PHEROMONE IN RABBITS: PRELIMINARY TECHNICAL RESULTS ON FARM USE IN FRANCE

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ABSTRACT

The results obtained when a pheromone, the Rabbit Appeasing Pheromone (RAP), was applied on farms between July 2005 and February 2007 are shown and discussed. The authors present briefly the pheromones and refer to the following definition: a pheromone is a chemical substance produced by one animal to communicate by olfactory route with other congeners of the same specie, and to induce on them some innate stereotyped behaviour patterns. The same protocol of RAP application was implemented in 9 farms differing for size, location, reason of RAP use and season when the product was applied. All the farms were under all in-all out system of management. RAP devices were introduced in the reproduction compartment 2 to 3 days before parturition, and let for 42 days until the next parturition. So, the litters grew under action of the product until weaning (35 days). As the pheromones spread in the air, it was not possible under field conditions to have contemporary placebo treated control, thus, technical results obtained with RAP were compared to the results of the previous cycles. Only farms with regular technical monitoring and properly recorded data were included in this trial. The data were transmitted by the technician responsible for the farmer economical results. In most of the cases, the farmer observed that the animals seemed quiet quickly after the implementation of the product (from a few hours to 1 day). Does were less stressed, and technical actions (as sweeping, nest manipulation, introduction of external personal) were easier. At least, technicians often noticed by additional comments on the technical documents that the treated rabbits were heavier and healthier at weaning. Fertility (percentage of parturitions per artificial insemination (AI), live born kits per litter and kits viability at birth improved in 3 farms. A global analysis, performed from data of all the farms (13090 does of reference groups and 8915 of treated groups) confirmed this trend. The results of this pooling were quite comparable to individual data recorded in each farm, confirming the interest of the use of this RAP for reproductive does. In conclusion, these trials brought new information regarding the use of pheromones on a mammal species: does are quieter with RAP, and manipulations are easier, fertility, litter size and viability at birth improve.

Key words: Rabbit appeasing pheromone, Rabbit doe, Fertility, Litter size, Litter mortality.

INTRODUCTION

Field trials were conducted in farms located in different regions of France from July 2005 to February 2007 with a new product, based on a combination of several rabbit pheromones (Rabbit Appeasing Pheromone – RAP - Lapézil® - Ceva Santé Animale, Libourne, France). The objective of this article is to present an overview of first behavioural and productive results obtained.

MATERIALS AND METHODS

Product and administration

Definition of pheromones is debatable, and this term often gives rise to many questions. To simplify and avoid any focus on formal points, we will adopt for this present text the following definition: a

pheromone is a chemical substance produced by one animal to communicate by olfactory route with other congeners of the same species, and to induce on them some innate stereotyped behaviour patterns. Pheromones are well-known in many species. They have been described in insects about 50 years ago, and more recently in mammals including rabbits (Hudson *et al.*, 1972). Different pheromones are known for rabbits (Pageat, 2004; Schaal *et al*., 2003). The product used in this experiment (RAP) is a mixture of fatty acids, esters and dimers of fatty acids secreted by the does during the 2 or 3 days periods before parturition. The secretion takes place on the belly skin, and is mainly present in the fur that the doe pulls out to prepare her nest. When applied in a corner of a box without nest, the structural analogue of this substance is responsible for appeasement and grouping of the progeny: the young rabbits crawl to the treated corner, and stay all together. This behaviour is not learnt, it is innate, reproducible and specific, as any response to a pheromone action.

To administer this product under intensive production system (keeping in mind that the product is released in the air, and so deeply dependant on ventilation systems), it was necessary to have a presentation: easy to use (that means with no need of heavy intervention by the farmer); diffusing a regular concentration of molecules; convenient for the way the production is managed; cheap. Following different approaches and laboratory trials, it was decided to focus on a device comparable to room scenter used for domestic purpose (Figure 1).

Figure 1: The device developed for release of RAP

This type of device is well-known; the presentation was optimised to make it safe, with a regular release of actives, which covers production time span. The devices are hanged under the cages, at entry. The way of use is shown on Figure 2 below.

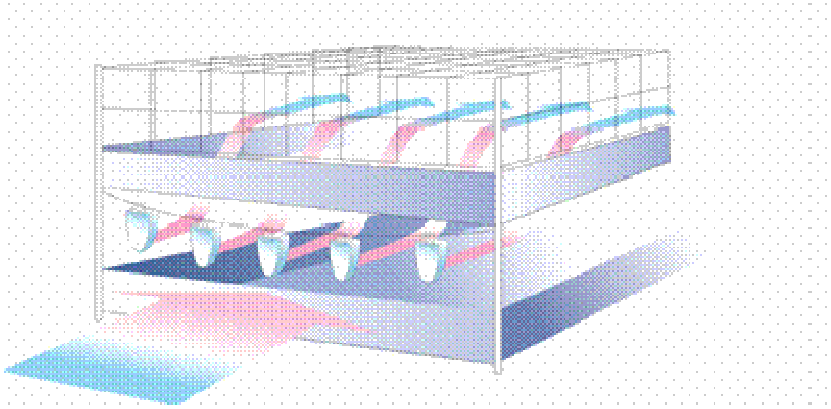

Figure 2: Implementation of RAP devices in a room

Trial design

The protocol of RAP application was designed and repeated in 9 different farms, in order to better compare and interpret the results of individual farms, and also to get a more global idea of the RAP activity by pooling all the data obtained, whatever the size of the farm, their location, the reason which motivated the inclusion in this trial, and the season when RAP was applied. All the test farms were under all in-all out system of management, with technical monitoring of production. RAP devices were introduced in the reproduction compartment 2 to 3 days before parturition, and remained there for 42 days until the next parturition. Thus, the litters grew under action of the product until weaning (35 days).

As the pheromones spread in the air, it was not possible under field conditions to have contemporary placebo treated control. Such protocols were previously performed, on small numbers of does in insulators, to prove the activity of RAP on behaviour (Pageat, 2004). Therefore, to verify the effect of the product, technical results obtained with RAP were compared to the results of the previous cycles. For this reason, only farms with regular technical monitoring and properly recorded data were included in this trial. The data were transmitted by the technician responsible for the farmer economical results.

RESULTS AND DISCUSSION

Behavioural aspects

In most of the cases, the farmer observed that the rabbits turned quiet, quickly after the introduction of the RAP (from a few hours to 1 day). Animals appeared less stressed, there was less noise when coming into the room, with less does throwing themselves against the partition of their cages. Farming activities, such as sweeping, nest manipulation, introduction of external personal, were easier.

One farm was especially demonstrating: this farm is close to an open quarry, and following a mistake made during its exploitation, the roof of the farm was knocked by a lot of small stones. After this accident, the does were so nervous that it became impossible to sweep the room without damage. The spreading of RAP improved the situation, and conditions went back to normal within 24 hours.

Pheromones were elsewhere considered of strong help to promote a new auxiliary nursing staff. Introduction of a new actor on the site is always difficult for farmers who dread stress reaction on their animals. With RAP, does kept cool with new people.

Besides, technicians often mentioned on the technical documents that the treated young rabbits were heavier and healthier at weaning.

Productive aspects

It is not possible to report here the results obtained in each farm, thus we will present the results in terms of fertility (percentage of parturitions per AI), live born kits per litter and percentage of kits mortality in only 3 farms, and global results obtained by pooling available data from all farms.

Farm 1
This farm was in a bad situation at the beginning of the trial: despite of many investigations, results were and had remained poor (Table 1). The RAP was applied in a 400 m² room peopled with about 440 productive does. 16 devices were used (1 for 25 m²). The table 1 below summarizes the collected data.

Table 1: Results collected in farm 1

	Results of 3 successive cycles just before using RAP			Results of 4 successive cycles, with RAP (first cycle: July 2005)			
AI (n.)	458	457	450	445	445	440	440
Fertility (%)	68.10	71.50	58	72.80	74	78.40	77
Live born kits per litter (n.)	8.32	8.09	8.28	8.51	8.46	8.40	8.64
Kits mortality (%)	4.70	3.20	7.20	5.80	6.70	4.80	5.00
Kg per AI*	10.37	11.24	7.32	11.21	11.35	12.92	14.04

*Weight of fattened rabbits sold per AI

In this farm, the main problem was the fertility, which improved from cycle to cycle, and so good (even still perfectible) results on 4 successive cycles had never been registered during the year before the beginning of the trial. The farmer also reported that the does were quieter, the rabbits at weaning of better quality, and the fattening period was easier and generated better profits.

Farm 2

The farm 2 has generally speaking good results in term of fertility, but poor results on litters. For the farmer, the objective was to improve the size of the litter and to reduce the mortality at birth. About 390 productive does were treated in a room of 330 m², with 12 devices. The Table 2 below summarizes the collected data.

Table 2: Results collected in farm 2

	Results of 2 successive cycles just before using RAP		Results of 2 successive cycles, with R AP (first cycle: March 2006)	
AI (n.)	389	395	384	376
Fertility (%)	83	82	84	84
Live born kits per litter (n.)	7.58	8.09	10.08	9.45
Kits mortality (%)	11.9	7.10	4.6	4.3

The results obtained on 2 successive treated cycles seem in favour of the use of the product. Mortality was reduced, mainly due to the reduced number of parturitions out of the nest. As pheromones are of maternal origin and targeted at maternal behaviour, such results were expected.

Farm 3

The farm 3 was of a large size: the product was implemented in a room with about 1040 productive does. This site had consistent but not optimal technical results, but it was an interesting site to monitor, because results are quite regular. The farmer wanted to test the RAP to improve the fertility, the size of the live litter and to limit the mortality. A total of 16 devices was put in a 410 m² room. The results obtained were in favour of the product (Table 3). The studied parameters were improved. In particular, mortality at birth was reduced from 6.26 to 4.31 % because the number of parturitions out of the nest was reduced. Additionally, the kilograms of fattened rabbits sold per inseminated doe rose from 15.39 to 17.34.

Table 3: Results collected in farm 3

	Results got on the cycle just before using RAP	Results got on the cycle with RAP (November 2005)
AI (n.)	1040	1064
Fertility (%)	75	78.66
Live born kits per litter (n.)	7.63	8.29
Kits mortality (%)	6.26	4.31

Pooled results

It is well known that rabbit production suffers from a great variability of performance from a cycle to another. This is why all the results obtained during these trials were pooled and submitted to a global analysis, irrespectively from the sizes of the farms, their location, the reason of use and the season when the product was applied. The aim of this meta analysis was to confirm the trends identified on individual results. Pooled results are summarized in Table 4 below.

Table 4: Pooled results

	Results of reference historical group (9 farms, 29 cycles)	Results of the treated group (the same 9 farms, 20 cycles)
AI (n.)	13090	8915
Fertility (%)	75,3	78.0
Live born kits per litter (n.)	8.8	9.3
Kits mortality (%)	7.3	5.9

The results obtained after pooling all the data collected during these extensive field trials are quite comparable to those recorded individually, suggesting that the individual results are representative. The rabbit appeasing pheromone, when applied to productive does, improves the technical results of the farm.

CONCLUSIONS

Extensive use of RAP on farms had the following major interests:

- behavioural indications as well as productive data were obtained with pheromones on a mammal species;
- behavioural responses are interesting: does are quieter when Rabbit Appeasing Pheromone is used, and manipulations are easier;
- productive data, as fertility, live born kits per litter and kits viability at birth seem to be improved. This trend, observed individually on farms, is confirmed when looking at the pooled results, which induce to retain that the improvement is independent of any season effect.

We hope to complete these data for the next years, especially by collecting information on focus indications, in order to enhance our knowledge as well as the knowledge of vet, technicians and farmers on rabbit behaviour during production phases.

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