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Overview of some of the latest development and new achievement of rabbit science research in the E.U.

By

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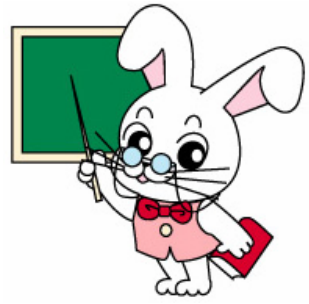
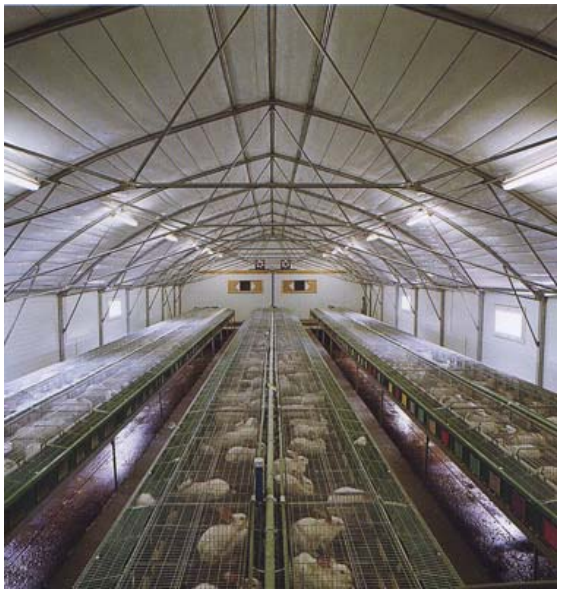
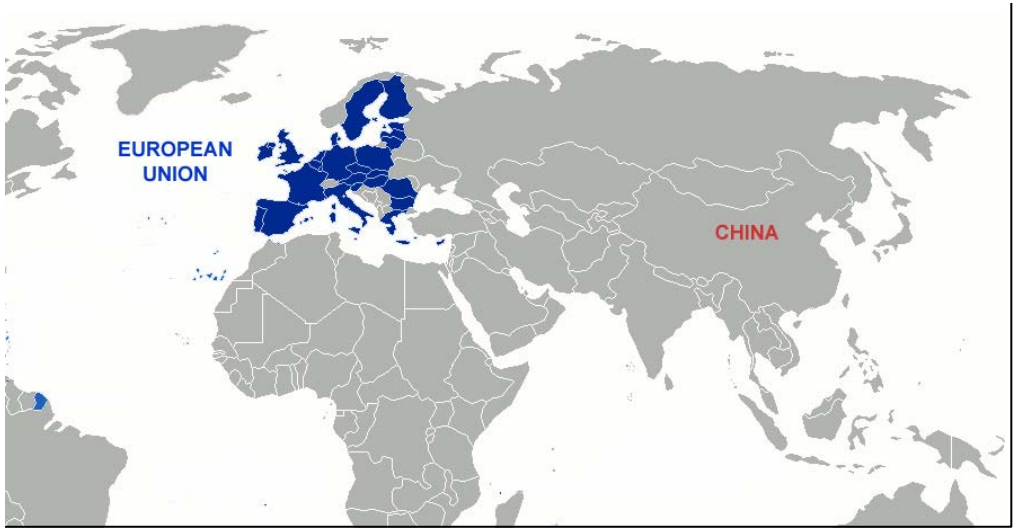


World Rabbit Science Association
http://world-rabbit-science-com

cuniculture.info
Le site du lapin



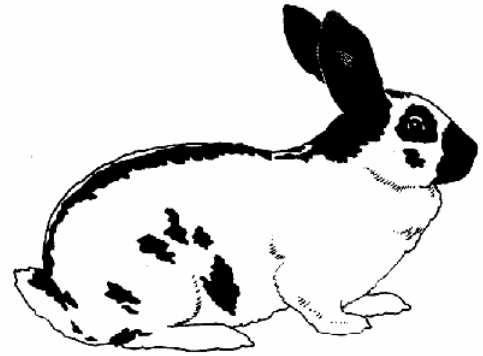


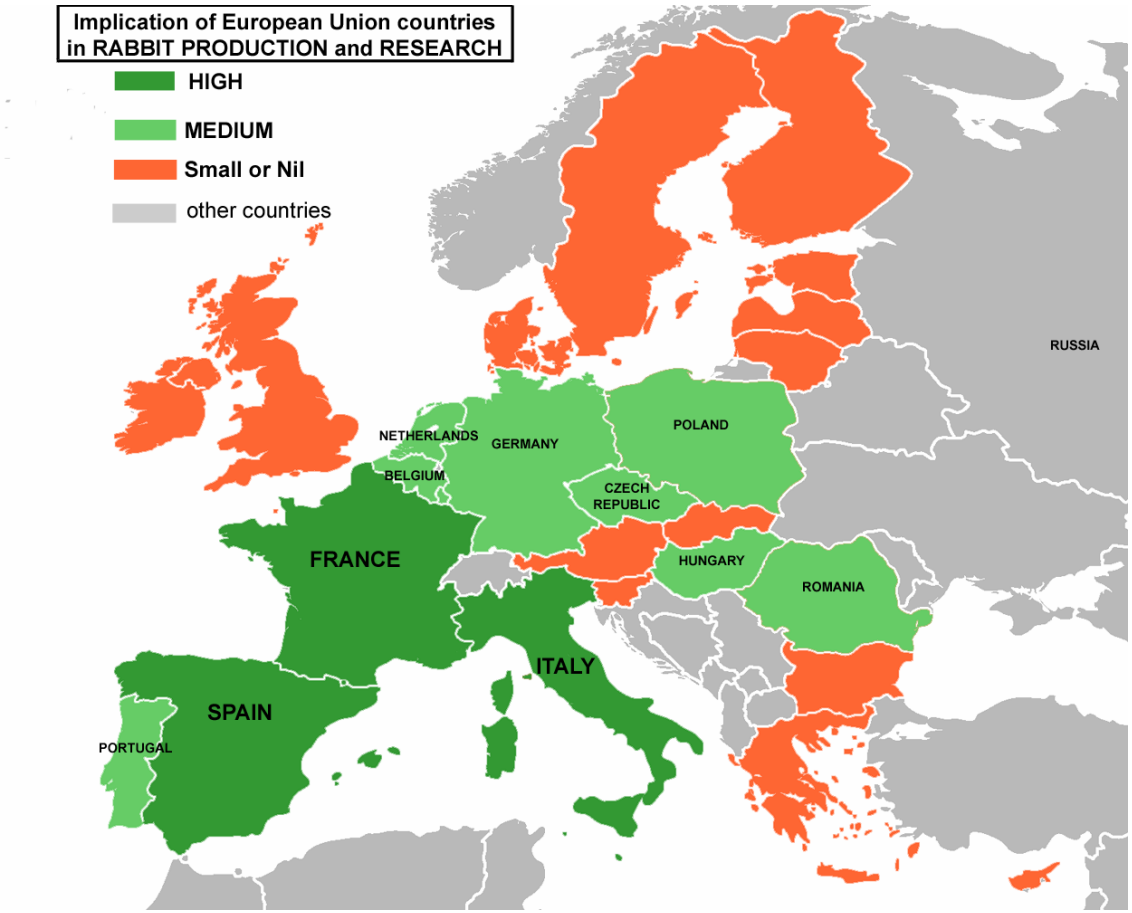
The European Union

= 27 countries associated

Rabbit production and research in the European Union are mainly concentrated in **Italy, France and Spain**

Production is estimated at 600 000 t carcasses per year





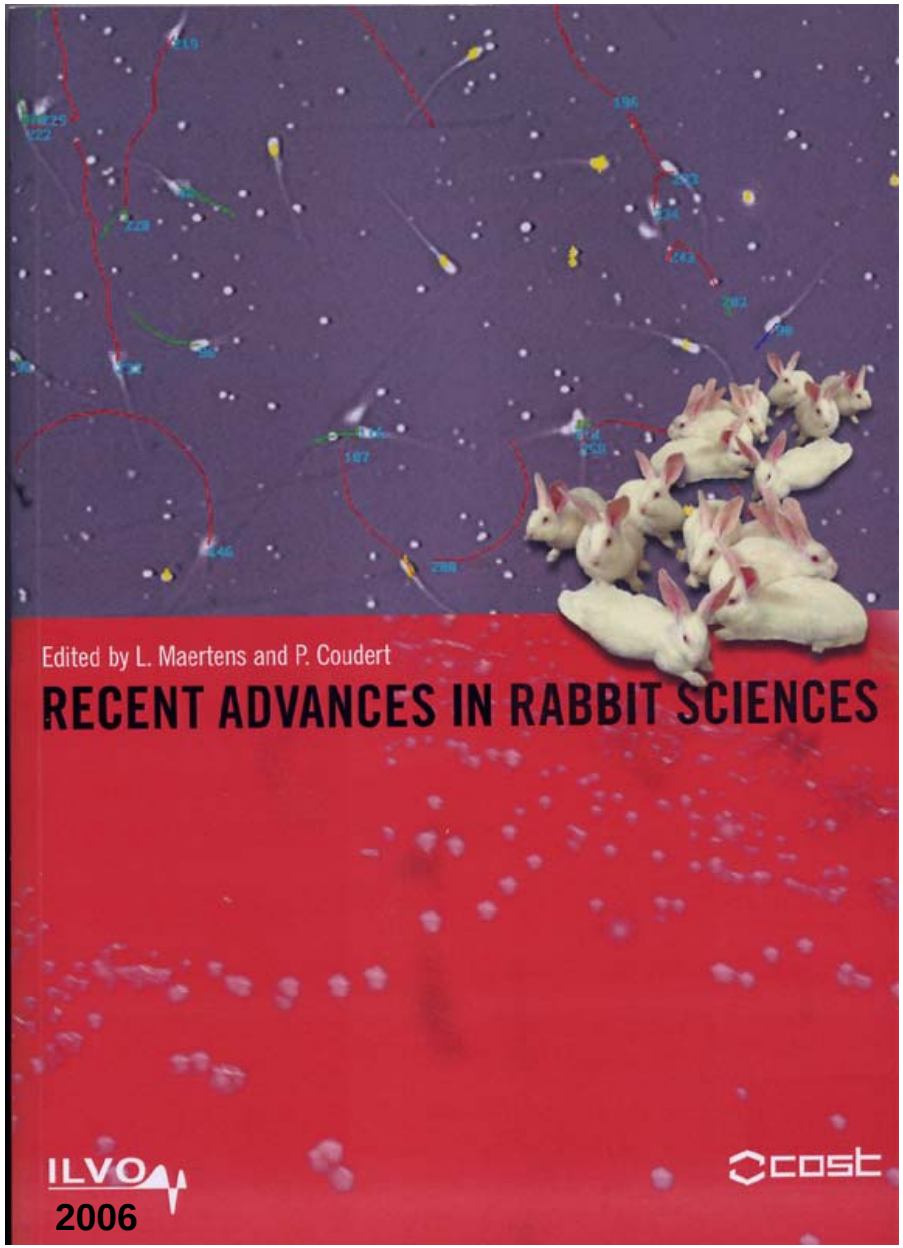
Researches made on rabbits could be separated in 2 categories

1. Those oriented mainly to biological knowledge
2. Those oriented to rabbit utilisation for production and economic activities

We will consider only the second category, even if those of the first may result also in practical solutions

In the European Union, research on rabbit is made mainly by institutional organisms. Nevertheless, 15 to 20% of the research, according to the country, are made directly or indirectly by private companies or professional organisations. This work is done strictly inside of companies or in association with institutional organisms

During the last French Rabbit Days (every 2 years) private companies produced themselves 25% of the 51 accepted communications.



From 2000 to 2005, the European Union authority has financed the cooperation between European rabbit scientists with specific funds for meetings organisation and short stays in foreign laboratories. A total of 170 scientists from 51 Universities or Research Institutes and 14 countries were involved in this program.

The direct result was 107 publications and communications in scientific congresses.
Most of them were done in cooperation between laboratories and were frequently interdisciplinary.

The final book (300 pages – *see left hand part*) contents 30 articles summarizing the results obtained with help of this European program.

An overview of the recent trends of rabbit research in Europe could be deduced from the titles of the content of this conclusive book.

REPRODUCTION

1. Reproductive physiology of the rabbit doe.
2. Alternative methods for the synchronisation of oestrus in lactating does.
3. New perspectives in rearing systems for rabbit does.
4. Developments in the investigation of rabbit semen and buck management.

HOUSING OF RABBITS *in conformity with animal welfare and protection criteria*

1. Welfare indicators.
2. Nursing behaviour of wild and domestic rabbits
3. Odour cues and pheromones in the mediation of rabbit female-offspring relations.
4. Behaviour of kits.
5. Behaviour of breeding does in cages.
6. Behaviour of growing rabbits
7. Group housing of breeding does.
8. Single housing of breeding does.
9. Environmantal enrichment in growing rabbits.
10. Group size and stocking density.
11. Animal protection in housing and transport**.**

PATHOLOGY

1. Recent advances in rabbit staphylococcosis research.
2. Myxomatosis
3. Pasteurellosis in rabbits.
4. Epizootic rabbit enteropathy.
5. Viral enteritis of rabbits.
6. Rabbit haemorrhagic disease**.**

NUTRITION and FEEDING *strategies for improving the health of the doe and the young rabbit*,

1. Recent advances in digestive physiology of the growing rabbit.
2. The digestive ecosystem and its control through nutritional or feeding strategies.
3. Nutritional and feeding strategies improving the digestive health of the young rabbit.
4. Nutrition of the young and growing rabbit: A comparative approach with the doe.
5. Strategies for doe's corporal condition improvement: Relationship with litter viability and career length
6. Feed additive to reduce the use of antibiotics.

MEAT QUALITY and SAFETY

1. Rabbit meat quality.
2. Rabbit meat safety and traceability

Nevertheless this overview does not cover all aspects of the research made in Europe. *For example* the active researches in genetics were absent.

An other way to determine the actual trends in rabbit research is to list the main technical problems encountered in commercial rabbit production. For each specific problem the solution may be searched with various disciplines

The approach needs the description of the dominant system of production

Rabbits used are crossbred, issued of lines selected mainly by 3 French private companies working in quite all European countries, and in Spain by 2 additional institutional companies.

The 3 main French companies for rabbit selection

Reproduction is conducted with artificial insemination, and in a given unit, all does are inseminated on the same day - 11-12 days after kindling - inducing reproduction with a fix 42 days cycle (8.7 cycles per year). Infertile does are re-inseminated only at the next cycle and litters are weaned altogether 30-34 days after kindling

This method of reproduction is called “batch reproduction” and has many consequences on the rest of the raising practice.

As frequently as possible, young rabbits are raised until slaughter age in the cage in which they were born. At weaning it's the doe which is removed from the cage, and moved in the other building.

The system known as "*all in all out*" needs the use of 2 identical buildings serving alternatively for reproduction and for fattening. With this system, **every 84 days** each building is completely empty, so cages, materials, walls and floors may be efficiently cleaned and disinfected. This system is well adapted to produce 2.4-2.5 kg rabbits with present lines. For lighter rabbits like in Spain (2.0 kg) or heavier like in north Italy (2.7-2.8 kg) specialized building/units are used (maternity and fattening)

During fostering operations, too small (<35 g) or supernumerary kits are culled

Kindling of all does is observed within 2-3 days maximum. This permits the equalization of litter's size by cross fostering, taking in account individual kit's weight. It has been effectively demonstrated that litters homogenous in weight with a number of kits never larger than the number of mother's teats +1, are those which provide best results *i.e.* the highest number of homogenous and healthy kits weaned per kindling.

Fryer rabbits are sent to slaughterhouse all together when 73-74 days old. It means that ALL rabbit corresponding to one Artificial Insemination operation went to slaughterhouse at the same time, whatever their individual weight.

Results obtained with all-in-all-out system and 42 days rhythm in France

Average year 2007	42 d all in all out	*Average year 2007*	42 d all in all out
Number farms observ.	294	Kits weaned / kindling	8.32
Does / farm	560	% fattening mortality	6.2%
% young does / batch	13.3%	Kits produced/doe/year	**54.7**
% kindling/ artif. insem.	81.9%	Slaughter age	73.3 days
Kits born alive /litter	9.78	Slaughter live weight	2.47 kg
kits kept after fostering	92.0%	kg sold / A. inseminat.	15.23 kg
kits viability => weaning	92,0%	Farm's feed conv. ratio	**3.45 kg/kg**

We will analyze each box of this table to identify the problems and the research programs developed to find solutions

% young does / batch = 13.3%

It means that new reproducing does must be introduced at the occasion of each artificial insemination operation (8.7 times / year) to replace does which died or were culled during the previous cycle.

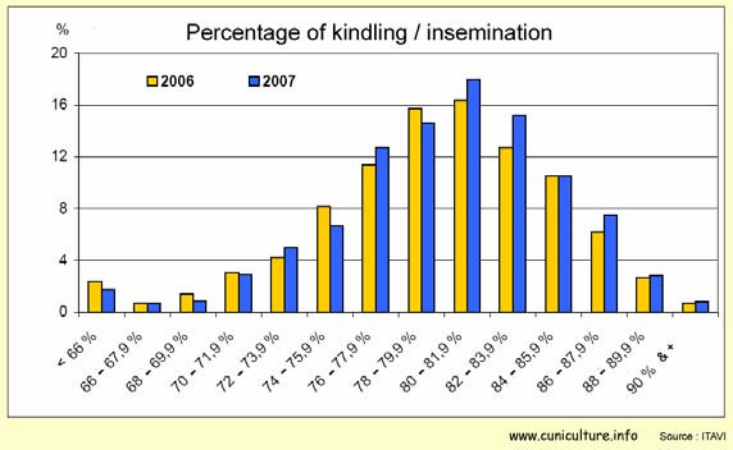
⇨ It's a problem of longevity

Research programs developed to improve doe's longevity

- genetic selection for a better longevity
- rearing methods for the preparation of young does before the first insemination
- study of slower reproduction rhythms supposed to be less exhausting
- study of early weaning (22-24 days) in order to reduce doe's lactation effort

% kindling / artificial insemination = 81.9%

It means that 18.1% of does are unproductive during each cycle. Special places for “empty does” must be reserved. It addition a greater problem is the variability of the percentage of pregnancy which can vary from 60% to 95% from one batch to the other, creating a great problem in maternity organization.



Research programs developed to improve fertility and regularity of pregnancy rate

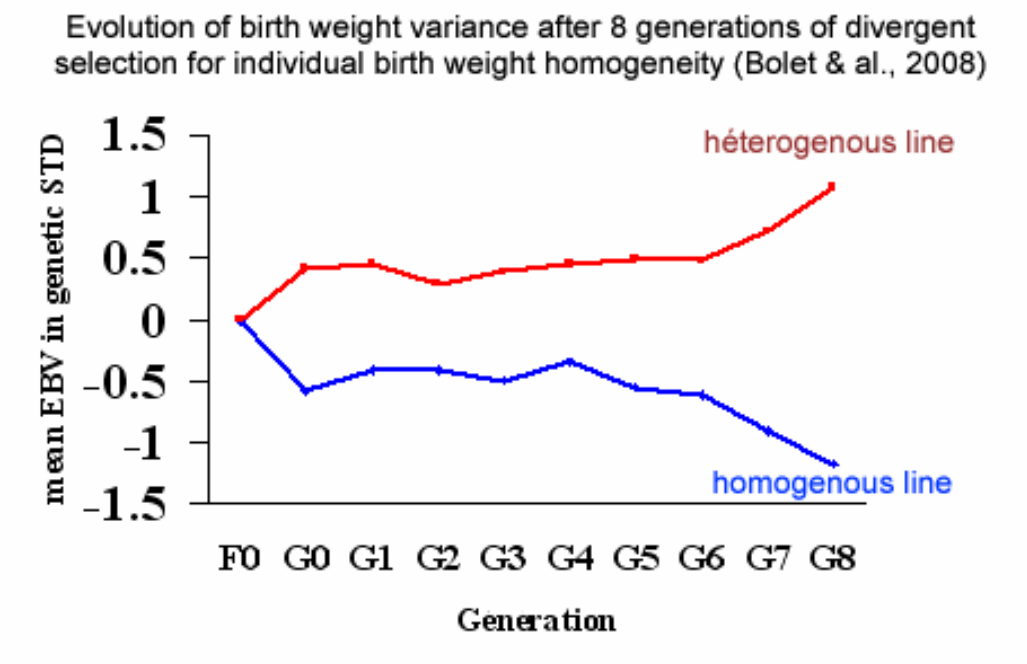
- study of ovarian activity in the lactating does : problem of does with high level of progesterone at insemination time
- search of methods able to improve the proportion of does fertile after insemination
  - hormonal treatment
  - biostimulation by withdrawal of some nursings or by nutritional flushing
  - light programs (duration – intensity – color)
  - control of does stoutness
- study of male physiology, more specially semen quality, and it’s real relation with artificial insemination results

Kits born alive / litter = 9.78
% kept after fostering = 92.0% .

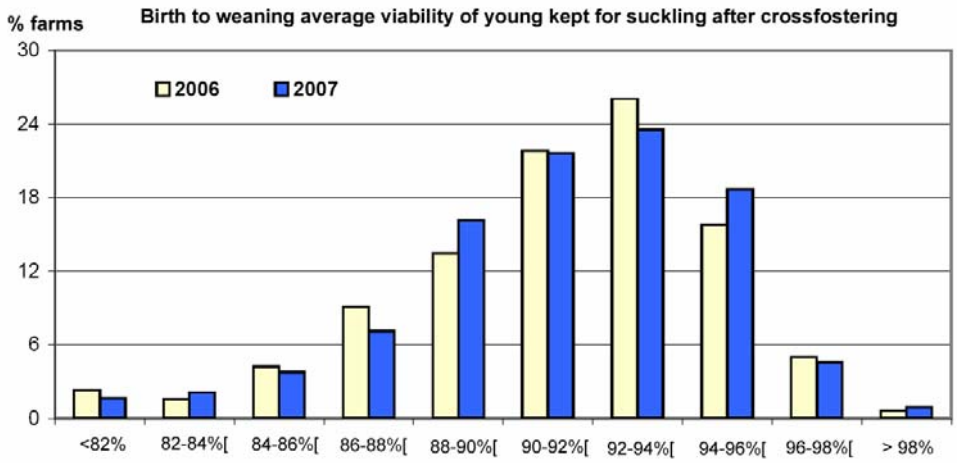
Most generally the average litter size is considered as sufficient.
Nevertheless this good average is obtained with various proportions of very small litters (few big kits), normal litters (close to the mean) and very large ones (numerous small kits). Cross fostering the day after birth is an acceptable solution to control size of the litters effectively reared, but it is not able to completely solve the problem of the too light kits (<35 g).

Research programs developed to homogenize litter

- Canalising selection for litter size homogeneity
- Canalising selection for individual kit's birth weight homogeneity



% viability => weaning = 92.0% :
It means that 8% of the kits considered as perfectly viable after the control made at birth, died before weaning. The proportion may be reduced since in some farms the mortality is only 2-3% or less



Research programs developed to reduce birth to weaning kit's mortality

- study of mother-litter relationships and behavior.
- improvement of does nutrition in order to increase milk production particularly during the first days following kit's birth
- study of the evolution of young's digestive physiology and flora during the weeks following birth. For the flora, use of the methods of molecular biology in place of the traditional bacteria *in vitro* cultivation
- study of confirmed or potentially pathogenic agents (*Staphylococcus*, *E. coli* strains, viruses…)

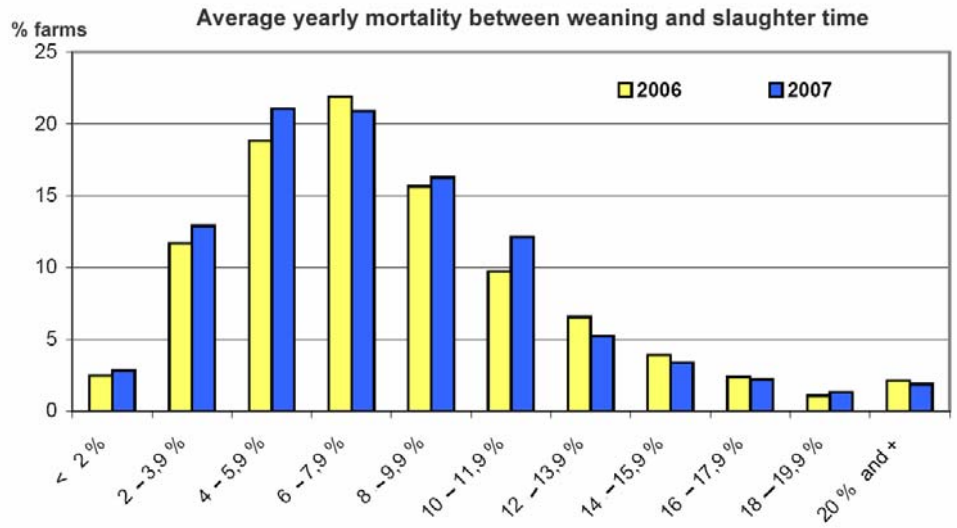
Kits weaned / kindling = 8.32 :
Because kits should be fattened in groups without separation of litters and at a density which should not exceed 40 kg / m^2 of cage at slaughter age, it is very important to have litters homogenous in size at weaning in order to use an adequate caging

Research programs developed to homogenize litter size at weaning

There is no specific program.
In fact efforts made to homogenize litter size at birth and kits live weight at birth also, added to programs trying to reduce the birth to weaning mortality, improve litter size homogeneity at weaning as well as individual weight mean and variability.

% fattening mortality = 6.2 %

Because a mortality reduced to 2% or less is observed during the fattening phase in some farms, this level could be considered as a common target. Most of the mortality is a consequence of digestive troubles



Research programs developed to reduce weaning-slaughter age mortality

- study of digestive physiology : digestive flora establishment and stability, role of starch and of different types of fiber, to be able to propose new nutritional recommendations
- study of a cautious use of antibiotics (doses, date of use, duration of withdrawn…)
- search for all types of feed additives able to replace antibiotics
- study of conditions of feed restriction known to reduce digestive trouble frequency
- study of specific pathology and possibilities of protection (Epizootic enteropathy, VHD, myxomatosis, …)

Slaughter age = 73.3 days
Live weight at slaughter = 2.47 kg

With the *all in all out* method the interval between successive kindlings is exactly 84 days. Pregnant does must be placed in cages with nest boxes 4-5 days before parturition time. As consequence the farmer has only 5 days to clean and disinfect the building after removing of all fryers and to prepare the does arrival. It's considered very short. For this reason framers expect always to reduce slaughter age for a constant live weight corresponding to the market's demand. It means to increase growth rate

Research programs developed to control growth rate

- Selection of lines with a very high growth rate (more than 50 g/day in pure line), but simultaneously with a good aptitude for reproduction
- Genetic improvement of slaughter rate to offset the physiological reduction of slaughter rate with age reduction
- Nutritional studies to increase safety growth rate and to simultaneously reduce the environmental pollution (lower nitrogen and phosphorus outputs)
- Study of caging conditions (single, by 2, by litters, in pens…)
- Study of the effects of rearing conditions on meat quality and acceptability

Conclusion

Research programs developed in Europe are very numerous .

The objectives are mainly

- To control in better conditions the rabbit production, with the new idea of variability control
- To reduce the incidence of rabbit breeding on the environment. Fortunately classical rabbit production has lower impact on environment than some other animal production like pig or poultry. So the pressure on rabbit production remains light
- A lot of research are now made with a better animal's welfare as main objective. They will result in an imminent future, in new European rules for rabbit breeding (mainly caging).

Thanks
for your attention