TECHNICAL AND ECONOMIC RECORDING SYSTEMS EMPLOYED IN RABBIT FARMS MANAGEMENT.-

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The goal of this work is to present the technical and economic management as an useful tool for all rabbit breeders. It is useful in order to program jobs, to know the reality of production and to calculate results of the own exploitation through economical margins, comparing them with a management group or management results of the country.
Rabbit production systems are diverse. The point is not to show only one management system or to present optimum figures to be reached in every productive rate because there are different production systems and various commercial products.
It is important to encourage rabbit breeders who do not use technical management systems to begin to. They could enjoy the advantages of technical management. Technicians have to be also motivated to develop useful systems and to implement them on the rabbit production sector.
From the beginning, we have to notice the necessity for all rabbit breeders to manage. Technical and economic management system is a quite malleable tool to be adapted to all realities of rabbit production.

INTRODUCTION

Management: the art of taking decisions (LARROUSSE AGRICOLE, 1981).

As in another branch of rational livestock production, industry or commercial activities, also in rabbit it is not compulsory to demonstrate at the end of 20th Century, the necessity of practising a rational management.

Meat rabbit production, like other livestock species oriented to sale or to autoconsumption, has to be carried out on a rational way in order to reach the proposed goals. Some rabbit peculiarities have to be taken into account: nutrition, handling, pathology and management.

The main particularities of rabbit breeding that should be considered from a management perspective are:

1. **The reproductive cycle of a doe is very short: gestation arround 31 days. The consequence is high speed and big volume of generated information.**

Moreover, the high occupation rate of the littering cage (120-150%) increase the difficulty of recording and compiling data. Breeding schedule becomes embroiled: matings, palpation, kindlings and animal movements.

A doe rabbit, weighting around 4 Kg., needs every 30 or 45 days the same records than a sow of 200 Kg. every 120-150 days. Thus, a doe rabbit needs 210 times more records per kilo and per day. This foolishness could demonstrate the complexity of the problem (TREMOLIERS, 1977).

This double perspective: planning of reproductive tasks and reflexive analysis of the technical and economic results oblige to record all generated information.

In dairy cattle, to control milk production it is necessary to note the daily individual milkings. Global production is estimated with sampled milkings along the lactation span recorded by external personal.

In rabbit the complexity of the notes previously cited is intensified because all of them have to be recorded by the own producer.

2. Another aspect to take into account is the diversity of rabbit production systems. Model is not unique and optimum management system does not exist if it is not adapted to the production system.

Management system is a sufficiently flexible tool to be fitted to every production reality. Requirements of a management system for a French rabbit breeder with a unique band every 45 days and the overoccupation of 150% are very different to the management necessities of a Tunisian breeder with 10 doe in a rabbit-warren on the floor.

Nevertheless, both rabbit breeders need a management system to know their own exploitations, its most restrictive aspects and to take decisions to improve. We do not have to make the mistake of convincing the Tunisian breeder to go shopping the late cages. We have several indexes in certain management system where the unit of production reference is the littering cage. If we want, erroneously, to implement this system in his country, we should meditate which are the real management needs of every breeder with its own specific productive structure and how it is possible to plan an useful technical and economic management. Management systems have to be adapted to each productive system situation, without any aim to change the production conditions to be adapted to the requirements of a concrete management system. The last aspect could break the equilibrium and the rationality of many production systems completely right.

Rabbit management is not an invention of technicians or researchers. Rabbit management has been inspired on traditional management of other livestock species with an adaptation to rabbit particularities. But the main objective is maintained: to contribute the maximum detailed information about production performance and to provide the economic results to take improving decisions.

Other singularities of the rabbit breeding are:
- a large number of reproducers to be individually controlled.
- animals with different physiologic states (even overlapped).
- cohabitation in the same farm of the animals with different age and of different żootechnical realities: maternity unity, fattening units, etc.

TECHNICAL AND ECONOMIC MANAGEMENT IN OTHER SPECIES

Management models in rabbit are basically inspired in pig systems because of the biological resemblances (litter), handling similitudes (mating, kindling, weaning) and the kind of commercial product (meat).

1. Pigs

Price of suckling pigs and pork meat have a classic cyclicity. Sometimes, despite of the technical optimisation of the cost of production, the economic profit is doubtful. The economic survival of a pig farm is based on getting the highest economic yield on favourable periods and reducing the costs (or losses) during unfavourable periods.

In both moments, technical and economic management plays a fundamental role (DAZA, 1995).

Any pig farmer who pretends to get enough global economic profits will get reproductive results conducting to optimise the numeric productivity of the sow. It is defined as the average weaned young pigs by sow and year of reproductive life.

Variates affecting to the numeric productivity are:
- litter size at weaning by farrowing, affected by
- interval lactation between prolificity farrowing.

When numeric productivity is studied, other factors are also studied:
- age at first mating.
- percentage of primiparous.
- interval between last weaning and discharge
- average age of renewal.

2. Milk cattle

On the economic current context, cattle farmers must not be satisfied making an approximate or intuitive management.

Several technical and economical rates or indexes are usually used in order to analyse dairy results. It is necessary the valuation of forage related with the use of concentrate, the knowledge of individual milk outputs, the definition of the herd handling.

In many dairy farms, it is not possible to increase milk production, and farmers have to be focused on a better production. In front of posed difficulties cowmen should utilise all the available management tools in order to take the best possible decisions.

Quality of technical and economical management is now more determinant than ever in maintaining or developing milk activities (METGE, 1990).

RECORDING DATA SYSTEMS AND JOB SCHEDULING

In order to manage it is necessary to dispose of the most reliable and sufficient figures which represent the functioning of the activity. These data are obtained through recording data in a technical and economical level.

Rational handling of reproductive tasks need a solid schedule which requires the existence of indispensable documents for an efficacious management: buck and doe cards and chore sheets (planning).

Male and female cards are very useful to record all the previous performances or actions. The role of them is memory.

Planning is a schedule tool -starting from a task, the following action has to be carried out in a programmed date (v. gr. mating and palpation).

Does record card

Doe record: is an indispensable item. There are a lot of models (ABADIE, 1979; MERCIER, 1979; MAINGUENE, 1986; CHEEKE *et al.*, 1982). All of them are based on a double entrance table. Characteristics to be recorded are disposed on rows. Every column informs about one productive cycle.

Female cards have to record:

Identification:	-cage number
	-tattooing
	-strain or type
	-birthday
Reproductive life:	-mating: date and behaviour.
	-mated male
	-palpation
	-kindling: date, total litter size and born alive
	-weaning: date litter size and, eventually, weights.
Disposal or removal:	
	-date and cause

These cards reflect the doe reproductive life. Besides to memory, cards are particularly useful to decide reproducer removal. Criteria are dependent on the exploitation and have to be applied in function of the own conditions (animal genetic origin, marketing conditions, season, etc.)

Bucks record card.

They allow to control whether or not a buck has settled the does, to detect quickly animals with low fertility and to remove them.

As in females, the organisation of the record card is also a double entrance table. Several characteristics are disposed on columns. Every row corresponds to every service (mating). Data to be recorded could be:

- Identification: -cage number
  -tattooing
  -genetic origin
  - genealogy
  -birthday
- Reproductive life:-date of mating
  -female
  -palpation
  -litter size at birth
  (it if was possible, viability and growth of the young rabbits)
- Removal/Disposal:
  -date and cause

This kind of record could be optional. The majority of the farms forgets it, for difficulties on manual handling. Informatic systems eliminate this limitation and shows fully the efficacy of recording the data on buck cards.

Plannings

Planning allows the breeding schedule of the handling jobs in the rabbitry: females to mate, palpations to check for pregnancy, next boxes to go in, weanings, etc. Planning could appear in different ways: from a simple calendar or an organised notebook where the different tasks are assigned specifying the date to be done in function of the previous carried out operations. For example, if a doe (with its number or identification) is mated the day D, we have to write the identification of the doe on the palpations box at day D+11. If palpation has a positive result, we leave to make a note at day D+25 to put the nest box. Handling of every farm will decide the operations to be carried out and intervals between them (ROUSTAN, 1992).

Other planning models are: lineal, circular or pigeon-holes.

Lineal plannings are normally printed on paper. It is necessary to write down identifications of every animal on the corresponding day-operation cell (MERCIER, 1979).

Circular plannings have a backing that is affixed to the wall and a circular, central position that is moved one step each day. Markers indicate each breeding female. As management action is made, the marker is moved forward to the date when the next management step needs to be taken (McNITT, 1986). It is also possible to draw concentric circles to put the does when is necessary to repeat a management action (COUSIN, 1975).

Lineal and pigeon-holes plannings are based on a double entrance table. Rows record the operations to be carried out and columns are the month days.

With the pigeon-hole system, the moving element is the doe card. Females are grouped by operation to be made in a date. When the action has been carried out, cards are moved to the next operation-hole.

It has to be noted that plannings which use the identification number do not save any information and they can lose it. Females with fertility problems could miss their normal reproductive cycle. Accidents could happen: fallen or lost markers (CORDIER, 1975).

Band handling, grouping animals by their physiologic state, allows to leave out the planning. This function is accomplished by the own rabbitry.

The use of breeder cards and planning together allow to follow in an accuracy way the state of the production. Is it not strange to observe confused uses of both tools. It is possible to find a rabbit raiser consulting all their cards to organise the actions to be made or recording productive results on the planning to be regarded to manage or to be used to know the animals background.

THE ROLE OF COMPUTERS

Support and process of the information for a good economical and technical management could take more or less sophisticated forms in function of the unity size and of the social or economic context.

Cards and plannings have been, they are and they will be of great efficacy. Computer allows to reach the same objectives in a new way, very useful but not indispensable.

A rabbit raiser who pretends to informatize the rabbitry has to evaluate repercussions of the investment (software and hardware) on the balances and improvements to be obtained. Farmer should dispose of a system able to record the productive data on the cards, to organise the handling actions and to carry out a technical and economic management at real time.

Rabbit breeder must demand to management programs:

1.- To be a good memory (individual cards)
2.- To be a good schedule (planning system)
3.- To be a good analyser (management).

Programs must have got to be most effective :
-automatic queries to detect errors when data are entered, improving the quality of the recorded data
- the ability to correct or to modify mechanically in order to avoid undetectable errors manually introduced.

NUMERIC PRODUCTIVITY: MAIN FACTORS

Incomes from a meat rabbitry are mainly dependent on numeric production. One of the most used figures is the number of young rabbits sold by female and year.

This expression requires several specifications:

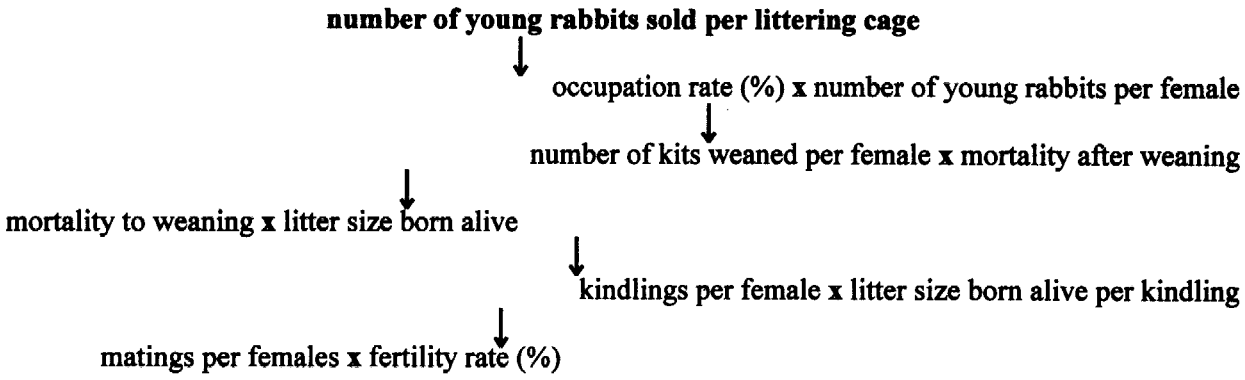
In intensive rabbit breeding it is normal to use the number of rabbit sold in order to know if the farm is well handled. This unit impede comparisons between exploitations over different marketing realities (for example: carcass commercial weight). In Spain animals reach the commercial weight at 1,950 g., but in France animals are slaughtered with a liveweight of 2,400 g., and in other countries young rabbits arrive to 3,000 g. These differences on sale weight and the number of produced kilos of meat will vary from one place to another.

The inclusion of temporal unity (year) on the division pretends to evaluate with wide perspective and to eliminate the variations caused by seasonal influences when the analysis period is very short. New handling systems (bands), and specially when the band is unique (42-45 days) have obliged to redraw the management system and to change the temporal unit, from chronological time (month, trimester, year) to become the band (KOEHL, 1994).

Littering cage is the cage where a nest box is put. The number of this kind of cages define the number of males, fattening, gestation and renewal cages. This figure is the economical unit. But in some models of production female cage does not exit, for example, using polyvalent cages or when rabbits are in colonies on the floor.

Every implanted management system on a rabbit exploitation has to allow a constant pursuit of numeric production, but also its breaking up in all their components, expressed by the perspective of female cage or by the own female. Both realities have not to be confused. Female cages are the economical unit of reference. Females are the technical element of production. Historic perspective of these two elements allow to understand why the confusion appears. Initially, the number of female cages was larger than the number of females in production. This situation allowed to identify each female with the inhabited cage during all their productive life, Both terms were equivalent. Now the situation has been inverted. The number of active does is larger than the number of female cages (overoccupation). This new state has obliged to identify individually every cage and every animal. One female cage is occupied temporally by females during a short part of their reproductive cycles.

Main elements affecting on the numeric production (KOEHL *et al.*, 1990).



MANAGEMENT MODELS

Management programs can consider the production individually **(Individual Management)** or can consider the results of an group of animals or the farm as a whole in a period **(Collective Management).**

According to the way this information is used, we name **Particular Management** when the rabbit raiser is not connected with other producer and only use the own information, or **Global Management** when the management program considers the results of a producers group (association) or collective in addition to the particular information.

Every system has its advantages and its troubles. It is not possible to decide in an absolute way which is the best (BRUN, 1978).

1. Individual Technical Management (GTI)

Individual management systems are based on recording data related with the productive life of every animal, individually (ROUSTAN, 1992).

The base information is recorded throughout female cards, at the end of every productive cycle. A detailed balance is provided for periods (weekly, quarterly, yearly). The repercussions on the average production of every producer item (animal) are analysed.

Normally, maternity is controlled to the weaning with a technical perspective. The management system on the fattening period is global, including economical data. This division is related with the troubles to pursuit every kit from weaning and transfer its data (weight, growth rate, mortality) to mothers records. Animals during postweaning period are only identified on rabbit breeder's farms.

The first GTI system was created in 1976 by INRA and GIE-Midi-Pyrénées. First, it was conceived to provide to the rabbit raisers information which allowed them to take decisions to improve. Second, the objective was also to create a data base to supervise the efficiency of different selection plans, taking into account the diversity of production conditions (ROUSTAN, 1978).

This system ("Contrôle de performance" CPL) is based on the monthly data transmissions from rabbit units to the INRA. Data are summarised in two documents. First, the new introduced reproductive animals and second the interchange sheet with performances on the reproductive cycle (mating, kindling, weaning). INRA compiled these figures from different producers, processed the data and pointed balances and the next interchange sheet.

Nowadays, this system is mainly used by breeders associated with INRA who demultiply the experimental strains. The interest lies on the ranking of homologue females. The selection efficiency at different levels and at different realities is also pursued.

In Spain, a similar GTI system was stated in 1980, named PCR (RAFEL, 1984). The same necessities of controlling the effectiveness on the transmission of genetic advances obtained by the lines selected by IRTA and diffused to the rabbit sector through a classic pyramidal scheme.

Requirements, functioning, evaluation tools and output balances are practically the same because of the common point of starting. Both systems have evolved in parallel.

Development of personal computers has permitted to implement several daily individual management software. These programs offer to the farmer, at the same time, a planning system, breeder cards and technical and economical output balances.

The main advantage of these systems is to provide information in real time.

CHEECKE *et al.* (1982) explain in Rabbit Production a management system developed in the United States. In France, several systems cohabit: CLAP and CPL MICRO. Both systems allow to manage the farm in an individual and particular way, but it is possible to connect (via diskette) with the "Control of Performances" of INRA in order to obtain comparative results in the group of reference.

2. Technical and Economical Management (GTE)

Different systems of Collective Management are normally presented under a global aspect.

All of them are based on collecting periodically the main zootechnical events in order to characterise all exploitations. Recorded data are: number of matings, number of kidlings, number of born rabbits, number of weaned rabbits, number of sold rabbits, in and out of animals during, a given period of time. Individual results are not taken into account, it is enough to record the written notes on the planning or on the notebook.

Data are transferred to a tabulated document. In columns, several criterions to be recorded, and in rows the days of the period to be registered. The document is sent at the end of every period to the emcee of the group or to the centre of data process. Information is processed to obtain the group balances and averages.

In order to overcome the time lapsed between the end of the period and the reception of the output, KOEHL (1992) presented a system which allows to send the outputs by phone or by Minitel terminals. The answer is immediate and the emcee can pursuit and advice the group outputs.

With these management systems, farmers can compare their productions with their objectives or with the average of the group to realise the slack and strong aspects of exploitations. They could not ever tune their diagnostics because of the partial knowledge of the reality: they know the means but have not the variability provided by each animal.

These systems illustrate the technical and economical efficacy of the farm because they inform about maternity, fattening and economical situations.

Technical-economical management programs are the most extensive around Europe. In Spain, ten management groups exist (RAFEL *et al.*, 1995). In France, this figure is lower: seven groups (POUSOT, 1995). In Italy, XICCATO (1990) and FACCHIN *et al.* (1994) presented several management models.

We have to insist on the rewards obtained by the rabbit raiser in spite of the recording efforts. Thanks to the obtained information the producer can know most accurately its exploitation and can, possibly, analyse it to advance in the suitable direction, optimising the performances. We have to emphasise the role of the emcee and the possibility of finding out reference data from the records of all raisers.

EMCEE ROLE

In front of the complex reality represented by a rabbit farm and the time invested on taking data, it is indispensable to motivate the breeder to understand the fruit of this labour.

The goal is not to fill papers with data, to complete printer sheet or to compile reproductive cards. Time invested on recording data has to be rewarded. Otherwise, the rabbit farmer will be lacking in motivation to carry out this task.

When raisers are included on a management group, they have as supplementary advantage the support of the emcee. Its presence increases the efficacy of the management system. Moreover, it has to assume several aspects:

- Motivation: it has to explain what is this, why is it suitable and the advantages of management system.
- Formative: the rabbit raiser has to be able to understand the received information and to detect the key points and to know the relationship between different rates or figures.
- Proposal: it has to propose alternatives to handling systems in order to improve results, it has to evaluate the answer of each rabbit raiser to the proposed changes on the handling patterns.

OUTPUTS OF MANAGEMENT PROGRAMS

Results of management have to be showed in a clear way form in order to provide to users of the management system a detailed information.

Normally, presentation of the results is made using periodic balances (monthly, quarterly, yearly). Every kind of users has adapted these reports to their own requirements in order to get figures which allow to reach its objectives.

Rates or figures are presented in two ways: synthetic (number of young rabbits per littering cage and year) or analytic (age at first mating, mortality). Results are not more than a link of the work chain. They help to guide searching the causes, but they do not give the solutions to be adopted on these handling techniques. At this point spring up the role of the emcee of the management group. It is not easy to search right solutions. KOEHL *et al.* (1990) proposed a simple method to analyse the output because they had realised many rabbit farmers did not operate output balances enough.

It is also important the formal presentation of the results. Balances have not to be a long list of indexes, rates and figures. Different ways of presentation allow to show that it was no evident in a first analysis or it seemed no logical

Presentation is function of the kind of user and the used program.

1. Individual farmer output

The first possible users are rabbit raisers few developed and not grouped. The level of analysis of management data to make is to use the information on doe and buck cards to remove animals (TREMOLIERS, 1977), carry out simple synthesis and to calculate by hand several rates.

Another particular user is an informatized one. Requirements are the knowledge of the global results and also the variations provided by each breeder animal on every rate in real time. It is important the limiting fact of not having reference data to compare. But it is possible to articulate mechanisms to make periodically these comparisons.

2. Management group output

When raisers are grouped, they have the advantage to dispose besides the own results, the average figures of the management group. Comparisons allow to locate our exploitation opposite other possible realities of production. If our results differ we have to take measures consequently.

In Spain, results coming from ten management groups are published every year. Two of them are organised by Rabbit Associations, four of them by Public Institutions and the remainder by Food Companies (RAFEL *et al.*, 1995).

In France, output balances coming from seven management groups are also published yearly, with national or regional scopes (PONSOT, 1995).

The goal in both countries is to offer a superior level of information and make possible to compare as a tool to improve the results. In this sort of presentations by group it is a mistake to compare between them and to rank them according to a criterion. Every management group is consequence of a context, a reality and several specific objectives. Variability among results from different groups is high, but a certain equilibrium is maintained within them.

Tables 1 and 2 show the outputs of management groups implanted in Spain and in France.

Table 1 : Outputs of Spanish management groups (1994)

MANAGEMENT PROGRAM CRITERIA	1	2	3	4	5	6	7	8	9	10
PER LITTERING CAGE AND YEAR										
NUMBER OF FARMS	41	19	7	5	14	166	14	67	40	15
NUMBER OF LITTERING CAGES	15960	6069	2002	2722	4458	54759	4180	16884	13340	3203
OCCUPATION RATE (%)	125	116	107	119	131,5	118		118	118	113
RENEWAL RATE (%)	113	124	89	141	100,8	124		122	120	121
NUMBER OF MATINGS	12,4	11,3	10,2	11,7	12,7	11,1	11,7	11	11,9	9,7
KINDLING/MATING (%)	74,8	74,7	74,8	69,8	71,2	73,2	73,6	78,9	72,6	71,3
KINDLING INTERVAL (d)	39,2	43,8	47,4	45,7	40,8	45,1	40,9	42,2	42,8	47,1
NUMBER OF PARITIES	9,3	8,3	7,7	8,1	8,9	8,1	8,6	8,6	8,7	7,7
LITTER SIZE AT BIRTH / KINDLING	8,4	9,1	8,9	8,9	9,0	8,8	8,6	9	9,3	8,5
NUMBER OF BORN	78,0	75,5	68,9	72,1	80,3	71,3	73,9	73,2	80,8	65,5
MORTALITY TO WEANING (%)	14	14	6,7	13,5	14,3	14,8	11,1	12,8	17	16,3
LITTER SIZE WEANING/ KINDLING	7,3	7,4	7,8	6,9	7,6	7,1	7,2	7,4	7,2	6,8
NUMBER OF WEANED	67,5	61,4	55,1	55,9	68	57,5	61.0	63	62,4	52,2
MORTALITY AFTER WEANING (%)	4,9	4,3	5,5	6,2	6,7	5,8	6,1	4,9	9,1	6,9
NUMBER OF SOLD RABBITS	60,9	57,7	51,6	53	61	55,1	59,2	60,7	56,7	48,6
AVERAGE SALE WEIGHT	1,985	1,927	2,000	2,010	1,984	1,904	1,910	1,960	1,950	1,999
AVERAGE SALE PRICE		246,5	245,6	234	240,6	247	250,8		227	
CONVERSION RATE	3,9	3,9	3,9	3,8	3,8	3,8	3,9	3,8	4,1	4
AVERAGE FOOD PRICE	28,8	29	29,3	30,9	29,4	29	31,9		33,1	
MARGINS FEED EXPENDITURES PTS.		14604	13709	12330	15608	15765	13223		10284	
PER FEMALE AND YEAR										
NUMBER OF MATINGS	9,9	9,8	9,5	9,8	9,7	9,4		9,3	10,1	9,7
KINDLING INTERVAL (d)	49,9	51	51,5	54,4	53,9	52,9		49,8	50,53	53,3
NUMBER OF PARITIY RECORDS	7,4	7,2	7,2	6,8	6,8	6,9		7,3	7,4	6,8
NUMBER OF BORN RABBITS	62,6	65,5	64,1	60,2	61,1	60,7		62,6	68,8	57,9
NUMBER OF WEANED RABBITS	54,2	53,3	51,3	47,4	51,7	49		54,1	52,9	48,5
NUMBER OF SOLD RABBITS	49,4	49,6	47,9	44,9	46	46,3		51,5	48,1	45,2
TOTAL SOLD WEIGHT	98,1	94,8	94,1	90,2	91,3	88,2		100,9	91,2	90,4
MARGINS FEED EXPENDITURES PTS.		12558	12659	10053	11869	13248			8652	

Source. RAFEL *et al.*, 1995
1-EUSKADI, 2-CATALUNYA, 3-GESCON, 4-GESTICON, 5-NAVARRA, 6-NANTA, 7-VALENCIA, 8-CUNIHENS, 9-COGAL, 10-NUTEGA

Table 2 : Outputs of French management groups (1994)

MANAGEMENT PROGRAM CRITERIA	AVILAP	GLMC	TECHNIPLUS	MICRORABLO	CUNITEL	TEC'LAP	LAPICAL.
PER LITTERING CAGE AND YEAR							
NUMBER OF FARMS	154	127	28	331	90	77	240
NUMBER OF LITTERING CAGES	36498	20066	6076	65538	21177	13629	41760
OCCUPATION RATE (%)	152	137,9	147,2	147,2	151	153,5	151,4
RENEWAL RATE (%)	119	114,3	112,9	117,6	131	131	122,17
NUMBER OF MATINGS	13,9	12,8	13,28	13	13,8	13,03	14,4
KINDLING/MATING (%)	77,7	74,9	78,46	78	76,5	82,6	75
KINDLING INTERVAL (d)	34,9	39,31	36	37,1	35,2	33,76	34,78
NUMBER OF PARITIES	10,5	9,5	10,43	10,1	10,5	10,81	10,81
LITTER SIZE AT BIRTH / KINDLING	9,72	8,81	9,72	9,9	9,2	10,18	9,25
NUMBER OF BORN	104,6	84,2	97,94	100,1	97,5	110,21	100
MORTALITY TO WEANING (%)	17,4	16,8	17,07	19,6	18,7	13,54	16,54
LITTER SIZE WEANING/ KINDLING	8,03	7,13	8,02	7,9	7,5	8,15	7,52
NUMBER OF WEANED	86,5	68,6	84,15	80,5	79,2	88,98	81,51
MORTALITY AFTER WEANING (%)	10,3	11,7	9,69	12,7	8,6	8,46	10,83
NUMBER OF SOLD RABBITS	77,6	60,2	75,45	70,3	68,3	82,66	81,47
AVERAGE SALE WEIGHT	2,34	2,38	2,32	2,36	2,36	2,39	2,38
AVERAGE SALE PRICE	9,91	258,06	239,95	250,09	244,78	238,74	252,5
CONVERSION RATE	3,68	4,12	3,63	3,89	3,86	3,72	3,81
AVERAGE FOOD PRICE	1,30	1,49	1,35	1,4	1,41	1,35	1,4
MARGINS FEED EXPENDITURES (FF)	916	652	836	775	729	962	804
PER FEMALE AND YEAR							
NUMBER OF MATINGS	9	9,28	9,04	8,9	9,2	8,49	9,5
KINDLING INTERVAL (d)	52	54,21	51,88	54,61	53,1	52,07	52,64
NUMBER OF PARITIY RECORDS	7	6,39	7,09	6,8	7	7,01	7,14
NUMBER OF BORN RABBITS	69	61,61	68,75	67,7	64,6	71,5	66,17
NUMBER OF WEANED RABBITS	57	49,75	57,24	54,4	52,5	57,73	53,85
NUMBER OF SOLD RABBITS	51	43,65	51,35	47,6	45,4	53,7	47,22
TOTAL SOLD WEIGHT		103,89	119,13	112,3	107,1	128,3	112,4
MARGINS FEED EXPENDITURES (FF)	604	652	652	652	652	652	652

Source: PONSOT J.F., 1995

3. National Synthesis

Actual synthesis correspond to countries which have obtained information thanks to several informative mechanisms. These synthesis are not exhaustive and they do not pretend to be exclusive.

State synthesis works have a double utility. They provide a higher level of comparison to the individual producer. These synthesis convert the results of management programs to reference data which define the functioning of the rabbit production in the country. This reference is very useful for public institutions and for general colectivity.

In France, ITAVI takes charge of this yearly synthesis. Several calculations are made and several rates and figures are presented for all management groups. It is named RENALAP (KOEHL, 1995).

In Spain, the synthesis is carried out from the data provided by the management groups and several rates are recalculated (RAFEL *et al.*, 1995).

In Belgium, the trade Versale-Laga Konijneboekhouding centralise a management group which include their customers. In Hungary, a management plan is foreseen similar to other countries including rabbitries larger than 50 females (KUSTOS and SZENDRO, 1996; SZENDRO (personal communication)).

Tables 3, 4 and 5 show the synthesis of Spain, France and Belgium.

In Spain, the sale price of life animals is deteriorated (from 1991 to 1993). The margins on feed expenditures was affected. No variations are detected on the technical rates oriented to increase the number of young rabbits sold by cage (overoccupation) or to improve genetic quality of animal to counteract the negative effect of the sale price.

In France, with a large historic series, technical and economical variations could be observed. The sinking of the price of sale caused a decreased Margins on feed expenditures / littering cage / year, but the rabbit raisers increasing the numeric production per cage, augmenting the overoccupation, and modifying the work organisation and the handling techniques: Batches handing, A.I.) and the genetic quality of females, working with a most relaxed rhythms to express all their genetic potential.

In global, evolution of the results in Belgium is not noticed possibly because of the reduced number of farms and years involved.

Table 3 : Evolution of synthesis in Spain

YEAR / CRITERIA	1991	1992	1993	1994
PER LITTERING CAGE AND YEAR				
NUMBER OF FARMS	289	320	334	388
NUMBER OF LITTERING CAGES	90465	96366	103272	123577
OCCUPATION RATE (%)	118,20	113,70	117,71	119,0
RENEWAL RATE (%)	126,00	120,81	117,99	120,7
NUMBER OF MATINGS	10,90	11,19	11,35	11,4
KINDLING/MATING (%)	73,10	73,79	74,13	74,0
KINDLING INTERVAL (d)	42,45	44,64	43,54	43,4
NUMBER OF PARITIES	8,00	8,28	8,45	8,4
LITTER SIZE AT BIRTH / KINDLING	8,70	8,69	8,70	8,9
NUMBER OF BORN	69,80	70,16	70,80	73,0
MORTALITY TO WEANING (%)	15,10	15,12	13,50	14,4
LITTER SIZE WEANING/ KINDLING	7,20	7,04	7,13	7,2
NUMBER OF WEANED	56,20	57,35	59,14	60,5
MORTALITY AFTER WEANING (%)	5,80	6,24	5,36	5,9
NUMBER OF SOLD RABBITS	50,60	54,11	55,09	57,0
AVERAGE SALE WEIGHT	1,95	1,95	1,95	1,9
AVERAGE SALE PRICE	300,90	259,51	229,30	241,0
CONVERSION RATE	4,10	4,07	3,90	3,9
AVERAGE FOOD PRICE	27,40	30,47	30,00	30,4
MARGINS FEED EXPENDITURES (pts.)	16755	14426	12420	13809
PER FEMALE AND YEAR				
NUMBER OF MATINGS	9,30	9,89	9,69	9,6
KINDLING INTERVAL (d)	50,30	50,40	51,17	51,8
NUMBER OF PARITIY RECORDS	7,00	7,28	7,16	7,1
NUMBER OF BORN RABBITS	59,10	62,86	60,80	62,4
NUMBER OF WEANED RABBITS	47,40	50,20	50,44	51,2
NUMBER OF SOLD RABBITS	43,50	47,14	46,79	47,8
TOTAL SOLD WEIGHT	84,70	91,62	91,95	92,3
MARGINS FEED EXPENDITURES (pts.)	14173	12414	10762	10697

Source.RAFEL *et al.*, 1995.

Table 4 : Evolution of synthesis in France

CRITERIA \ YEAR	1983	1985	1990	1991	1992	1993	1994
PER LITTERING CAGE AND YEAR							
NUMBER OF FARMS	404	488	585	922	1101	1108	1104
OCCUPATION RATE (%)	104	114	137	142	142	147	148
NUMBER OF LITTERING CAGES	142	153	165	170	180	186	203
RENEWAL RATE (%)	141	157	142	135	1331	122	120
KINDLING/MATING (%)	68	69	71	72	73	75.5	76.5
NUMBER OF PARITIES	7.7	8.5	9.9	10.2	10.2	10.4	10.2
LITTER SIZE AT BIRTH / KINDLING	8.3	8.6	8.8	9.0	9.1	9.3	9.6
MORTALITY TO WEANING (%)	21.3	24.3	19.4	19.4	19.1	18.9	18.6
MORTALITY AFTER WEANING (%)	14.9	12.4	13.2	12.7	12.9	12.5	11.5
NUMBER OF SOLD RABBITS	42.8	47.9	61.3	64.6	65.4	69.3	70.6
AVERAGE SALE WEIGHT	2.33	2.34	2.34	2.34	2.36	2.38	2.36
CONVERSION RATE	4.37	4.22	4.00	3.97	3.95	3.92	3.84
AVERAGE FOOD PRICE	1.67	1.71	1.56	1.52	1.53	1.47	1.4
AVERAGE SALE PRICE	12.57	13.02	12.62	12.84	11.99	10.69	10.32
MARGINS FEED EXPENDITURES (FF)	526	650	915	1029	918	813	824
PER FEMALE AND YEAR							
NUMBER OF MATINGS	10.9	10.8	10.1	9.9	9.8	9.5	9.0
NUMBER OF PARITIY RECORDS	7.4	7.4	7.2	7.2	7.2	7.07	6.90
NUMBER OF BORN RABBITS	61.4	63.4	63.9	64.6	65.3	66.4	66.4
NUMBER OF WEANED RABBITS	48.4	48.0	51.5	52.1	52.9	53.9	54.1
NUMBER OF SOLD RABBITS	41.1	42.1	44.7	45.5	46.0	47.1	47.8

Source: RENALAP ITAVI. KOEHL P.F., 1995

Table 5 : Evolution of synthesis in Belgium.

CRITERIA \ YEARS	1992	1993	1994
NUMBER OF FARMS	25	25	25
NUMBER FEMALES	231	258	315
OCCUPATION RATE (%)	96	92	97
RENEWAL RATE (%)	104	112	99
KINDLING INTERVAL (d)	49	48	50
FECUNDITY RATE	66.4	67.7	64.5
PROLIFICITY RATE	63.5	63.4	62.2
LITTER SIZE AT BIRTH / KINDLING	8.4	8.3	8.4
LITTER SIZE BORN ALIVE	7.9	7.8	7.9
LITTER SIZE WEANING/ KINDLING	7.5	7.3	7.3
BORN/ DOES / YEAR	64.0	63.0	62.8
NUMBER OF WEANED	56.8	55.2	54.5
NUMBER OF SOLD RABBITS	44.0	44.4	43.4
MORTALITY TO WEANING (%)	12.8	14.2	13.4
MORTALITY AFTER WEANING (%)	7.7	6.5	8.0
CONVERSION RATE	3.99	3.96	4.09
AVERAGE SALE WEIGHT	2.39	2.46	2.47

Source: LUZI *et al.*(1995) and VERSELE-LAGA (communication personal)

4. Research works based on management programs

Data of management programs constitute an important database with very valuable information about rabbit sector. Its analysis can help to detect productive problems and moreover can help to find right solutions.

These research works use data coming from technical and economical management programs or from individual management.

Works based on GTI - Research has been focused on the individual performances and not on the global functioning of the farms.
Majority of works have been made using the database coming from the "Contrôle de performances. INRA". First works were carried out by ROUSTAN at the beginning of 80's.
Study about young rabbits mortality before weaning showed the dependence of this character on the factors related with female, environmental factors (ROUSTAN, 1980)
ROUSTAN *et al.* (1980) carried out an intensive report about adoptions techniques in order to know the influence on the viability of pups. Data from 25.415 litters were used (5.492 adoptions).
Another utility of the individual management program has been the foundation of a line with females named "hiperprolific" developed by INRA. A new strain was constituted with the progeny of females with exceptional parity records (ROCHAMBEAU, 1985).
The same management program has been used to estimate in farm the heterosis on numeric traits (BRUN *et al.*, 1994).
The "Control of Performances" is also used to control rabbit selection scheme in France. Demultiplication step adds another stage to the breeding scheme and allows to overcome the limitation of diffusing reproducers to the sector.
Demultipliers have to use individual technical management in order to predict the breeding values of animals and to detect indirectly sanitary troubles from the zootechnical outputs (ROCHAMBEAU, 1994).
Finally, technical individual management has been used to characterise and to evaluate the productivity of the "Argenté de Champagne" breed (PERRIER, 1984). A project of the European Commission foresees the utilisation of GTI to characterize several rabbit breeds to conserve these genetic resources coming from several European countries.

Works based on GTE - As the works based on GTI, research based on technical and economical management (GTE) are focused on detection of global troubles and proposing solutions.
HENAFF *et al.* (1986) studied about fertility and thought how to improve it determining the favourable factors. Data coming from GTE of 50 French farms from 1983 to 1985 were analysed. Conclusions were: the main role of the raiser, importance of reproductive rhythm, male surveillance and good mating handling (observation of vulva colour and mating visual control).
Because of yearly summaries of GTE published in France do not answer all the questions posed by technicians and rabbit raisers. KOEHL has made several complementary studies in order to delve deeply into.
KOEHL (1994b) made comparisons between rabbit farms with good and bad productive results. Information was coming from 149 rabbitries. He defined as good outputs farms with more than 82 young rabbits per littering cage and per year and bad outputs when production was lower than 43.5 bunnies per littering cage by year. Data were obtained thanks to RENALAP (1992). Differences in productive performances were due, mainly: a) reproductive handling, b) animal genetic quality, c) sanitary quality.
Annual reports of meat rabbit farms following technical and economical management are published in France from 1983.
Variation among good and bad results is about 25%. KOHL (1994c) tried to find out if outputs evolution along the years is also observed on the farms which were using management systems permanently. As main conclusion the author realise that the evolution of individual managed farms are near to the annual RENALAP reports. However, differences were detected and evolution was dependent on occupancy percentage of cage, mortality during fattening period and lightly by the reproductive rhythm. KOEHL also marked the difficulties of the farms to maintain a high productive level more than three years.

PROFIT FARM IMPROVEMENT. HOW TO IMPROVE THE PROFIT OF THE FARM

Profit in a rabbit farm oriented to meat production is dependent on numeric production, on weight of sale, on price and on production costs.

Price is à variate depending on market laws. Rabbit raiser has little or no possibility to influence on it directly. In developed countries, one possibility to add an extra value on the product is to provide it a distinction from the others, allowing a higher selling price. FACCHIN (1996) propose a rabbit meat production with a high hygienic sanitary conditions, focused on the reduction of pathogens and residues.

The best tools for the producer are: increases of numeric production and reduction of productive cost per unit.

Numeric production improvement has to be focused on several points: female, littering-cage and efficacy of handling. When numeric productivity reaches a roof, improvement has to be oriented on the production of the same kind of final product with the least time of work, optimising the output by hour. Artificial insemination and batch handling are determinant in reducing timeworks (KOEHL *et al.*, 1996).
Management system plays a decisive paper in this process.

CONCLUSIONS

1. It is very interesting to implement management systems in countries where they have not arrived yet. Also it is very important to impulse the existing ones.

2. In order to provide more information to producers, the actual management programs have to diffused their reports widely.

3. Technicians have to work to find out criterion to homogenise the calculate process to make comparisons between management systems in the next future.

4. A centralised database files with management system information of several countries could be very useful to exchange experiences, to detect boundary elements in different production systems and to develop studies which should propose the best solutions.

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