

INTERNATIONAL COLLABORATION IN RABBIT REPRODUCTION RESEARCH:

PRESENTATION OF THE IRRG GROUP

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In this issue of "WORD RABBIT SCIENCE", five papers deal with the so called "biostimulation" methods which are intended to increase the reproductive performance of rabbit without resort to exogenous hormones. This is not just a fortunate coincidence, but rather the evidence of the role undertaken by the IRRG (International Rabbit Reproduction Group) on rabbit research. It is my responsibility to briefly illustrate here the main objectives and the concerted actions on which our work-group is engaged.

Foundation

The IRRG was founded on November 1996 during a workshop held at Brescia (Italy) in the after word of a meeting on the "Use of exogenous hormones in rabbit reproduction" sponsored by ASIC, the Italian branch of the World Rabbit Science Association (WRSA). In this workshop, attended by 22 researchers from 5 European countries, we defined and agreed upon the premises for the mission of the IRRG together with the main research projects to pursue during year 1997. Now, about a year later, we count a greater number of members from several countries: Austria, Belgium, France, Greece, Holland, Hungary, Italy and Spain (refer to Table 1 for their name and institutions).

As the chosen acronym suggests, the first commitment of the IRRG is rabbit reproduction, but the second one relies on its type of organisation. As a matter of fact, the IRRG is not just another dwarfed scientific society or a satellite of a bigger one, but rather a true work-group. Borrowing the image I used at Gödöllő (Hungary) in introducing our 2nd general meeting, I like to think at the IRRG as a warehouse, where people move freely all around, willing to cooperate in a friendly attitude.

Its organisational structure is actually very thin without any secretary's office: a *General Coordinator*, who is in charge of representing the IRRG, and of acting as chairman at meetings, and several *Project Managers*, one for each joint research project, who have the responsibility of coordinating the research teams involved. Also, no fee is required to join it. One general meeting lasting 2 days is scheduled every year

between October and November with a open plenary session and 2 workshops restricted to IRRG members. After that of Brescia in 1996, the 2nd IRRG Meeting was held in Gödöllő, while the next will be organised at Athens (Greece) in 1998.

Objectives

In most countries applied rabbit research suffers of a significant decrease in financial resources granted by Governmental Authorities, despite the economical relevancy that this kind of breeding has in the European meat market today. Of course, this trend exerts its negative influence on all the research areas, but its worse effect reflects upon those experiments which deal with reproduction as these are very expensive and time consuming. Therefore, is not surprising that relatively few researchers are involved in studying applied reproduction on rabbit and that, very often, their experiments are down-sized. This is another reason of concern and may explain why the results are sometimes difficult to interpret or not consistent. The IRRG, of course, has not the power of reversing the current set, but it may provide a leverage to research by:

1. driving coordinated research projects based on agreed-upon protocols,
2. supporting an interdisciplinary approach,
3. integrating different specialist from several countries,
4. rising funds from EC and International Institutions.

In my opinion, this policy may well improve the quality of research on rabbit reproduction in several ways. Up-scaling the number of experiments performed on the same research topic by different teams is one of them. When entering a new area of research a lot of preliminary experiments have to be done in order to select the most interesting direction between those available. The possibility of planning together several lines of research greatly reduce the amount of time necessary to explore the new field and, therefore, also reduce its cost. No doubt that, following this strategy, the outcome of the research will significantly improve in term of efficiency and efficacy. At the same time, the application of a

standardised set of experimental procedures, the so called "basic methodological platform" approved by the members working at the same joint research project, give a reasonable assurance against discrepancy of results which may be very common in this field. In fact, different methodology used, together with insufficient description of the experimental designs and conditions may undermine the obtained result. The "General recommendation and guidelines for applied reproduction trials with doe rabbit" which are now under preparation by the IRRG in order to be published after approval by the next general assembly, is a good example of how IRRG is managing this important issue.

Also, the simultaneous replication of exactly the same experimental protocols (the so called "ring tests") in different countries and therefore under different managing and environmental conditions is another way to quickly obtain a critical mass of data, thus improving the overall efficiency and efficacy of the research project and, at the same time, reducing the risk of pitfalls. The research lag, the time elapsing for a research innovation to become applied into practice, should be, therefore, greatly reduced.

Concerted action

Artificial insemination (AI) is widely used in large production units in Europe. It is commonly experienced that reproductive performance of does depends on their physiological status at the moment of insemination. The major factor involved is sexual receptivity, but we know that receptivity interacts also with the lactating status of does and, therefore, it is not surprising that lactating non receptive does have the poorest reproductive efficiency. Also, analysis and evaluation of semen quality is actually quite poor in rabbits compared to other animal species.

Consequently, the main effort of the Group was addressed to improve the reproductive performance of the lactating female following, two objectives:

- A short-term objective, aimed to study different ways to induce sexual receptivity to improve and homogenise reproductive performance, and
- a long-term one, turned to a better understanding of the related physiological mechanisms responsible for the antagonism between lactation and the reproduction function.

On this basis, three research projects were activated early in 1997. Two are focused on the female: one "The Physiology of the reproductive hormones", coordinated by Cristiano BOITI, and the other on "Biostimulation" methods which do not require the use of exogenous hormones, coordinated by Michèle THEAU-CLÉMENT. The third project, devoted

to the evaluation of semen quality by computerised systems is leaded by Flavia PIZZI.

1. The prostaglandin project

The IRRG is not satisfied on how the gonadotrophin hormones are used today in rabbit. In fact, their widespread employment as the only management tool for oestrous synchronisation should be discouraged. The IRRG is also aware that a negative opinion against these products, which could gradually force the EC toward a complete ban of their usage, is mounting sponsored by the consumers. At this point, however, it should also made clear that gonadotrophins are unavoidably linked to the current rabbit breeding system of nowadays. In fact, when using AI, the administration of GnRH is absolutely necessary, and GnRH is, at least in many products, just an analogue of the hypothalamic hormone LHRH. In many instances, hormones like drugs used for chemotherapy, are powerful tools which can be valuable when prescribed rationally. On this premises, the aim of the project for the years 97-98 was related to a better understanding of the role of Prostaglandin-F₂α as a luteolytic agent capable of controlling the life-span of corpora lutea in the rabbit female. One of the intended uses is pointed at the recovery from specific pathological situations, in problem herds. In this projects only few IRRG teams are involved (ALVARINO, BOITI, CASTELLINI and FACCHIN), preliminary results being in progress, but we hope that some papers will appear in specialized journals within the next few months .

2. The "Biostimulation" project

The theoretical and practical aspects of Biostimulation approach to the control of rabbit reproduction are introduced and examined by M. THEAU-CLÉMENT *et al.* in this same issue of this journal. Briefly, the aims of this project are :

1. reduce the use of gonadotrophins to synchronise oestrous,
2. improve productivity and
3. verify the overall efficacy of the so called "Biostimulation" methods.

All the teams adhered to the same experimental design having:

- artificial insemination;
- one control group and systematically one or more "biostimulated" group(s);
- groups established on the basis of the weight of the doe for new herds or on the basis of physiological stage and parity for a productive herd;
- 42 days reproductive rhythm;
- intra-group adoptions, eventually;
- assignment of a doe to a specific group, preferably;

- more than 300 inseminations per group.

Up to date, 7 teams ended the experiments scheduled for 1997, but only 4 are ready to present their results in this number of the WRS journal. Other experiments will be activated or concluded during 1998. By autumn all the experiments are expected to be concluded so that the Biostimulation project will be discussed again during our next general meeting. On that occasion, based on the results achieved, more efforts will be put on those research lines which look more promising and rewarding. It is our intention, in fact, to have a significant mass of work done on this issue by the year 2000 when the 7th World Rabbit Congress will be held at Valencia (Spain). Right now I can say that the results presented here, by the teams involved in the Biostimulation project, are interesting and promising, but they need to be deeply tested before the techniques suggested could come into practice replacing the more conventional ones. Also, these methods have to be easy to apply, inexpensive, consistent with animal welfare and adapted with cycled production (see the paper by M. THEAU-CLÉMENT *et al.*, in this issue of the WRS journal)

3. The semen evaluation project

In Europe, several insemination centers were created in the 4 last years (e.g. 14 in France, more than 10 in Italy), but nevertheless, the following hold true today:

- limited research works studied the optimal semen dosage in relationship with the physiological status of does;
- cryopreservation of semen presently does not allow the use of this technique for production, even if frozen semen give good results on receptive does. On the contrary, semen cryopreservation can be useful for genetic purposes;
- some management and environmental conditions to allow the bucks to express a better sperm output (collection frequency, photoperiod, genetic effects) were investigated, but high correlations between semen biological characteristics and fertility of does were not found;
- limited knowledge is available concerning the semen quality characteristics and the relationship with fertility; the different equipment used compromise the reproducibility of data.

In artificial insemination programs, the optimal use of genetically superior bucks primarily rely on the fertilising ability of their ejaculated spermatozoa, which are commonly evaluated by their motility and the percentage of live cells. However, visual estimations are highly subjective. Quantitative aspects

can also be estimated by spectrophotometer, but this method is generally not used for rabbits because the seminal plasma contains different number of prostate secreted particles.

Computer Assisted Semen Analyses (CASA) have been of practical use in human and animal reproduction. Nevertheless, the performance of computer assisted semen analyses greatly depend on the correct setting of the system. These settings may differ greatly between species. The right set up must first be determined before practical use of the equipment.

Regarding the male, therefore, the decision of the IRRG to firstly focus on the evaluation of semen quality has been almost a mandatory choice in order to progress more rapidly in the answer of these questions. On this basis, the main target for 1997-1998 was to evaluate those tools allowing a better evaluation of biological semen characteristics to set up good fertility predictors.

A preliminary step is to validate the reliability of different equipment of CASA on the same samples of frozen semen, throughout a ring test involving 6 teams. Standard straws will be sent to each research unit where it will be processed and analysed following the laboratory guidelines established at the 2nd IRRG Meeting. By using the same pool of semen, artificial inseminations will be performed in one farm under controlled conditions in order to evaluate the correlation between CASA parameters and fertility rate. This project is still going on and it will be concluded by the end of September 1998.

Concluding remarks

The research areas previously outlined are those mostly pursued and stimulated by the IRRG, but it should be clear, however, that each team preserves its own scientific identity and provides money for its own research. Exchanging experiences between members having different technical and scientific backgrounds and expertise, through horizontal and vertical integration, is to us a necessary step in approaching and solving much more efficiently the "puzzling" problems of reproduction. The get together, therefore, is almost a prerequisite, but this is really expensive. Today, the necessary link between members is mostly assured throughout Internet, but this is not substitutive for inter-personal contact. Rising funds to sponsor the concerted actions is another difficult task to which the IRRG is committed. New lines of research are under study : one is turned towards the patho-physiological and hygiene conditions of the rabbit farms, the other towards the rabbit model in the biotechnology. The

results and experiences of the team from Vienna are in this context greatly appreciated.

sharp-eye, and Ennio FACCHIN for his patience, advice and strong support to the IRRG.

Acknowledgement : I wish to thank Michèle THEAU-CLÉMENT, Flavia PIZZI and Cesare CASTELLINI for their help in preparing the text, Luc MAERTENS for doubling checking the manuscript with

Received : January 28th, 1998
Accepted : February 6th, 1998

Table 1 : List of members registered to the IRRG

COUNTRY	PARTNERS	INSTITUTION AND CITY
AUSTRIA	BESENFELDER Urban FLEISCHMANN Machaela	Inst. for Animal Breeding & Genetik, VIENNA
BELGIUM	MAERTENS Luc	Rijksstation voor Kleinveeteelt, MERELBEKE
FRANCE	THEAU CLÉMENT Michèle	INRA, Station d'Amélioration Génétique des Animaux, CASTANET TOLOSAN
THE NETHERLANDS	ROMMERS Jorine	PP. Spelderholt, BEEKBERGEN
GREECE	XILOURI-FRANGIADAKI Eftyhia	Agricultural University of Athens, Faculty of Animal Production, ATHENS
HUNGARY	VIRAG Györgyi	Inst. for Small Animal Research, GÖDÖLLO,
	SZENDRŐ Zsolt VAROS Gala MERES Miklos	Faculty of Animal Science Department of Small animal Production, KAPOSVAR
ITALY	ALABISO Marco BONANNO Adriana	Ist. di Zootechnica Viale delle Scienze, PALERMO
	BERNARDINI Marcella CASTELLINI Cesare DAL BOSCO Alessandro LATTAIOLI Paolo	Inst. Zootechnica Generale, PERUGIA
	BOITI Cristiano CANALI Claudio	Ist. Fisiologia Veterinaria, PERUGIA
	CAIROLI MOLLO Antonio	Ist. Clinica Ost. e Ginec. Veterinaria, MILANO
	CASTROVILLI Clara	Ist. Zootechnica, MILANO
	CAVANI Claudio	Ist. di Zootechnica, BOLOGNA
	FACCHIN Ennio ZANON Fabio	Ist. Zooprofilattico Venezie - Sez. Verona, VERONA
	GAIANI Rosella	Dip. Morfofisiologia Veterinaria e Produzioni Animali, OZZANO EMILIA
	LUZI Fabio	Ist. Zootechnica, MILANO
	MONACI Maurizio PIZZI Flavia	Ist. di Ost. e Ginecologia Veterinaria, PERUGIA IDVGA - CNR - Ist. Zootechnica, MILANO
SPAIN	ALVARIÑO R. Mario	Departamento Produccion Animal E.T.S.I. Agronomos, MADRID