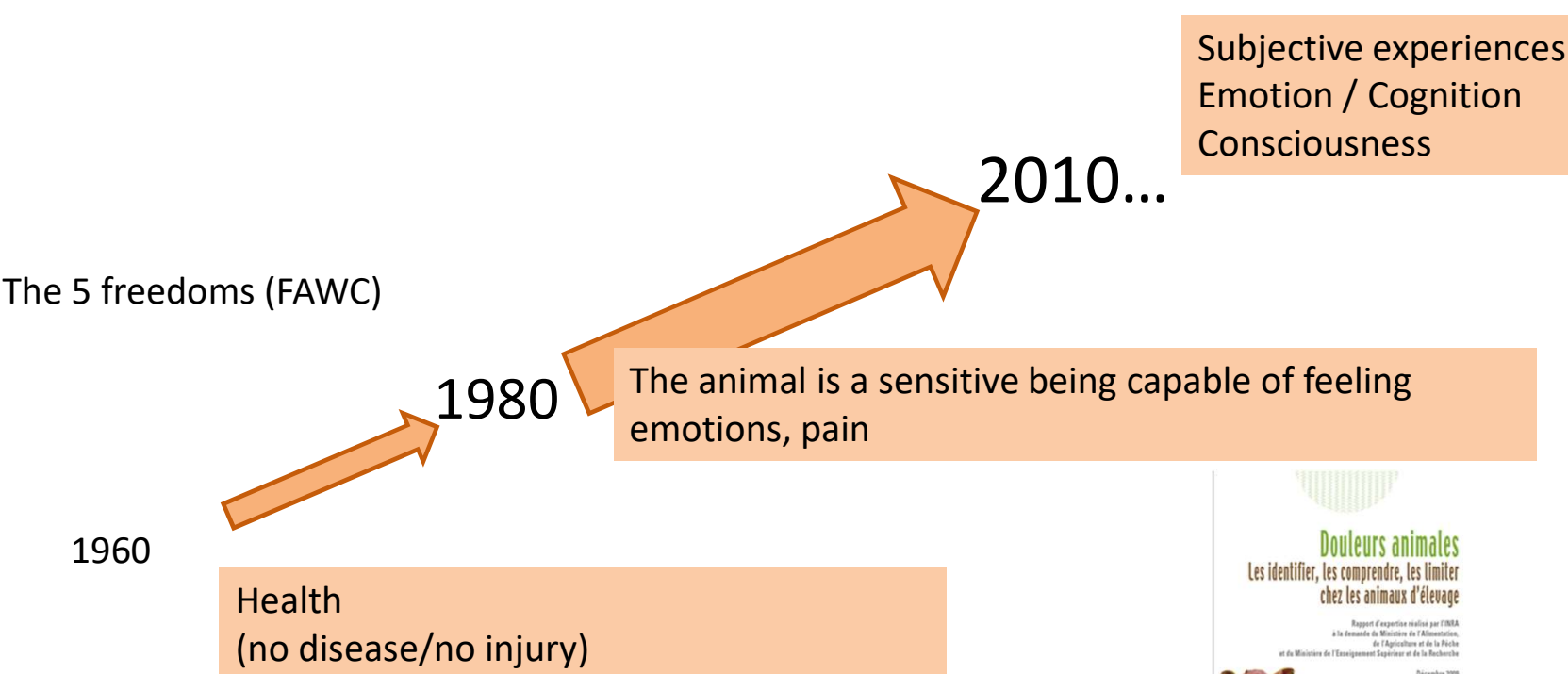
# ➤ Five Freedoms

Farm Animal Welfare Council (UK 1979, 2009)





# ➤ Evolution of animal welfare concept



Rq : A lot of regulations

## ➤ Definition of animal welfare

### Sentience and consciousness

Good health, good housing and a certain level of production is necessary, but not sufficient; the animal's **emotional state** must be taken into account => **well-being vs welfare**

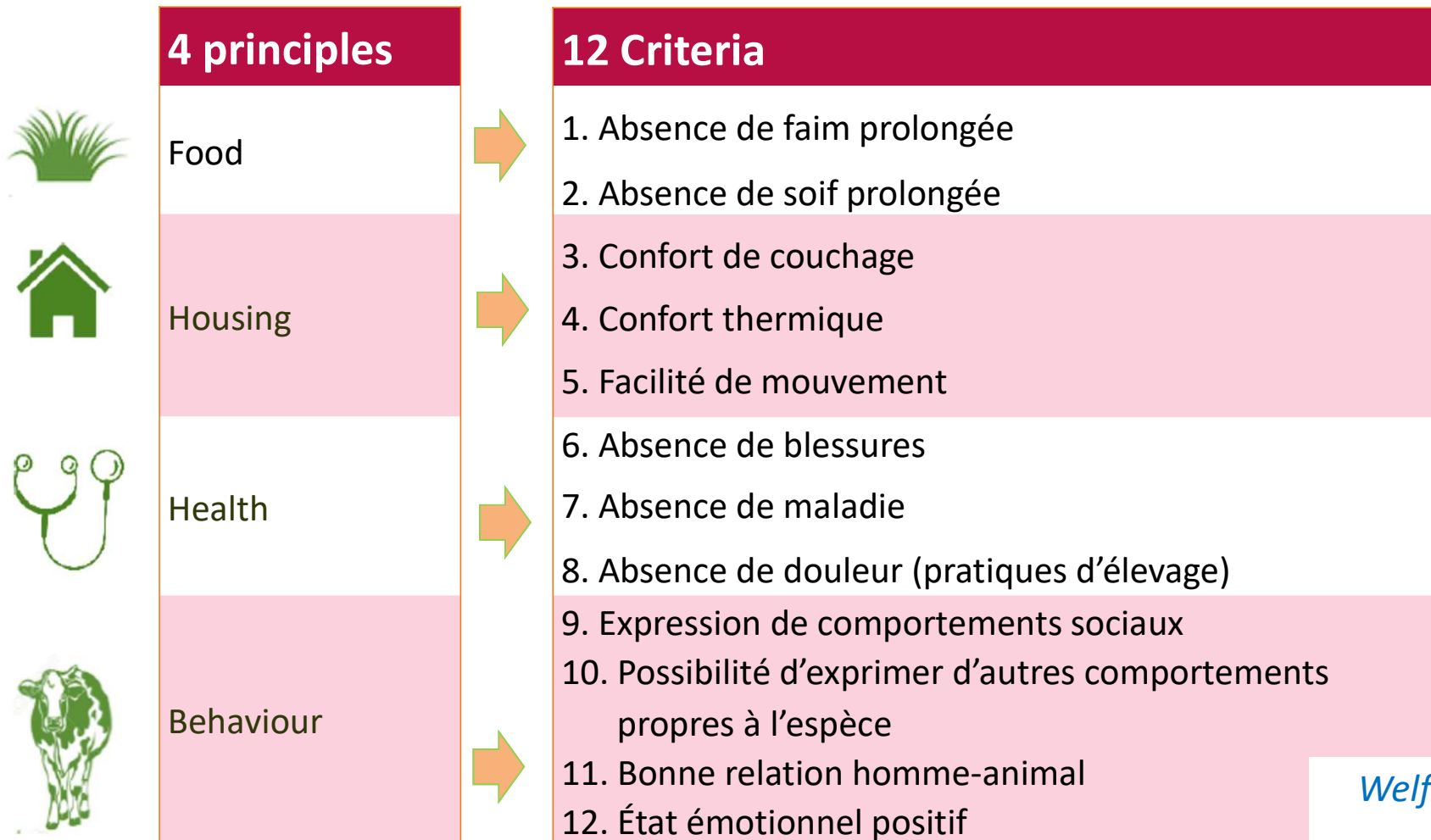


*“The welfare of an animal is its positive mental and physical state as related to the fulfilment of its physiological and behavioural needs in addition to its expectations. This state can vary depending on the animal's perception of the situation.”*

A need is a requirement for survival and quality of life related to the maintenance of homeostasis and behavioural motivations.

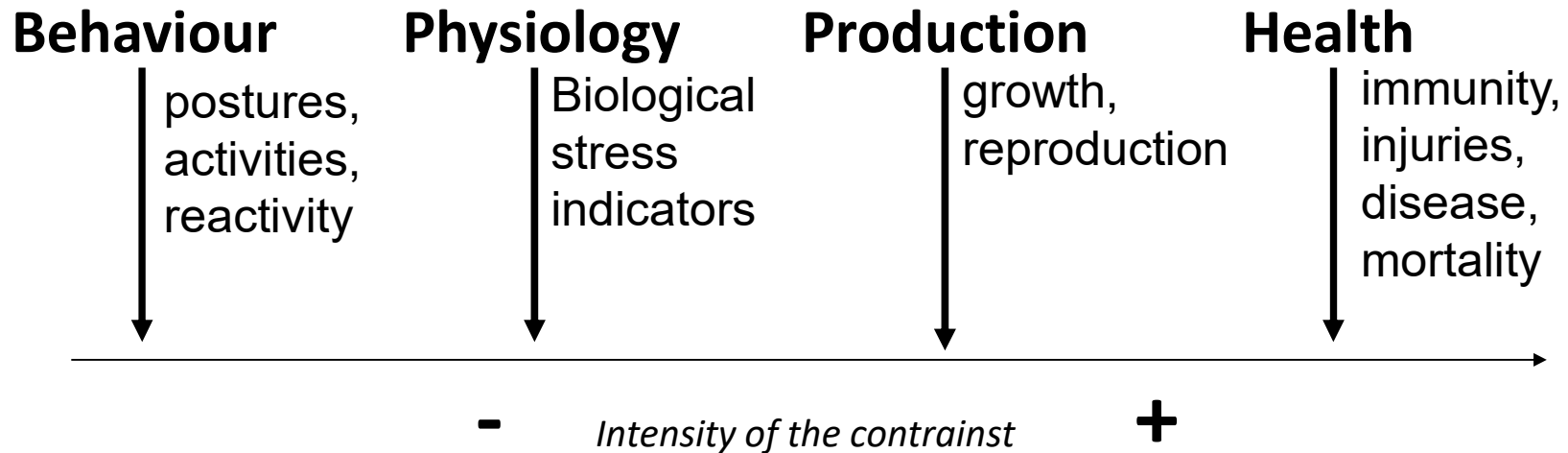
An expectation is a mental process generated by the anticipation of an event to which the animal will refer to assess the valence of that event, from pleasant to unpleasant.

# ➤ Evaluation of animal welfare => objectivation



*Welfare Quality, 2004-09  
40 institutions, 13  
countries*

## ➤ Diversity of animal based indicators



- **Behavioural indicators are the most sensitive and the earliest**
- **An objective assessment focused on the animal's experience is needed to improve animal welfare**

## ➤ Welfare Quality© et AWIN for farm species



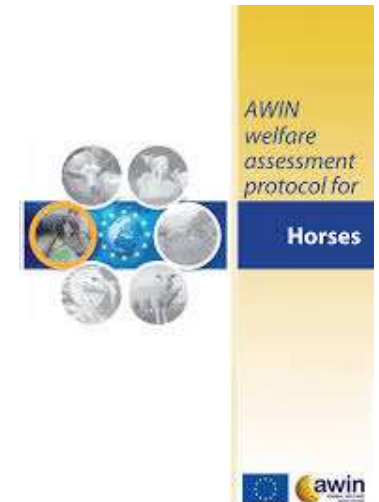
Welfare Quality **NEN**



Welfare Quality **NEN**



Welfare Quality **NEN**



## Principles of welfare improvement

- **Knowledge on fundamental needs of the species : biology, physiology, social behaviour, cognitive abilities...**
- **Knowledge on the natural environment and social organisation**
- **Take into account the individual differences**
- **Give the animals the possibility to make choices and control their environment**

## ➤ **Taking home messages...**

- ✓ **Scientific evidences of animal sentience and consciousness**
- ✓ **The sentient nature of animals is the basis of our moral concern for them**
- ✓ **Animal welfare is a social construct**
  - => definition**
  - => ethical and philosophical considerations**
  - => regulations to protect animals**
- ✓ **Animal point of view => indicator => Objectivation and Assessment => Improvement**

## > To go further

Numéro spécial 2007. **Bien-être animal**. *INRA Productions Animales* 20 (1), 1-100

Juin H, Nozières MO, Peyraud JL, 2014. **Révision de la directive européenne sur l'expérimentation animale : qu'en est-il pour la recherche agronomique ?** *INRA Productions Animales*, INRA Editions, 27 (1), 65-68

**Expertise scientifique collective Douleurs animales : les identifier, les comprendre, les limiter chez les animaux d'élevage**, 2009. <http://inra.dam.front.pad.wedia-group.com/ressources/afile/234209-2d3c1-resource-expertise-douleurs-animales-rapport-complet.html>

**Expertise scientifique collective Conscience animale**, 2017. <http://institut.inra.fr/Missions/Eclairer-les-decisions/Expertises/Toutes-les-actualites/Conscience-animale>

**Rapports ANSES**, 2018. Bien-être animal : contexte, définition et évaluation  
<https://www.anses.fr/fr/system/files/SABA2016SA0288.pdf>  
[institut.inra.fr/Missions/Eclairer-les-decisions/Expertises/Toutes-les-actualites/Conscience-animale](http://institut.inra.fr/Missions/Eclairer-les-decisions/Expertises/Toutes-les-actualites/Conscience-animale)

Mormède et al., 2018. **Bien-être animal : contexte, définition, évaluation**. *Productions animales*, 31 : 145-162

Mounier et al., 2021. **Le bien-être des animaux d'élevage - Comprendre le bien-être animal** *QUAE Editions*

<https://www.cnr-bea.fr/>



**\_02**

**What is a rabbit ?**



*Oryctolagus  
cuniculus !*

➤ What is the natural living environment of *Oryctolagus cuniculus* ?



« Scrubland » or « Brousse »



« Grassland » or « Prairie »



« Écotone » or « Lisière »

(Lombardi *et al.*, 2007)



**A social species living in small family groups**

**Strong hierarchy around the dominant couple (violent fights)**

**Huge territory : 1 to 3 ha – land marking (drops and chin)**

**Complex organisation of the territory**

- Private area
- Social area
- Feeding area



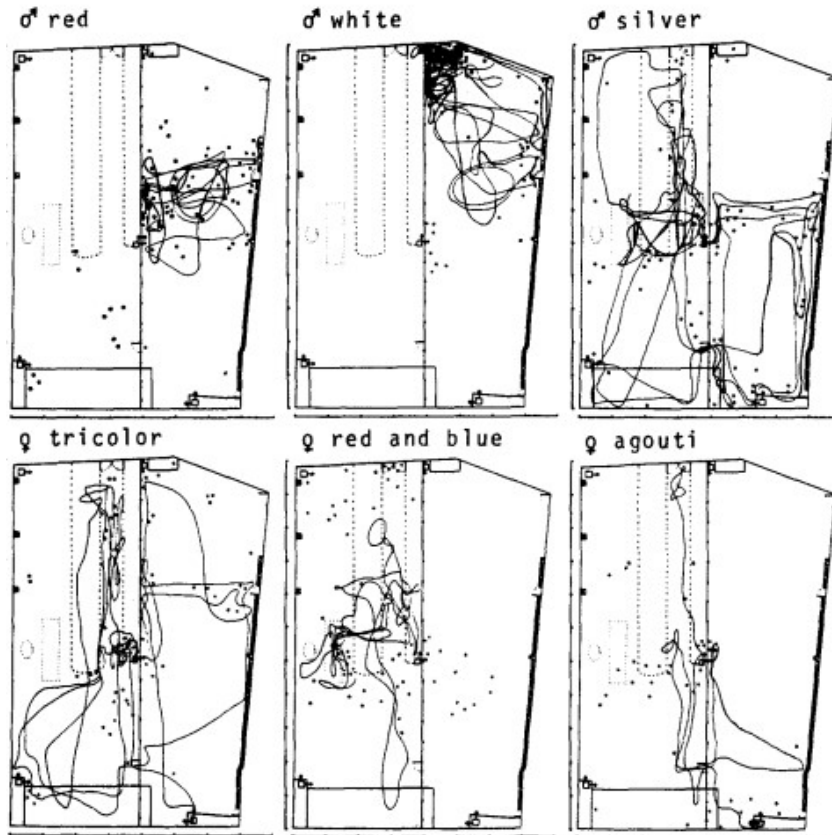
**Capacity to structure the warren and modify their environment**

**Nycthemeral rhythm**

**Prey species**

**Strict herbivores**

## Space exploration



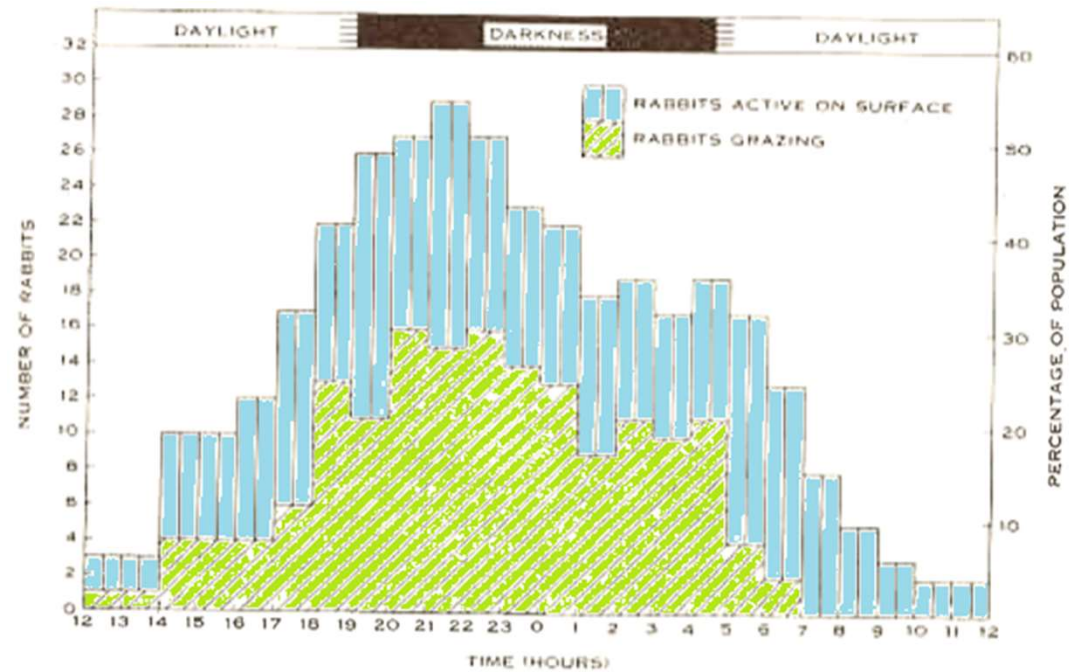
### Daily distance travelled (m)

Rabbit No.	Distance
<b>Female</b>	
1	1000.66
2	1445.06
3	1547.46
4	876.33
5	1183.30
6	1728.13
Moyenne = 1297 m	
<b>Male</b>	
7	2499.50
8	3361.00
9	1150.30
Moyenne = 2337 m	

(Vastrade, 1986)

# Nycthemeral rhythm

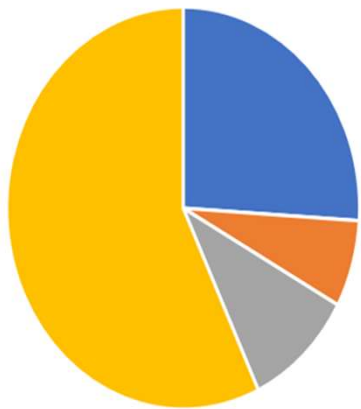
Active at dawn and dusk  
Underground during the day  
Grazing is an important behaviour when outside



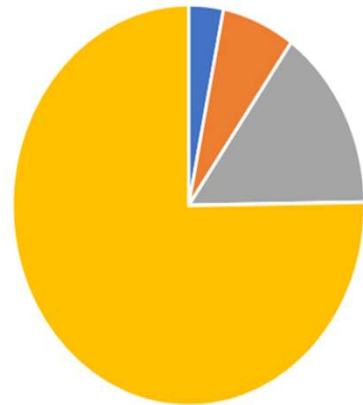
Activity outside the burrow

(Mykytowycz *et al.*, 1958)

## ➤ Ethogram and time budget

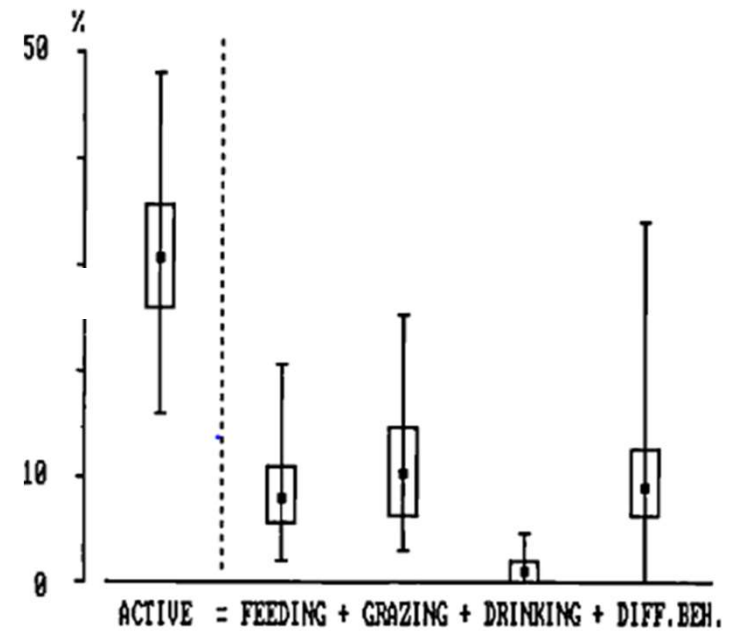


Wild rabbit



Cage rabbit

- Eat and drink
- Move
- grooming
- Rest



Proportion des différents types d'activité en % du jour du jeune lapin

(Lehmann, 1987)

Resting > grazing > grooming > moving

Grazing



Resting



Hopping



Rearing



Hiding



Gnawing



Digging



Grooming





## ➤ Social behaviour

### Between youngs



### Between adults

Violent fights between males

Does have a strong territory behaviour  
Protect their nest from other does  
The dominant has the best place

Does are carefull but distant mothers



Allogrooming



## ➤ Physiological characteristics

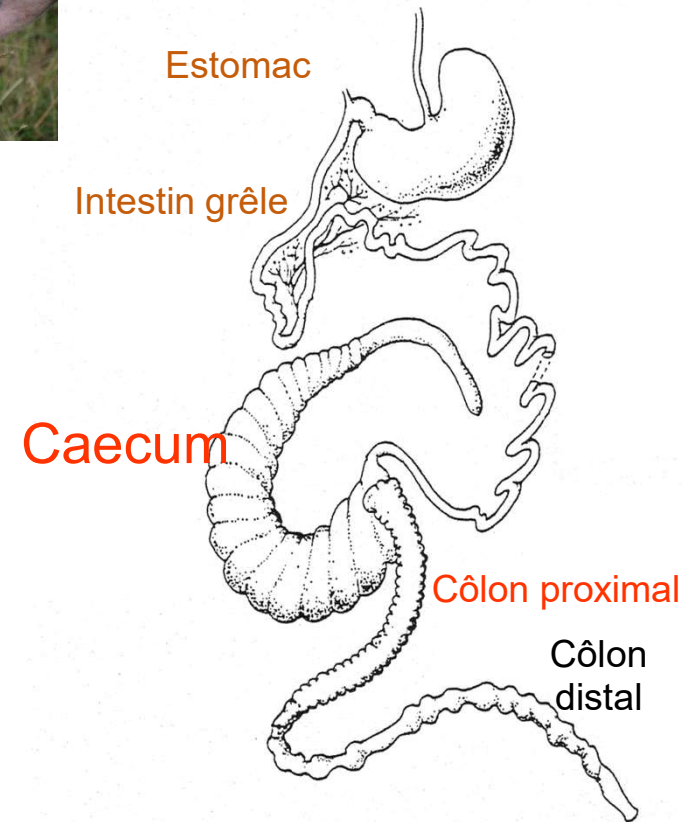
Monogastric + herbivorous species

Caecotrophy : enzymatic and bacterial digestion

Continuously growing teeth

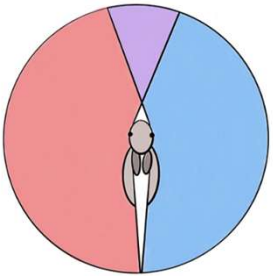
20 to 40 meals a day

- Minimum fiber intake for digestive health
- Gnawing and grazing for teeth
- Feed formulation as monogastric (protein, energy)
- Physical activity for a good transit

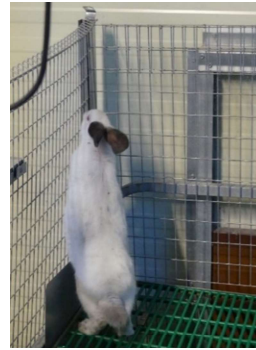


**Prey species**

**Sensory organs very sensitive**



- Shelter to hide
- Calm environment
- Routine
- Enough space to stand up and watch

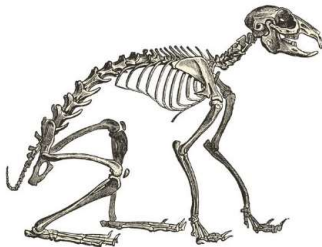


**Urinary elimination of Calcium**

- Physical activity to avoid calcifications in kidneys

**Lightweight skeleton and strong muscles**

- Physical activity to avoid fractures
- Sun light or Vit D supplementation



# Reproduction

No oestrus

Ovulation induced by mating

Pregnancy : 31 days

Pups : naked, deaf, blind at birth

The doe builds the nest (hair and straw)

One or two breast feeding a day



- Warm nest
- Burrow or nest
- the doe keeps its distance

## ➤ Rabbits feel emotions

Pain, curiosity, anxiety, fear, joy, love, pleasure ...

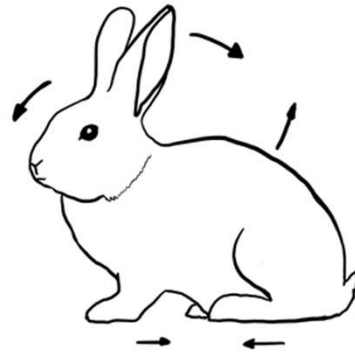












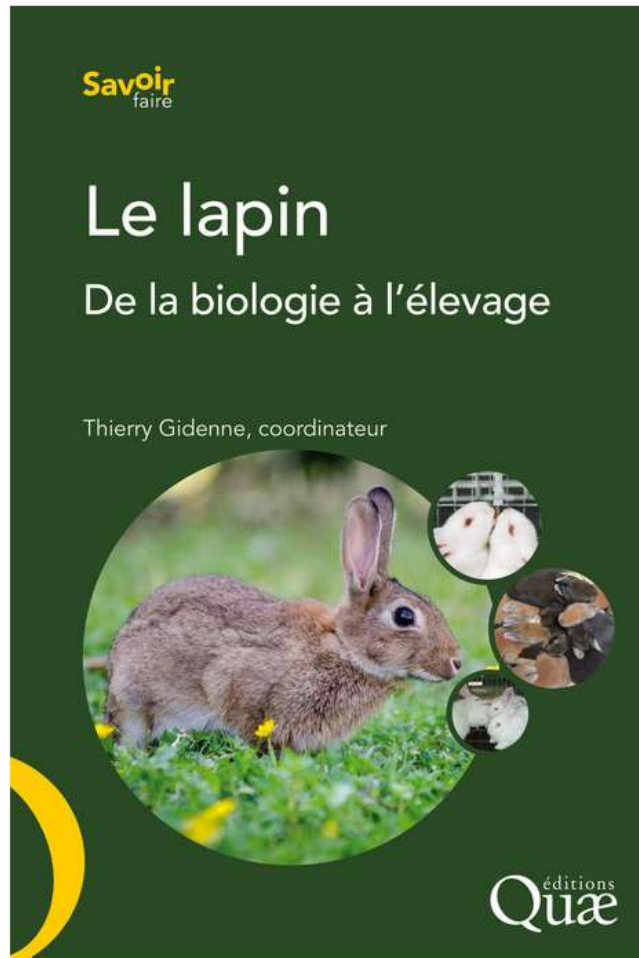
DOULEUR



## ➤ Rabbits fundamental needs



To go further ...



**Epub free of charge !!!**

**\_03**

**How rabbits are raised ?**

# French rabbit sector

**CL!PP**  
Interprofession du Lapin  
An active  
interprofession

42%  
are  
women

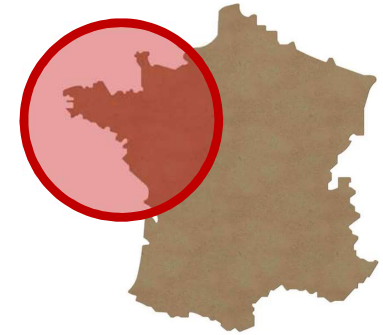
550  
Professionals



90%  
members of  
a producer  
group

78% of production in  
the West of France

1/3 of farms  
are  
specialized



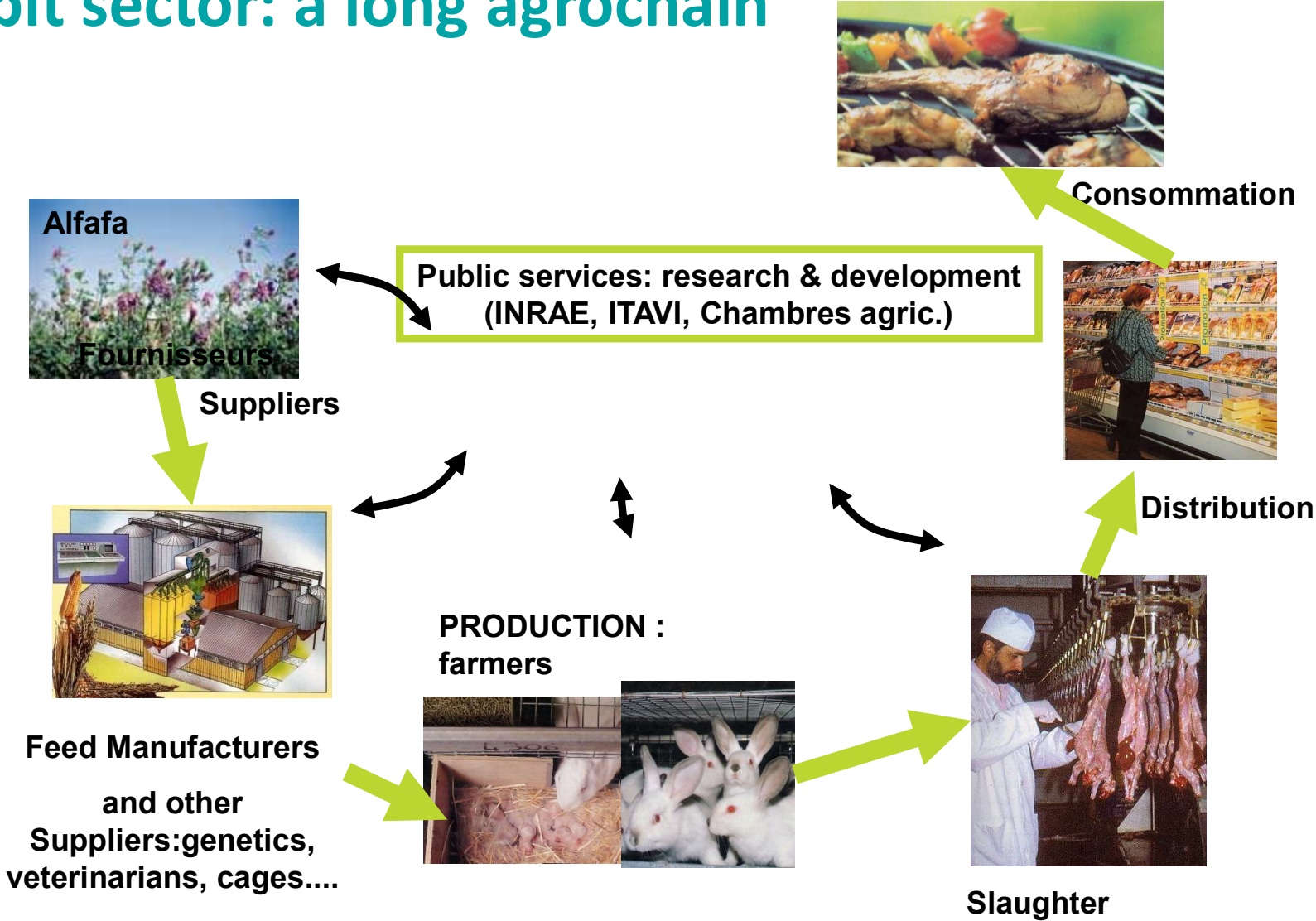
33 Slaughter houses  
90% of production

39 500 t eq. cc

95% of rabbits  
produced in  
France are  
consumed in  
France



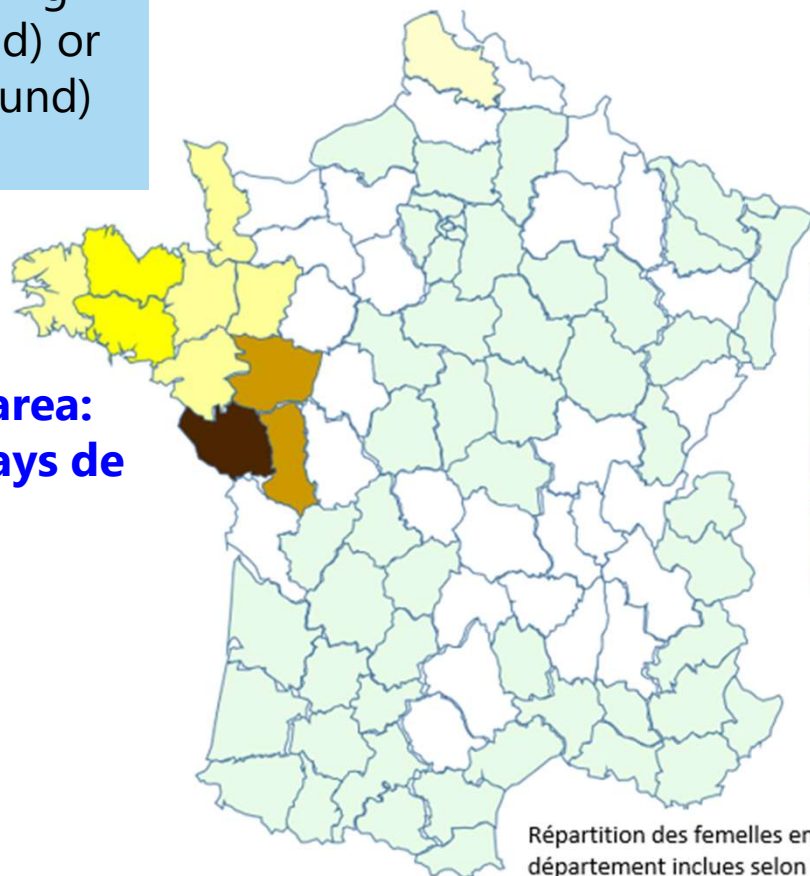
# Rabbit sector: a long agrochain



# French rabbit sector

Alternative rabbit farming  
= in pen (above ground) or  
large pens (on the ground)  
(<3%)

**Main production area:  
western Brittany, Pays de  
Loire = 80%**



2020	
1	à 5000
5000	à 10000
10000	à 15000
15000	à 20000
20000	à 30000
30000	à 40000
40000	à 50000
50000	à 60000
60000	à 150000

vert = non connu

Conventional rabbit farming = in cage (>95%)

646 000 does  
27 millions rabbits / year  
≈ 190 million €

Organic rabbit farming (< 1%)

15-20 000 rabbits / year ≈  
350 000 €



Source : ITAVI d'après enquête GTE Renaceb

# Rabbit meat consumption

Total = 85 kg/hab./year

Rabbit = 0,5 kg per hab./year

- porc = 32 kg per hab./year
- poultry = 28 kg per hab./year
- beef = 22,2 per hab./year
- lamb = 2,3 kg per hab./year

**Falling for 10 years**

Rabbit = the 3rd pet in France  
Concerns about the rabbits welfare

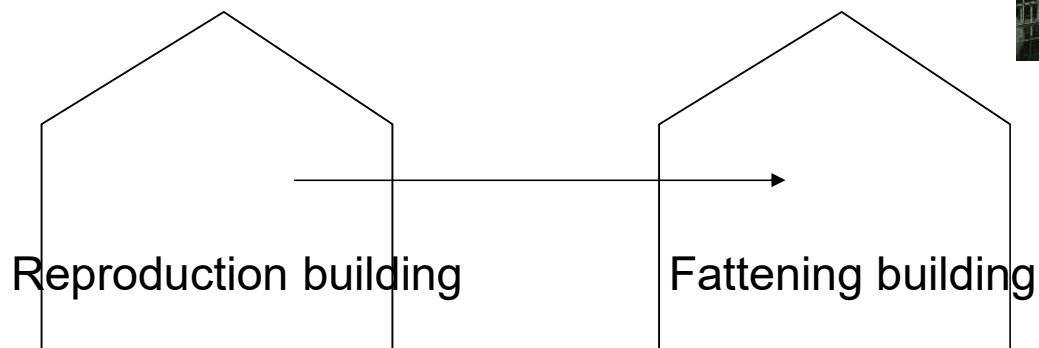


# Housing and management (97%): conventional systems

## Indoor building

Classical système : 2 separate buildings

Weaned rabbit are moved



Cages  
for females and litters

Cages  
for fatteners only

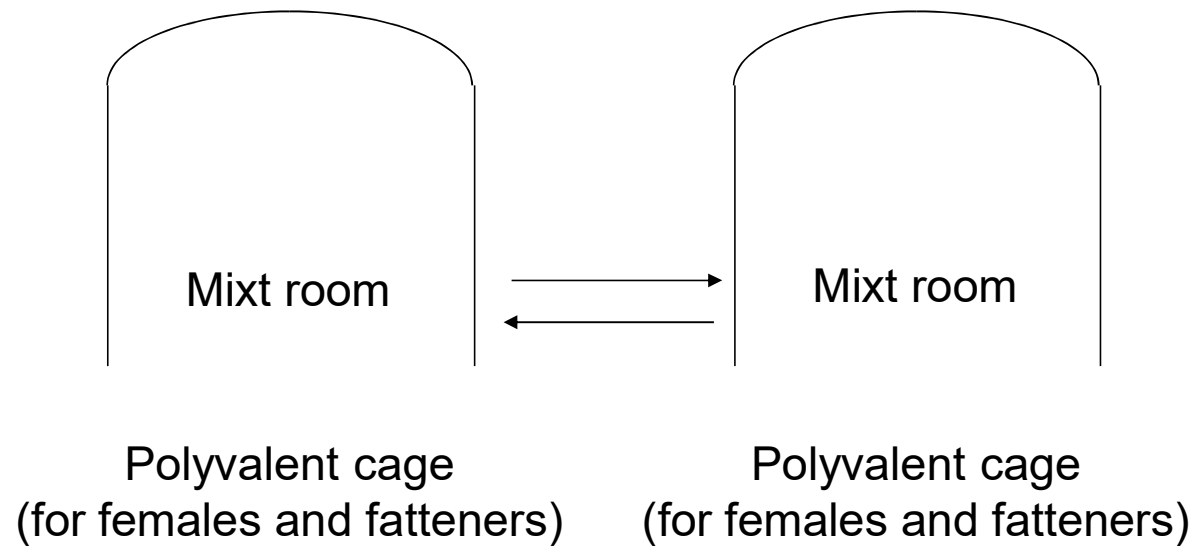


# Housing and management: conventional systems

## DUO System : 2 similar buidlings



Moving of females at weaning



## In France, the majority (95%) of rabbits are raised indoors, in wired cages

### Commercial polyvalent cages:

- 90 x 40 x 30 cm (L x W x h)
  - 1 female + litter (~10 kits), or
  - 8 to 10 growing rabbits/unit
- Variations:
  - 90 x 46 x 30 cm
  - 80 x 40 x 30 cm
  - 80 x 46 x 30 cm



### “Welfare” polyvalent cages:

- 90 x 40 x 60 cm (L x W x h) & Platform

### Pen systems :

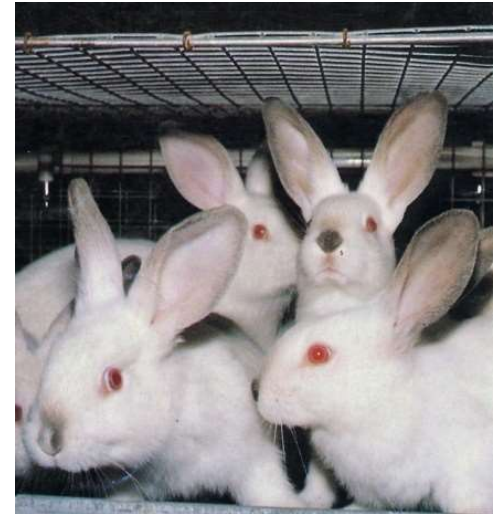
- 10 m<sup>2</sup> (45 kg/m<sup>2</sup>) or 180 rabbits/pen
- Up to 200 rabbits (50 kg/m<sup>2</sup>)



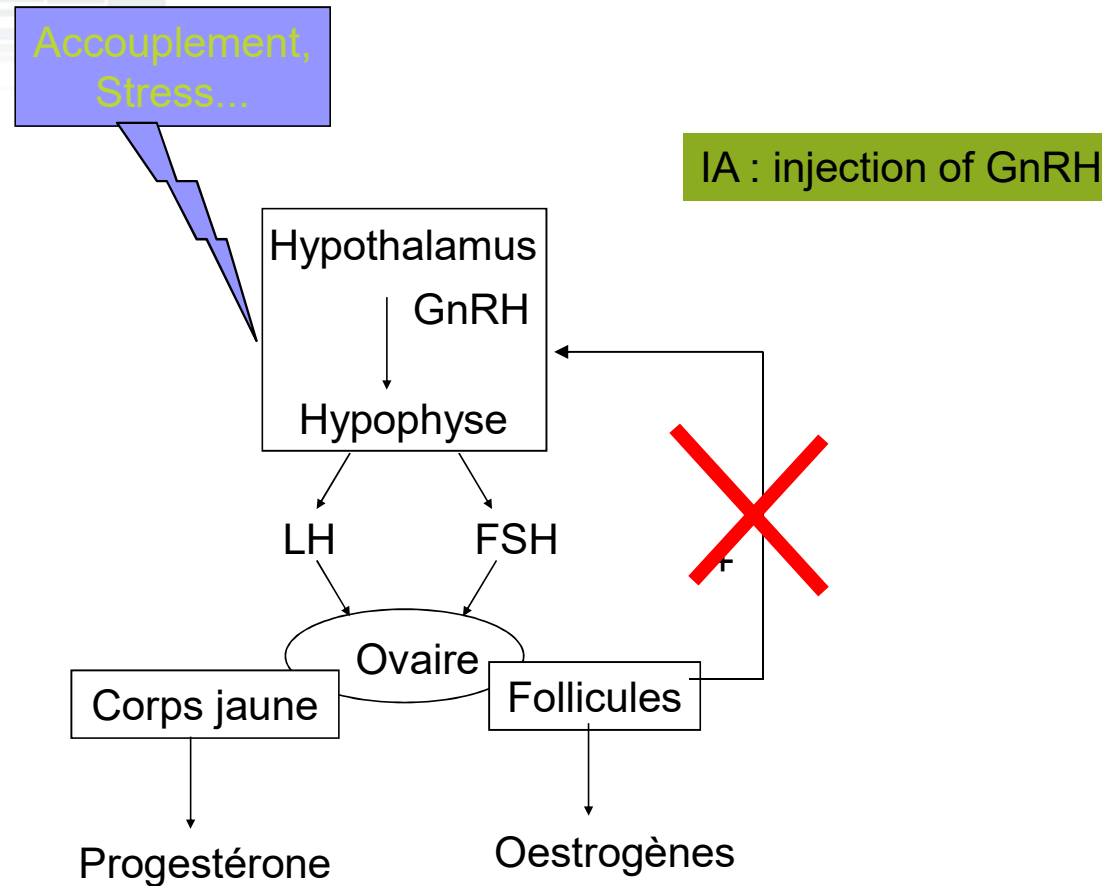
# Reproduction / Genetics

## Some data :

- Female puberty: 14 weeks
- Current breeding age : 19.5 weeks
- Fertility rate: 85 %
- Gestation period : 30-31 days
- Litter size: 10.5 total born, 9.8 live born
- Lactation length : up to 6-7 weeks if not weaned and not pregnant  
currently weaned at 35 days
- Number of breeding cycles per year: theoretically 8.4
- Number of rabbits produced per female per year: 54 rabbits/fem/year
- Weight of a 70d rabbit : 2.4 Kg
- Weight of a female : 4.8 kg
- Genetic type : New Zealand x Californian (medium size breed)



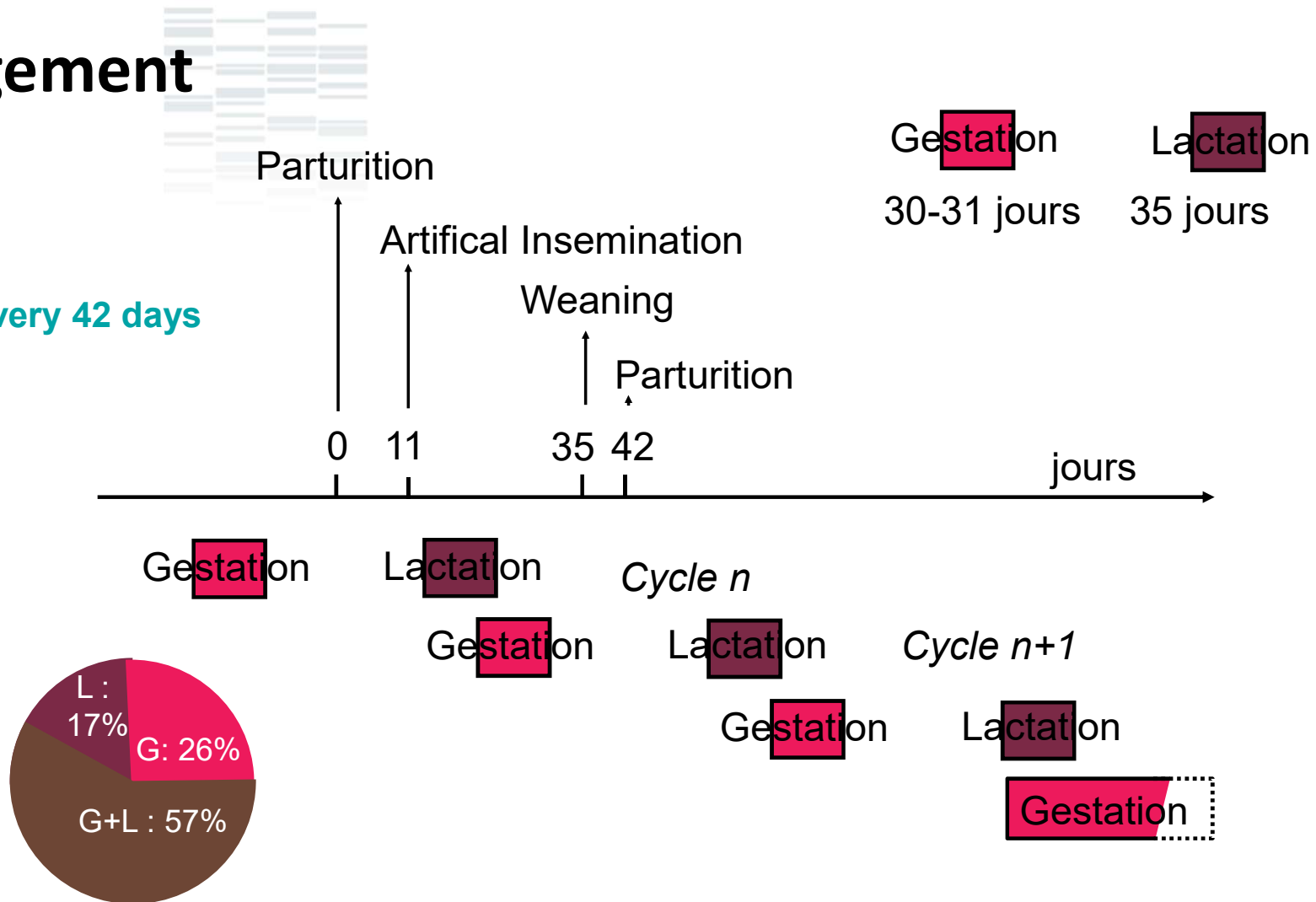
## Ovulation induced by mating



- The breeder chooses/imposes the breeding rhythm
- All breeding/breeding takes place on the same day: work organisation

# Management

1 parturition every 42 days



→ Very high nutritional requirements for females

→ Work organization

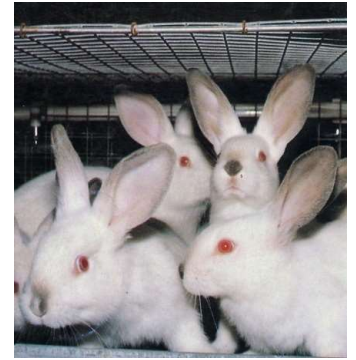
# Feeding

Some data :

- Pelleted feed (no hay, no grass)
- Balanced complete feed
- Cereals + fibre sources + protein sources + co-products + premix

Consumption

- youngsters at weaning : 70-80 g/d
- Youngsters for sale = 130-150 g/d
- Breeding females: 250-380 g/d
  
- Consumption index 3 to 3.5
  
- Weight of youngsters for sale : 2.4 kg
- Age of the youngsters at sale : 70-77 days





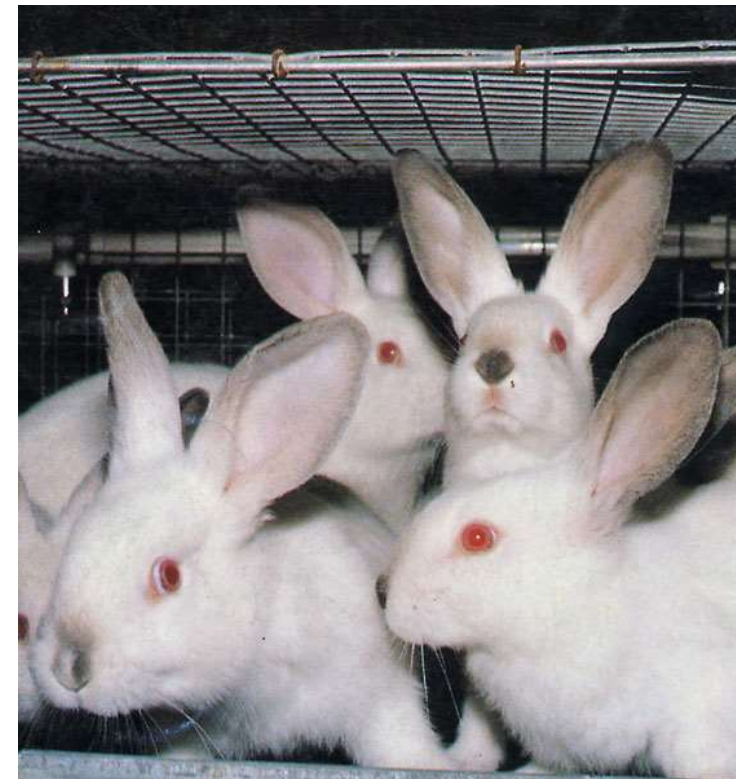
1 day

Very fast growth,  
intensive production



1 week

4 weeks



2,4 kg at 70 days



**\_04**

**What about rabbit welfare ?**

## ➤ Highly criticized method of raising rabbits for meat

Episode #1 : les lapins

UNE VIE DE SOUFFRANCE  
POUR UN MORCEAU DE VIANDE



Élevage de lapins - France - 2013

Dans l'écrasante majorité des élevages, les lapins vivent entassés dans des cages. Un lapin sur 5 meurt avant l'âge de 3 mois.

L'élevage en batterie est l'une des pires formes de maltraitance animale.

Changeons la vie des animaux. Une campagne d'information de l'association L214 : [www.L214.com](http://www.L214.com) Rejoignez-nous sur 



## “End the Cage Age” : Citizen's Initiative ~ 1.4 M signatures



The EU Commission commits to table, by the end of 2023, a legislative proposal to [phase out, and finally prohibit](#), the use of [cage systems for all animals mentioned in the Initiative](#).

([https://europa.eu/citizens-initiative/end-cage-age\\_en](https://europa.eu/citizens-initiative/end-cage-age_en))

**Novel Rabbit Farming Systems ► Outdoor, No Cages**

**Regulations expected in 2023**  
**The draft of regulation has been postponed**



## ➤ Rabbit welfare : what is the problem ?



## What about the 5 freedoms ?



**Improvements are needed and wanted !**

1. **Hunger and Thirst**
  - Absence of hay or gross fibre
  - Absence of foraging behaviour
  - Most losses due to digestive disorders
  - Reduce time of feed intake
2. **Discomfort**
  - Self-isolation is not possible
  - Comfort behaviours "flop" never observed in wired-cages
  - Wired floors (metal or plastic) 24h, 7/7 d
  - No space
3. **Express Normal Behavior**
  - Grazing, gnawing, hopping are absent
  - Do not organize their living space (empty cages)
  - Stereotypic behaviour (gnawing bars, frustration)
  - No social behaviour in adults
  - No choice for social interaction
  - No locomotion
4. **Fear and Distress**
  - Animal density  $\approx$  fast handling  $\approx$  fear
  - No socialization, no positive relationship with humans
  - Noisy environment
5. **Pain, injury and diseases**
  - Pododermatitis in adult rabbits (cages)
  - Respiratory (indoor) & digestive (diet related) diseases are the main causes of culling or death & Kidney failure (20%)

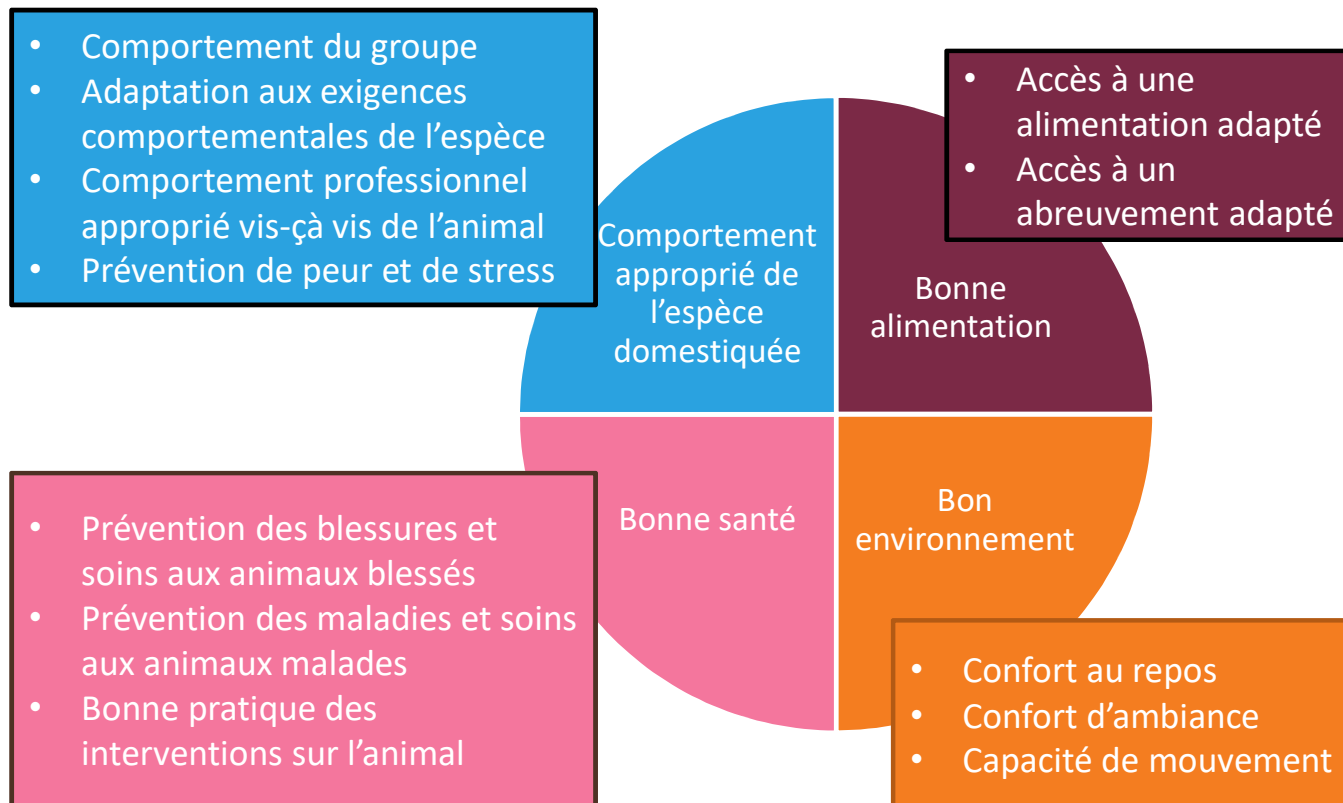
# ➤ Welfare evaluation with EBENE® method

<https://agriculture.gouv.fr/ebene-une-appli-pour-evaluer-le-bien-etre-des-animaux>

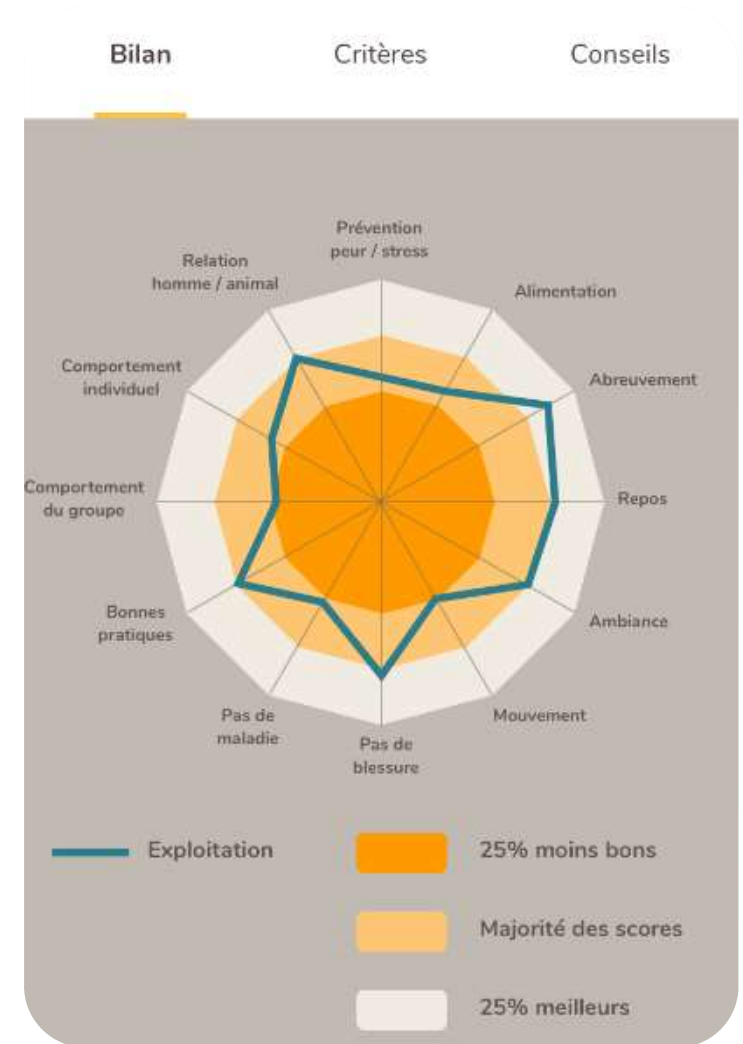
## Conceptual framework :

- 4 main principles
- 12 criteria
- About 20 relevant indicators, measurable on the animal, few in number, shared

**Methodology validated for confinement farms,** and adapted to carry out observations :  
in the field (growing rabbits)  
in collective housing for rabbits in maternity



An immediate result for the 12 well-being criteria → identifying ways to improve



# Indicators in rabbits

## Behaviour

postures,  
activities,  
reactivity

## Physiology

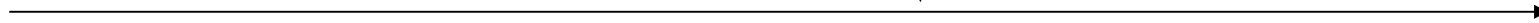
Biological  
stress  
indicators

## Production

growth,  
reproduction

## Health

immunity,  
injuries,  
disease,  
mortality



-

*Intensity of the constraint*

+

### Ethogramme :

grazing,  
hoping,  
rearing,  
hidding  
digging  
social interactions

Spatial distribution

### Corticosterone :

Blood  
Saliva  
Hair

Blood analysis

### Zootechny:

Growth  
Fertility

### Health indicators

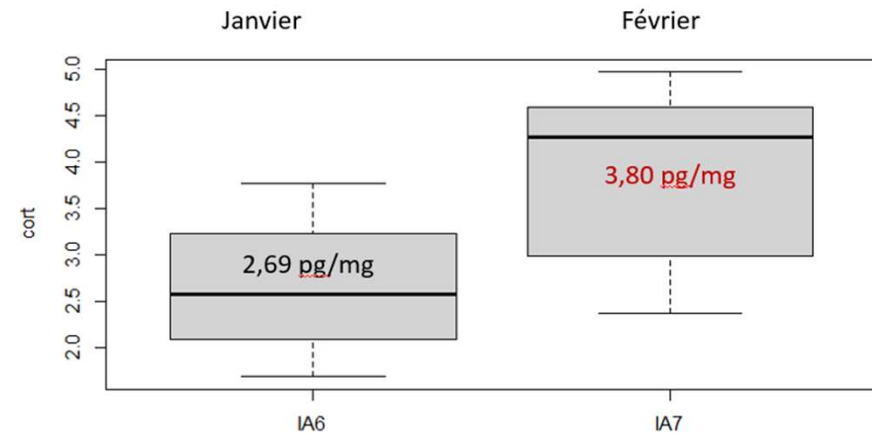
Mortality rate  
Digestive  
Ig dosage



## Hair cortisol dosage (elisa)



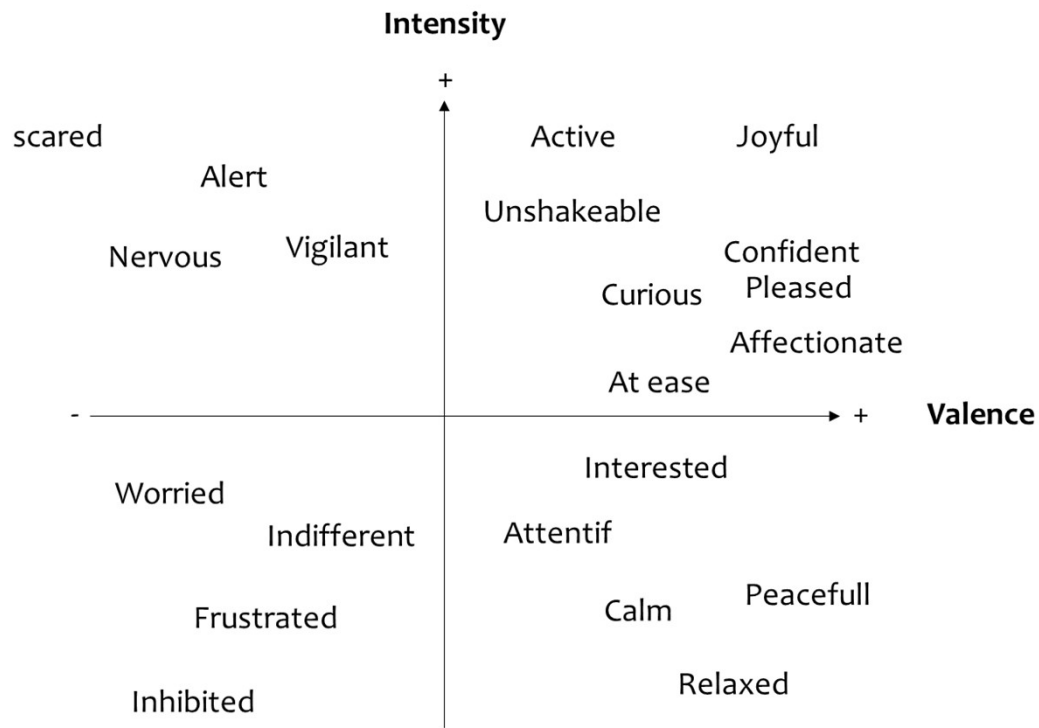
- ✓ Friendly sample
- ✓ Corticosterone for a period
- ✓ Not influence by the handling stress



➔ **Chronic stress**  
**Effect of housing conditions**

# Emotional states

## Qualitative Behaviour Assessment



Calm



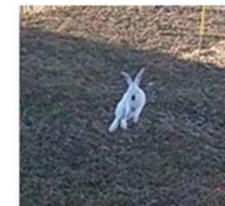
Curious



Worried



Active



Joyful



Scared



Relaxed



Vigilant



Frustrated



At ease



Alert



Nervous

21 descriptors

*Fetiveau et al, in revision*

**\_05**

**Rabbit welfare improvement**

## ➤ Indoor systems (<3%): alternative to cages systems

In buildings with floor pens



*Photo : CPLB*

**Lapin et bien**  
(≈ 15 fermes)



*Photo : Terra*

**Cuniloft**  
(<5 fermes)



*Photo : wisium*

**Wellap**  
(1 ferme)

## ➤ 3L Project

Projet Recherche et Sociétés : 2018-2021 / 350 k€



Designing rabbit farming systems that represent a **significant for the welfare of the rabbits**, and to the **consumers**, in the management and technical characteristics of rabbit housing

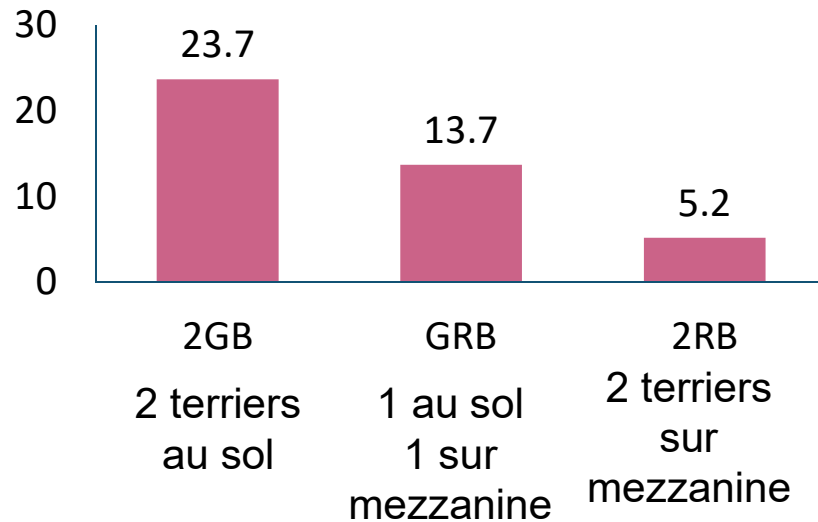
While maintaining the **health** of the animals, the **work and income** of the farmer and the **price** of the meat within acceptable limits

➔ **But a lot of practical and economical limitations !...**

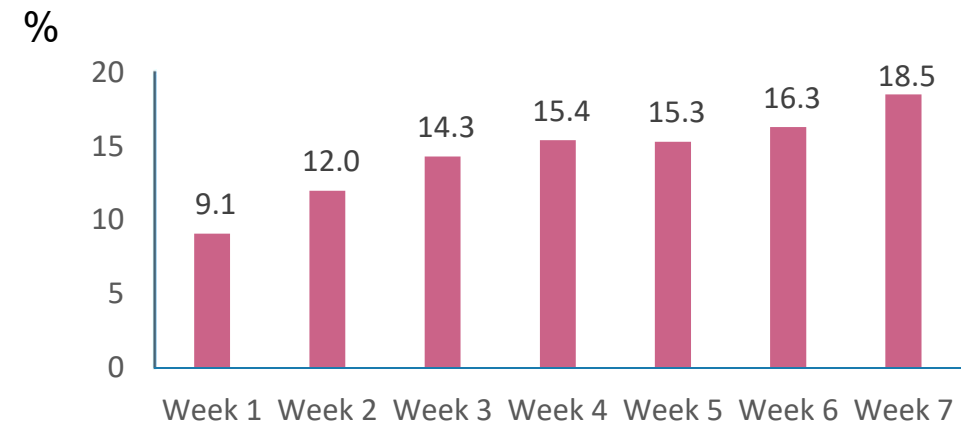
## Some experiment on growing rabbits

To hide → a burrow-like

% of rabbits in the burrows



Evolution % of rabbits in the burrow

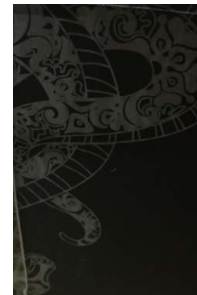


## Experiments on growing rabbits



Gnawing wood

Scratching cards



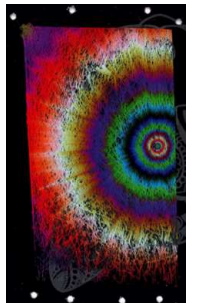
Score 0



Score 1



Score 2



Score 3

➤ **Raising rabbits outdoor : a possible way for health, welfare and more**





## Organic farming systems (<1%) : mobile cages



# Organic farming systems : fix pens



# System with outdoor access : the mobile warren

Mobile house, equipped with 8 indoor-pens (wired, plastic floor) placed on a cultivated pasture (ray-grass & clover).

## Growth Rate

- Indoor: 30.2 g/day
- Outdoor: 26.7 g/day



## Mortality Rate

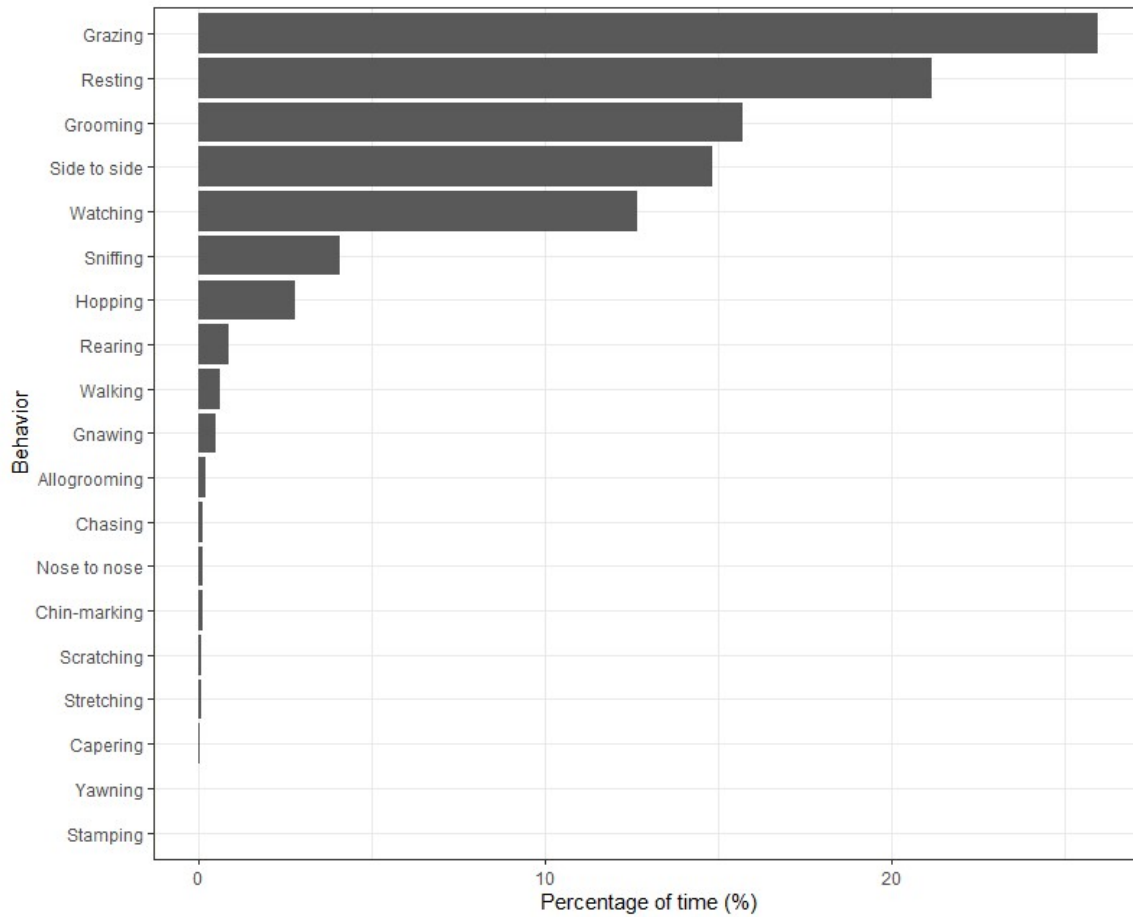
- Indoor: 10%
- Outdoor: 7.6 to 50 %

Behaviors: grazing (40%), grooming (22%), watching (8%), sniffing (3%), hopping (3%), rearing (1.8%), gnawing (1.5%), capering (0.4%)...

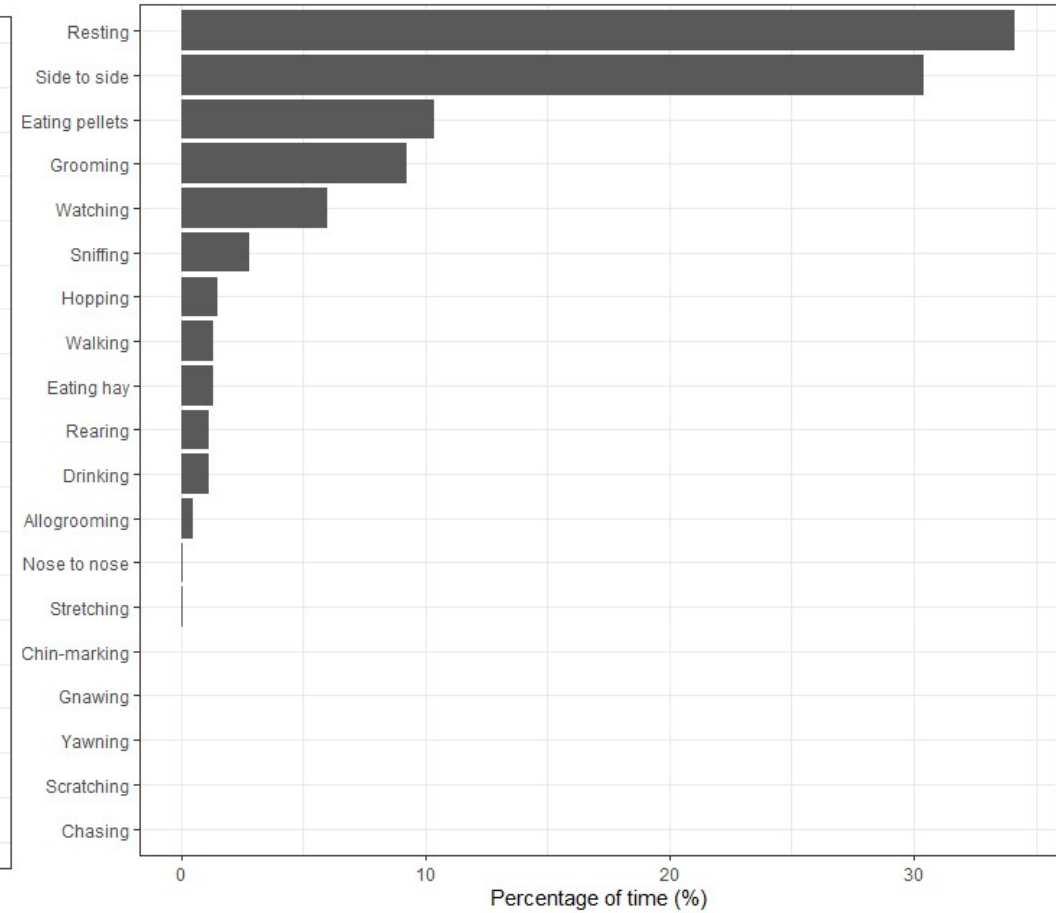
**Huge motivation for grazing. Only a few seconds after opening the hatches.  
Same behavior observed in all trials (7 with this system).**



## Focal sampling of young rabbits with access to a grass land.



In the field



In the house

## Respect of natural circadian rhythm



## Social and Specific Behaviors



Interact when, where and whenever they want.  
And only if they want. They have the choice.



Find a shelter and use it.  
Protection from the sun or from something.  
They find their way, they have the choice.





## “Agroecology, orchard and rabbits”

Rabbits provide other services than meat in a crop-livestock system.



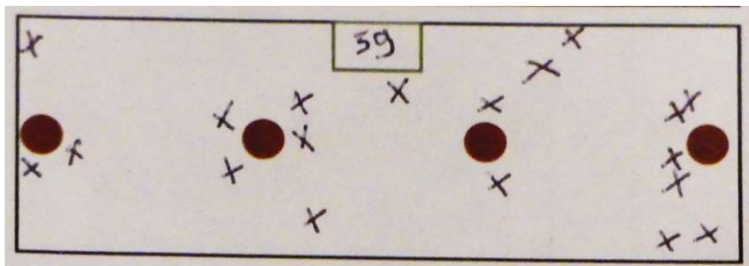
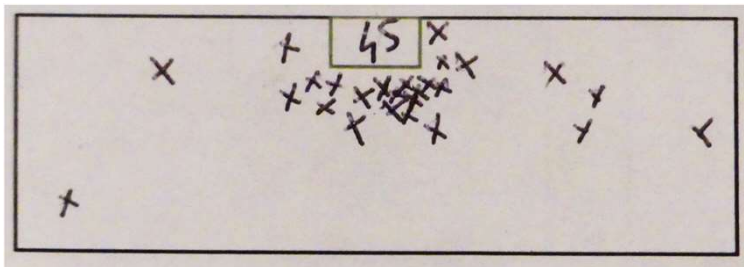
Inter-specific services.  
Apple-Orchard ► Rabbits  
Protection, Microclimate, Food



Inter-specific services.  
Rabbits ► Apple-Orchard  
Fertilization, Weeding, Pest-control

# Trees are beneficial for rabbits

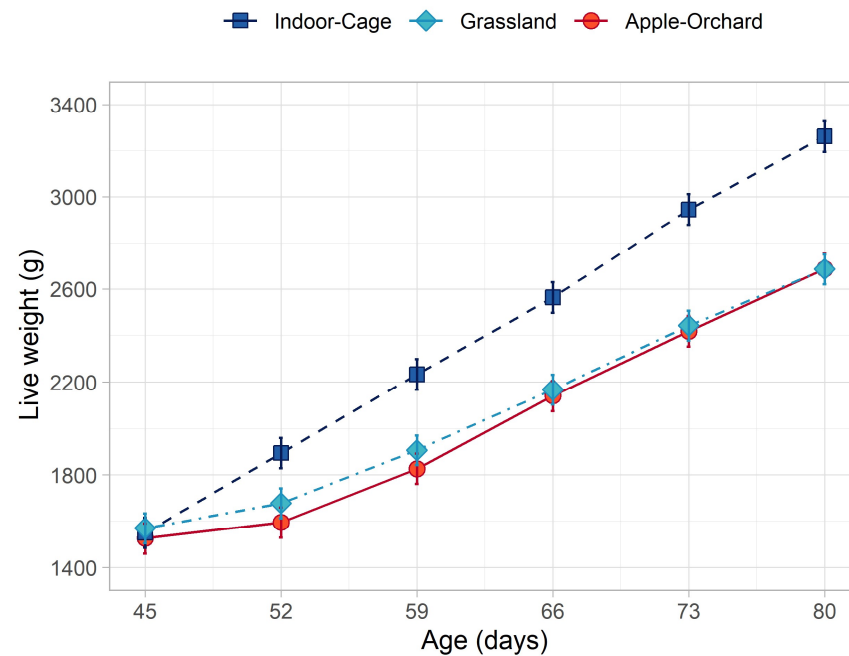
- Expression of various behaviours
- Safety feeling
- Better use of space



Rabbits can be very productive in this system...

### Growth Rate (52-80)

- Indoor-Cage: 49 g/day
- Grassland: 39 g/day
- Apple-Orchard: 36 g/day



### Mortality Rate

- Indoor-Cage: 9.7%
- Grassland: 0.0 %
- Apple-Orchard: 1.4%

...and health is not an issue. But a close and specific care is required. The farmer is key !

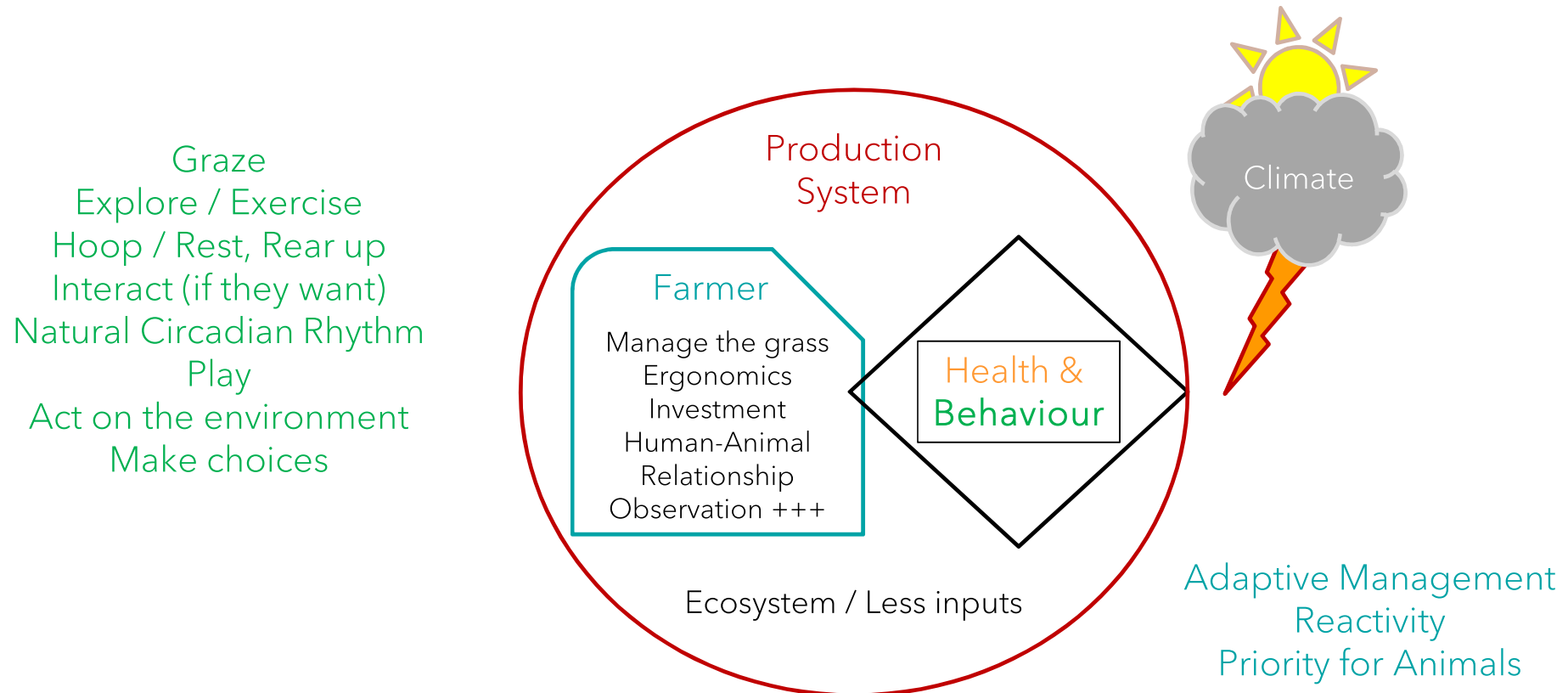
For orchardists, grass is an inconvenient.



For this little herbivore, it is the most important resource they can get.

# Outdoor, No Cage. Significant improvement of rabbits welfare.

However, the external environment is not neutral. Hot, cold, wind, predators...

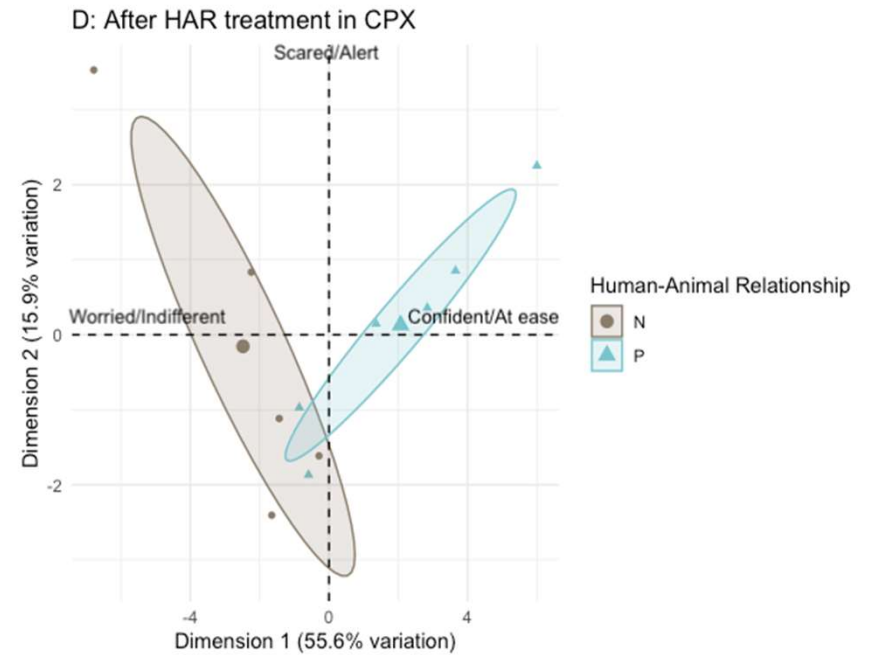
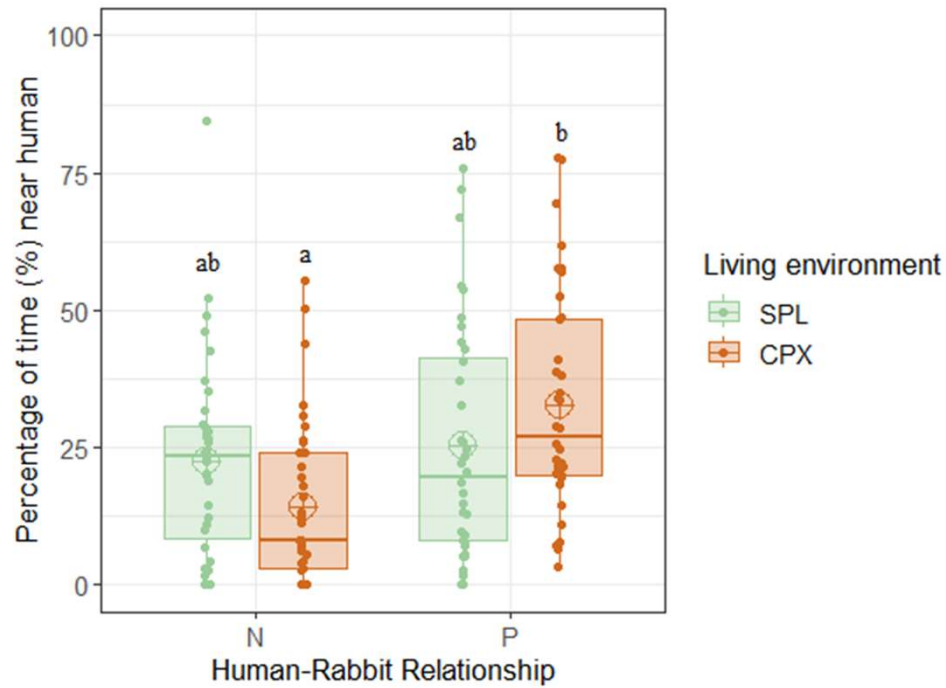


**A different way to work with rabbits ?**



# Effect of the Human animal relationship

5-10min every day per group (6 rabbits) for 2 weeks



# **Cage is not a good housing for rabbits but :**

**Is the improvement of rabbit welfare possible in intensive productions ?**

Economical cost

**Is rabbit welfare really better in outdoor farming ?**

Health ? Predators?  
Heat or cold stress ?





**Thank you !**