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WORLD RABBIT PRODUCTION AND RESEARCH SITUATION IN 1992

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SUMMARY

We have estimated the world production of rabbit meat at 1 200 000 tonnes. Of this total, 43.6 % are produced through "rural" management methods and 56.4 % (675 000 tonnes) through "rational" ones. The five major producers are Italy, France, CIS (ex. USSR), China and Spain, in that order. Together they total 70 % of the world production. We have put foreward an estimation by quantity for 53 countries and an evaluation by nature of rabbit meat production for a total of 106 countries.

Among those producing more than 2000 t./year, 6 Groups of countries were indentified on the basis of different patterns of production and consumption.
Group 1 – Traditional producers–consumers countries – These are the South–West European or Latin countries (Italy, France, Spain, Belgium and Portugal). This Group account for 50% of the world production and consumption.
Group 2 – Countries where rabbit production is undergoing rationalization, primarly for domestic consumption – These are Central or Eastern European countries: the former Soviet Union, Czechoslovakia, Poland, Yugoslavia and Greece.
Groups 3 & 5. Countries very active in the rabbit international business with a significant national consumption (Group 3 – China) or a small one (Group 5 – Hungary, Netherlands)
Group 4. These are the developing countries involved in rabbit production, mainly Philippines, Egypt, Marocco and Mexico.
Group 6 – Countries involved in hobby rabbit breeding – : the USA, Germany or the United Kingdom. Meat production is not the main purpose of rabbit breeding here.

The authors have also given some considerations to Angora wool production (where China is the major producer), and to the use of rabbits in biomedical and research laboratories.

The situation of rabbit research worldwide has also been assessed through 463 publication on rabbit recorded for the years 1990 & 1991 in 3 reviews of abstracts published by the CAB–International. 51% of publications originate in 5 countries: the USA, Italy, Spain, Germany and France. A total of 218 laboratories were found to be working in this field. A list of those which published 3 papers or more over the period is given and includes 48 laboratories in 19 countries. The major centers for publications are in order of importance, the INRA Research Center in Toulouse (France), the Rabbit Research Center in Corvallis (Oregon, USA) and the University of Valencia and the Agricultural School of Madrid in Spain.

INTRODUCTION

Rabbit production techniques have been described in various reviews (LEBAS *et al.*, 1984 ; CHEEKE *et al.*, 1987), but only a few estimations of worldwide production quantities have been published (LEBAS *et al.*, 1984, CAMPS, 1988). This is the main subject of our article, in which we shall first of all review rabbit meat production worldwide, before going on to the other uses of the domestic rabbit : Angora wool, fur, laboratory, hobby breeding. Finally we shall review the research laboratories and universities involved in the knowledge improvement on rabbit as a production animal.

RABBIT MEAT PRODUCTION WORLDWIDE

A/ AIMS AND METHODOLOGY

An estimation of the rabbit meat production quantities was made for more than 50 countries (cf. Table 1). The first column in table 1 gives the most recent official or published estimations. The other three columns give our own estimations as follows : total rabbit meat production, production by "rational" breeding methods and finally traditional "rural" production.

"Rational" breeding concerns farm which commercialize at least part of their production. Production techniques are either intensive or semi intensive (more than 15 rabbits produced/doe/year). Concentrated feeds are used either as sole feed or as complement of forage.

"Rural" production on the other hand concerns rabbit breeding for home consumption and involves very extensive production techniques (less than 15 rabbits produced/doe/year). Feed consists almost exclusively of forages or farm and domestic by–products.

Our estimations, are based on a combination of published data, economic statistics (such as sale of rabbit feed, production figures from slaughterhouses) personal informations and data from different private companies. In some cases, these methods were combined with FINZI's (1991) based on human demography, proportions of rural families with and without rabbits and comparisons between different countries.

Secondly we have described rabbit production in 106 countries in terms of its nature. Five criteria were applied : types of production – patterns of consumption – total rabbit production – volume of exports and imports in proportion to national production (Table 2).

1 – Type of production

Four types of production were defined in each country. The countries were then characterized by the predominant pattern.

a/ Rural rabbit production : this is defined as category R an relates to rabbits produced for home consumption. In the countries were this pattern is dominant, most of the rabbit farms belong to the rural sector we have already mentioned.

TABLE 1

QUANTITATIVE RABBIT MEAT PRODUCTION IN SOME COUNTRIES

Countries	Published data	Lebas & Colin	Ration.	Rural
Albania	–	1000	0	1000
Algeria	7000	7000	500	6500
Argentina	4000	4000	1000	3000
Australia	0	100	100	0
Austria	–	1500	200	1300
Belgium	16000	20000	15000	5000
Benin	–	500	100	400
Bolivia	200	1000	0	1000
Brazil	4000	12000	10000	2000
Bulgaria	–	1000	0	1000
Cameroun	–	1500	500	1000
Canada	2000	2000	1500	500
China	200000	120000	70000	50000
C.I.S. (ex-USSR)	120000	150000	50000	100000
Columbia	2500	6000	1000	5000
Czechoslovakia	–	30000	3000	27000
Denemark	–	1000	500	500
Egypt	15000	15000	2000	13000
France	150000	150000	100000	50000
Germany	16000	20000	10000	10000
Ghana	7500	5000	1000	4000
Greece	4000	5000	2000	3000
Hungary	19000	19000	5000	14000
Indonesia	500	9000	500	8500
Italy	210000	300000	250000	50000
Ivory Coast	500	1000	100	900
Japan	750	750	750	50
Kenya	–	500	0	500
Korea(South)	4200	1500	500	1000
Malaisia	–	2000	500	1500
Marocco	16000	12000	1000	11000
Mexico	9200	10000	1000	9000
Netherlands	10000	12000	10000	2000
New-Zealand	0	100	100	0
Norway	250	250	100	150
Ouganda	–	500	0	500
Philippines	–	18000	1000	17000
Poland	25000	25000	5000	20000
Portugal	20000	20000	4000	16000
Roumania	18000	18000	8000	10000
South-Africa	900	1500	500	1000
Spain	80000	120000	80000	40000
Sweden	1000	1000	500	500
Switzerland	–	3000	1000	2000
Tanzania	–	500	0	500
Tunisia	150	4000	300	3700
U.S.A.	15000	17000	10000	7000
United-Kingdom	7000	7000	4000	3000
Uruguay	450	1000	450	550
Venezuela	1700	6000	1000	5000
Vietnam	700	700	100	600
Yugoslavia	–	10000	3000	7000
Zaire	–	2000	500	1500

Countries	Type of Production	Type of Consum.	Quantity	Export	Import
Afganistan			NS		
Albania	R	S	2	0	0
Algeria	I	T	3	0	0
Argentina	C	E	2		
Australia	C	E	1	0	0
Austria	H	S	2	0	0
Belgium	C	T	5	*	**
Bengladesh			NS		
Benin	R	S	1	0	0
Bolivia	R	S	1	0	0
Brazil	C	E	4	0	0
Bulgaria	R	S	2	0	0
Burkina Faso	R	S	1	*	0
Burma			NS		
Burundi	R	S	1	0	0
Cameroun	R	S	2	0	0
Canada	H	E	2	0	***
Chile	C	E	NS		
China	I	E	7	**	0
CIS (ex USSR)	I	S	7	0	0
Colombia	R	S	3	0	0
Cyprus	R	S	1	0	0
Czechoslovakia	I	S	5	**	0
Denmark	I	T	3	*	0
Egypt	R	S	5	0	0
Ethiopia			NS		
Finland			NS		
France	C	T	7	*	*
Germany	H	S	4	0	*
Ghana	R	S	3		
Greece	I	S	2	0	0
Guatemala	R	S	1	0	0
Haiti			NS		
Hungary	I–C	S	5	***	0
Iceland			NS		
India	R	S	?	0	0
Indonesia	R	S	3	0	0
Irak			NS		
Iran			NS		
Israel			NS		
Italy	C	T	7	0	**
Ivory Coast	R	S	2	0	*
Japan	C	E	NS		
Jordan			NS		
Kenya	R	S	1	0	0

(to be continued on the next page)

(Continuation of the Table 2)

Countries	Type of Production	Type of Consum.	Quantity	Export	Import
Korea (north)	I	E	1	0	0
Korea (south)	I	E	1	0	***
Lebanon	R	S	NS	0	0
Libya	I	S	1	0	0
Madagascar	R	S	2	0	0
Malaysia	R	S	2	0	0
Malta	I	T	1	0	*
Marocco	R	S	4	0	0
Mexico	R	S	4	0	*
Netherlands	C	E	4	**	*
New Zealand			NS		
Nigeria	R	S	3	0	0
Norway			NS		
Ouganda	R	S	1	0	0
Pakistan			NS		
Peru	R	S	1	0	0
Philippines	R	S	4	0	0
Poland	I	S	5	**	0
Portugal	I–C	T	4	0	0
Roumania	C	E	4	**	0
Rwanda	R	S	1	0	0
Seychelles			NS		
South Africa	I	E	2	0	0
Spain	C	T	7	*	*
Surinam	R	S	1	0	0
Sweden		E	NS		
Switzerland	H	T	2	0	***
Syria			NS		
Taiwan			NS		
Tanzania	R	S	1	0	0
Thailand			NS		
Trinidad & Tobago			NS		
Tunisia	R	S	2	0	0
Turkey			NS		
U.S.A.	H	E	4	*	0
United Kingdom	H	S	4	*	**
Uruguay	C	E	1	*	0
Venezuela	R	S	3	0	0
Vietnam	R	S	1	0	0
Yemen	R	S	1		
Yugoslavia	I	S	3	**	0
Zaire	R	S	2	0	0
Zimbabwe	R	S	2	0	0

b/ Intermediate rabbit production : this is defined as category I and relates to situations where rabbits are mostly bred in small production units as a secondary activity. Most production is sold, although home consumption is still far high. Concentrated feed is used, generally to complement a basic diet of forage.

c/ Commercial rabbit production : category C. relates to situations where most rabbits are produced on specialized farms geared almost exclusively to production for sale. Managements methods are intensive and the rabbits are generally fed on complete pelleted commercial feeds

d/ Hobby rabbit production : category H relates to situations where rabbits are mostly bred in small units, generally by non–farmer who bred rabbits as a hobby rather than as a professional activity. These rabbits are bred for shows, or fore sale as "beautiful rabbits" to other hobbyists or as pets. Sales of rabbits for meat or home consumption are only "by–products" of this activity.

Most rabbit farms in categories I, C, and H are conducted on "rational" lines (described in our evaluation of production quantity)

2 – Patterns of consumption

a/ Home consumption : category S. Most rabbit meat is consumed by the producers or their relatives and neighbours.

b/ Ethnic consumption and export : category E. The rabbit meat is either exported to other countries or produced for ethnic or social categories of the population in the country it self.

c/ Traditional consumption : category T. The rabbit meat is widely consumed and is a normal ingredient of traditional dishes.

3 – Rabbit meat production by quantity

The following categories have been defined

7	More than 100 000 t.
6	From 50 000 to 100 000 t.
5	From 20 000 to 50 000 t.
4	From 10 000 to 20 000 t.
3	From 5 000 to 10 000 t.
2	From 1 000 to 5 000 t.
1	Less than 1 000 t.
NS	Non significant

4 – Exports and imports

Four categories have been defined

0	No significant exports or imports
*	Less than 10 % of national production
**	From 10 to 50 % of national production
***	More than 50 % of national production.

B/ QUANTITATIVE ASPECTS OF THE RABBIT MEAT PRODUCTION

We estimate the world rabbit meat production at 1 200 000 tonnes. of which 525 000 t. (43.6 %) are produced in the rural sector and 675 000 t. (56.4 %) in the rational sector. Our estimation is slightly higher (+ 20 %) than this made by LEBAS *et al.* (1984) and close to the CAMPS's one (1988), but much lower than FINZI's estimation (1991) which is based mainly on human demographic consideration (Table 1).

It should be emphasized that production is concentrated in a few countries. The first five (Italy, France, CIS, China, Spain) produce more than 100 000 tonnes each and account for 70 % of world production. Ten countries (these five plus Czechoslovakia, Poland, Germany, Portugal and Belgium) account for 79.6 % of production while 33 countries out of 106 account for 90 %.

The official production figures for some countries have been increased in our estimation to account for home consumption and direct sales between producers and consumers (without any intermediaries). This is particulary the case of Italy, Spain and the CIS (ex–USSR). It should be emphasized that the rural segment is very often underestimated in official statistics, even in the biggest producer countries.

According to our evaluations, this rural segment accounts for 34.5 % of the rabbit meat production for the five first producers and 38.5 % for the first ten . The difficulties regarding the estimation of rural rabbit production are particulary important for some producers of middle importance in North Africa, Tropical Africa or Far East.

For example, the official statistic for Tunisia deals with a production of only 150 t./year (BERGAOUI, 1990). But, a field survey carried out by FINZI (1991) shows that rabbits are present in 60 % of the farms in southern Tunisia.

TABLE 3

PERCENTAGE OF FAMILY UNITS IN SOUTHERN TUNISIA WHERE RABBITS AND/OR POULTRY ARE BRED (FINZI, 1991)

		Poultry		
		Presence	Absence	**Total**
Rabbits	Presence	43.3	15.9	**59.2**
	Absence	16.3	24.5	**40.8**
	Total	**59.6**	**40.4**	**100.0**

It thus appears that the official figures deal in fact with the "C" rational farms in the country, but not with the whole production. Our estimation (4 000 t.) is therefore much higher than the official statistics (150 t.). The situation is similar for Brazil (12 000 t. *vs* 4 000 t.), Colombia (6 000 t. *vs* 2 500 t.), Venezuela (6 000 t. *vs* 1 700 t.), Philipines (18 000 t. *vs* 1 000 t.) and for Indonesia (9 000 t. *vs* 500 t.).

Mainy of our evaluations are higher than those of some previous studies (LEBAS *et al.*, 1984 ; CAMPS, 1988), but this seems to be due rather to a better understanding of rabbit production than to a real increase in production between the 2 periods of study. In our opinion, there has been a real increase in production in a few countries only (Belgium, Italy, Egypt).

On the other hand, in several cases our evaluations are lower than the previous ones either because production's conditions are better understood or because there has been a real decrease in production (Table 4).

TABLE 4

RABBIT MEAT PRODUCTION FOR THE COUNTRIES FOR WHICH OUR EVALUATIONS ARE LOWER THAN THE PRECEDENT

	Previous evaluations (LEBAS *et al.*, 1984, CAMPS, 1988) *(metric tonnes)*	Curent evaluation *(Tonnes)*	Explanation for decrease
CIS (ex. USSR)	From 200 000 to 210 000	150 000	Better knowledge of production
HUNGARY	From 40 000 to 49 000	19 000	Better knowledge of production and confusion of live weight and carcass production
CHINA	200 000	120 000	Better knowledge of production
FRANCE	180 000	150 000	Decrease in the rural sector
GERMANY	35 000	20 000	Reunification and change in economic conditions in East Germany
UNITED KINGDOM	15 000	7 000	Change in eating habits. Use of rabbits as pets
SWITZERLAND.	4.000	3.000	Difficulties due to production's legislation
SOUTH KOREA	4.200	1.500	Imports from China

TABLE 5

ESTIMATIONS OF WORLD RABBIT MEAT PRODUCTION ACCORDING TO DIFFERENT SOURCES

	LEBAS *et al.* (1984)	CAMPS (1988)	Current study
ITALY	160 000	145 000	300 000
FRANCE	180 000	190 000	150 000
CIS (Ex. USSR)	210 000	200 000	150 000
CHINA	60 000	270 000	120 000
SPAIN	120 000	110 000	120 000
CZECHOSLOVAKIA	?	?	30 000
POLAND	25 000	13 000	25 000
GERMANY	35 000	?	20 000
BELGIUM	?	?	20 000
PORTUGAL	20 000	20 000	20 000
HUNGARY	40 000	45 000	19 000
ROMANIA	?	18 000	18 000
PHILIPPINES	?		18 000
USA	15 000	?	17 000
EGYPT	7.000	?	15 000
WORLD RABBIT PRODUCTION	**1 000 000**	**1 200 000**	**1 200 000**

Though rabbit breeding for meat exits in practically all countries, some exceptions should be noted. There is no rabbit breeding in Israel for religious reasons nor in most of the Middle East countries (Iraq – Iran – Syria – Saudi Arabia – Pakistan).

We have not been able to obtain any suitable information as to quantity for India and Bangla Desh, although it is known that a significant amount of rabbit breeding for meat exits in India (RAI *et al.*, 1985). The same is true for Lybia, although we do known that breeder rabbits have been recently imported from Italy.

To conclude this section on production quantities, we should like to stress that it would be advisable for all countries to use the same production estimation methods, especially for extensive rural production. This is particularly true for the CIS and the East European countries, where rural production is important (from 60 to 90 % of the total production) and where production levels are changing very rapidly because of political changes on the one hand (and consequent changes in the organisation of rural production) and secondly because of the effects of the Viral Haemorragic Disease (CANCELOTTI *et al.*, 1990). The exemple of the CIS is typical with evaluations ranging from 210 000 t. in 1984 according to LEBAS *et al.* to 120 000 t. in 1989 (PRIGENT, 1989) and our current evaluation of 150 000 t.

C/ QUALITATIVE ASPECTS OF RABBIT MEAT PRODUCTION

To gain a better idea of the qualitative characteristics of rabbit meat production and of the possible relationships between the different countries, we have carried out a classification of the main countries (production higher than 2 000 t./year) using the 2 first factors of discrimination applied in the table 2 : type of production and consumption patterns (Table 6).

Six main groups of countries may thus be defined (Table 7) :

GROUP 1 – Traditional producer–consumers countries. These countries are the Latin countries of South–West Europe, where rabbit meat has been a traditional food for a very long time, and where domestication has began some centuries ago (LEBAS *et al.*, 1984). This group produces some 610 000 t. of rabbit meat and account for a little bit more than 50 % of world production (Table 8). In these countries, and even in some of the smaller ones in the same geographic area such as Malta, rabbit meat consumption exceeds 2 kg/capita/year. It should be emphasized that although its rabbit meat production is high in terms of quantity, the group as a whole has an annual deficit of about 36 000 tonnes. This means imports for about 5.5 % of the whole consumption of the Group.

In this Group 1, rabbit meat is mainly produced by rational breeding methods (75 %) but rural production is still significant (25 %).

TABLE 8

PRODUCTION AND CONSUMPTION OF RABBIT MEAT IN THE PRODUCER–CONSUMER COUNTRIES (Group 1)

Country	Annual production (T)	Total annual consumption (T)	Consumption/ inhabitant/ year (Kg)	Deficit consumption/ production (T)
ITALY	300 000	320 000	5.3	20 000
FRANCE	150 000	160 000	2.9	10 000
SPAIN	120 000	120 000	3.0	–
BELGIUM	20 000	26 000	2.6	6 000
PORTUGAL	20 000	20 000	2.0	–
MALTA	1 300	1 300	4.3	–
TOTAL/MEAN	**611 300**	**647 300**	**3.7**	**36 000**

TABLE 6

CLASSIFICATION OF THE MAIN PRODUCTORS OF RABBIT
ACCORDING TO THE TYPE OF PRODUCTION AND THE TYPE OF CONSUMPTION

Framed names : more than 100.000 tons
Names in capital letters : between 10.000 tons/year and 100.000 tons/year.
Names in small letters : between 2.000 tons/year and 10.000 tons/year.

Type of production / Type of consumption	Rural "R"	Intermediary "I"	Commercial "C"	Hobby "H"
SELF CONSUMPTION "S"	PHILIPPINES Columbia EGYPT Venezuela MAROCCO Ghana MEXICO Tunisia Indonesia Zaire Algerie Malaisia	CIS CZECHOSLOVAKIA POLAND YUGOSLAVIA Greece		GERMANY United Kingdom
ETHNIC AND EXPORTATION "E"		CHINA	HUNGARY ROUMANIA BRAZIL NETHERLAND Argentina	USA Canada
TRADITIONAL "T"			ITALY FRANCE SPAIN BELGIUM PORTUGAL	Switzerland.

TABLE 7

DESCRIPTION OF THE MAIN RABBIT MEAT PRODUCER COUNTRIES

GROUP		MAIN COUNTRIES	IMPORTANCE OF THE PRODUCTION		REPARTITION OF THE PRODUCTION	
			Tons	% of the total	Rational	Rural
RABBIT PRODUCER CONSUMERS (LATIN EUROPE)		ITALY FRANCE SPAIN BELGIUM PORTUGAL	611 000	50.9	75	25
RATIONALISING RABBIT PRODUCTION	NATIONAL CONSUMPTION ORIENTED (EAST EUROPE)	CIS CZECHOSLOVAKIA POLAND YOUGOSLAVIA	220 000	18.3	30	70
	EXPORTATION ORIENTED (CHINA)	CHINA	120 000	10.0	60	40
RABBIT FAMILIAL SELF CONSUMPTION (DEVELOPPING COUNTRIES)		PHILIPPINES EGYPT MAROCCO MEXICO	120 000	10.0	10	90
RABBIT BUSINESS		HUNGARY ROMANIA BRAZIL NETHERLAND	70 000	5.8	52	48
RABBIT HOBBY (NORTH AMERICA AND WEST EUROPE) (EXCEPTED LATIN COUNTRIES)		GERMANY USA	59 000	4.9	54	46
TOTAL			1 200 000	100	56	44

GROUP 2 – Countries where rabbit production is undergoing rationalization, primarly for domestic consumption : These are some of the East European countries, where the domestic rabbit is traditionally present, though in smaller quantities than in Group 1. Rabbits are generally bred on family farms, primarly for home consumption.

During the socialist period, major efforts were made to rationalize the rabbit production in order to export rabbit meat. Czechoslovakia and Poland have thus become rabbit meat exporters, mainly to Italy, France and Belgium (JOUVE, 1989). In Yougoslovia, a very large production unit (20 000 to 30 000 rabbit does) has been set up at Velika Kladusa in Bosnia Herzegovine, and exports live rabbits to Italy.

After the political changes in the 2 last years, many of the structures set up during the socialist period have encountered major difficulties as a result of poor adaptation to the new conditions of market (for example, most rabbit farms of East Germany have disappeared). However, new projects are now under way. In Russia, Bielorussia, Ukraine and Azerbaïdjan (the CIS countries with the major part of the former Soviet Union – PRIGENT, 1989), rabbits are mainly bred for their fur. Meat of these rabbit is considered as a by-product and very little information is available on its use.

Group 2 countries produce 220 000 t. of rabbit meat, accounting for 18.3 % of world production. In this group, 70 % of the rabbit meat is produced by the rural sector and only 30 % by rational breeding methods.

GROUP 3 – Countries rationalizing rabbit production, primarly for export : China, the only country in this case, produces 120 000 t of rabbit meat, accounting for 10 % of the world production. The history of rabbit production and the true level of domestic consumption are not well known, although it is most likely that rabbit meat consumption is high in some provinces (such as Sichuan) and non-existent in all the others. A significant part of total production is sold for export, however, and China is a exporter to the EEC, South America and Africa. Exact figures for export or total production are not easy to obtain. For example, ZANG (1989) has estimated for his own country the annual production at 50 to 100 millions of rabbits slaugthered for meat purpose, estimation which is not very precise

According to the year and to different assessements, Chinese rabbbit meat export may be estimated at between 30 000 and 60 000 t. Very little is known on production techniques, but these appear to be mainly of the rural type (CHEEKE et PATTON, 1987). It has been assumed that rabbit meat was in fact mainly a by-product of Angora wool production (LEBAS *et al.*, 1984) or rabbit fur production (CHEEKE et PATTON, 1987), but this is not confirmed by ZHANG (1989) for his own country. As a matter of fact, specific meat rabbit farms are known to exist in some provinces and China regularly buys from Europe, rabbit breeders of genetic lines known for their meat production ability.

GROUP 4 – Countries where rabbits are bred in family units mostly for home consumption : Many developing countries belong to this category, which produces some 120 000 t. of meat (10 % of the world production). As mentionned by FINZI (1988), rabbit farming exists in most developing countries. Where it is assumed to be absent, this is usually due to a lack of relevant information, as we have already shown in the case of Tunisia. Rabbit breeding seems to be a traditional practice in the Far East (FINZI, 1988 ; SINQUIN, 1989). In Africa, it has been introduced mainly by the French, Italians and Portuguese and in Central and South America by the Spaniards (FINZI, 1988). Production units are generally very small (2 to 10 does) with very rustic cages or buildings (FINZI et AMICI, 1988) and rabbits are fed with local ingredients. This

type of small unit also exits in and around many large cities as mentioned by FINZI (1991) for Mexico.

Even though this form of rabbit production is very extensive, it can probably be developped to contribute to the protein supply for some protein–deficient populations.

Apart from the numerous small home–consumption units, in these countries some commercial farms do exist where rabbits are produced mainly for the Europeans living in the big cities. The livelihood of such units is very much dependent on the political situation in the country, as it was shown recently in the Ivory Coast where the large production units went out of business when the Europeans left the country.

GROUP 5 – Rabbit business countries : Very different countries can be found under this denomination. Hungary and the Netherlands have developed a production, almost exclusively for export (to France, Italy, Belgium). Two significant point may be stressed:

* In Hungary, home consumption decreased when began the big national effort for export (1965–1970), as a consequence of the high prices paid to farmers. At that time and until 1990, rabbit meat export was a significant source of national income in foreign convertible currencies.

* In the Netherlands, rabbit consumption is low and is almost exclusively supplied by imported rabbit (frozen) meat. As in the case of many agricultural products, the domestic rabbit production is exported at higher prices.

Rabbit meat in Hungary is mainly produced by small units but with an efficient collective organization (technical advice, supply of feed and drugs, animals collection, etc...). In the Netherlands, rabbit meat is produced in breeding units of 300 to 800 does. In South America, some big farms and slaughtering plants produce rabbit meat almost exclusively for local ethnic minorities (Italian). The countries of this Group 5 produce 70 000 t. of rabbit meat (5.8 % of the world production). About 50 % are produced by the rural sector and 50 % by the rational one.

GROUP 6 – Hobby Rabbit countries : We have already described the purpose and characteristics of this type of production. Three types of situation can be defined:

* In North America and the United Kingdom, most people refuse to eat rabbit meat, because they consider the animal as a pet. The slaughter rabbits sold by the hobbyists are almost exclusively eaten by some ethnic minorities, i.e. the italian one in North America.

* In Germany, rabbit meat is more likely accepted and some is even imported from France. But, consumption is still very low (0.25 kg/capita/year), so rabbit meat has a very little weight in the economy.

* In Switzerland on the other hand, consumption is already high. About 3 000 t. are imported each year (equivalent to domestic production) and average consumption is about half–way between consumption in the Latin and Germanic countries, at 1 kg/capita/year.

Although production levels in this Group 6 are relatively low (less than 60 000 t. or 4,9 % of world production), the genetic importance of hobby rabbit breeding must be emphasized. Rabbit breeding as a hobby enables original populations to survive and ensures genetic variability conservation which is essential to the selection of appropriate breeding stock for different types of rabbit production.

D/ INTERNATIONAL TRADE IN RABBIT MEAT

Only a few countries are involved in international rabbit meat trading :

* 9 are exporters only,
* 6 are importers only,
* 6 are both importers and exporters.

It should be emphasized that the level of the international trade is very low : from 5 to 7 % of the world production according to the different estimations. This means that in general, rabbit meat production is mainly oriented to domestic–consumption.
The two main exporting countries are China (from 30 000 to 40 000 t.) and Hungary (18 000 t.)

TABLE 9

MAIN EXPORT AND IMPORT COUNTRIES

Country	Exports *(tonnes)*	Imports *(tonnes)*	Balance *(tonnes)*
BELGIUM	2 000	7 000	– 5 000
BURKINA FASO	– 50	–	+ 50
CANADA	–	3 000	– 3 000
CHINA	From 30 000 to 40 000	–	From + 30 000 to + 40 000
CZECHOSLOVAKIA	4 000	–	+ 4.000
DENMARK	500	–	+ 500
FRANCE	3 000	10 000	– 7 000
GERMANY	–	5 000	– 5 000
HUNGARY	18 000	–	+ 18 000
ITALY	–	From 30 000 to 40 000	From – 30 000 to – 40 000
IVORY COAST	–	100	– 100
KOREA (South)	–	3 000	– 3 000
NETHERLANDS	4 000	3 000	+ 1 000
POLAND	5 000	–	+ 5 000
ROMANIA	4 000	–	+ 4 000
SPAIN	500	500	0
SWITZERLAND	–	5 000	– 5 000
USA	2 000	2 000	0
UNITED KINGDOM	1 000	3 000	– 2 000
URUGUAY	500	–	+ 500
YUGOSLAVIA	3 000	–	+ 3 000
TOTAL	**From 77 500 to 87 500**	**From 68 700 to 78 700**	–

Its very hard to gain a clear idea of the exact level of the Chinese exports for 2 reasons.

* There are wide observed variations in volume from a year to the other. For example, imports to France only during the last 8 years, show variations from 1 to 4.7 (Table 10).

TABLE 10

LEVEL OF THE CHINESE IMPORTS TO FRANCE OVER THE LAST 8 YEARS

Year	Volume of imports (Tonnes)
1984	11 700
1985	10 156
1986	4 688
1987	5 818
1988	6 765
1989	9 403
1990	7 717
1991	2 470

* It is known that some Chinese rabbit meat is sold to certain developing countries. But very little information is available as regards quantity.

Hungary's rabbit meat production is geared to export (domestic consumption is very low at less than 1 000 t.). Hungary is an exception in this respect. The main buyers (in order of importance) are Italy, France and the other Western European countries (Belgium, Germany, the Netherlands, Switzerland). Other East European countries also export rabbit meat to the same countries: Czechoslovakia (4 000 t.), Poland (4 000 t.), Roumania (4 000 t.), Yugoslovia (3 000 t.).

On an absolute basis, the larger importer is Italy which appears to be the largest rabbit meat consumer in the world. Even though its own production is well developed, Italy is not self-sufficient and has to import. The main suppliers are Hungary, China, Yugoslavia and sometimes Romania and Poland. France is the second largest importer in terms of quantity (7 000 t.) but imports account only 4–5% of domestic consumption. The main suppliers are the same as for Italy.

Imports of rabbbit meat in relation to domestic consumption are the highest in Switzerland (about 60 %). This may be explained by highly restrictive legislation with regard to conditions of production (influence of the "green" lobby). France is the main supplier though Hungary and China are also involved.

Some countries are both importers and exporters. Export prices are generally higher than import prices. So while France buys cheap rabbit meat from China and Eastern Europe, she sells to Switzerland at high prices. Belgium, the Netherlands and the United Kingdom import from China and East Europe and sale to France. The USA buy in China and sell in Canada.

Chinese rabbit meat exports are exclusively frozen. Exports from Hungary and the other Eastern European countries, are generally fresh, even if occasionally they sell small quantities of frozen meat. There are some exports of live rabbits (slaughtered in the importating country) for example between the Netherland and France, the United Kingdom and France, Yugoslavia and Italy or the USA and Canada.

Some countries are setting up big projects for export–geared rabbit production. This is true of the East European countries, particulary Poland and Czechoslovakia. Other countries are also trying to do this such as New–Zealand and Philippines. They are motived by high prices (compared to other types of "white" meats) on the Western European market. The success of such projects depends not only on sucessfull technical management but also on a real increase in rabbit meat consumption, especially in Western Europe.

E/ CONCLUSIONS ON WORLD RABBIT MEAT PRODUCTION

From an economic point of view, worldwide rabbit meat production is characterized by 2 apparently contradictory features :

* Rabbit production exists in practically all the countries and can only be said to be non–existent in 10 to 12 countries of the Middle East region.

* Rabbit production is of significant importance in only few countries. Rabbit meat consumption seems to be higher than 1 kg/capita/year in only 6 countries of Group 1 of rabbit producer–consumer countries (Italy – France – Spain – Belgium – Portugal – Malta). This is a region where consumption of rabbit meat is a historical tradition, no doubt in relation with consumption of wild rabbits, which are very common in this part of the world.

The situation in developing countries is very different. Rabbit meat is almost exclusively produced by families for home consumption. This is very useful in that rabbit are raised on grass and waste–products only and thus provide a cheap source of protein to individual families. This form of rabbit production thus provides for a better protein supply in malnourished populations.

It should be stressed that this type of breeding cannot evolve, as it can only function on a very small scale with less than 10 does. Technical problems soon appear if the unit becomes larger, especially with feeding: traditional forages and feed resources may not be available in sufficient quantity in the immediate vicinity. The production of this type of small scale breeding for family consumption can only be increased if the economic context allows for changes in production techniques.

In our opinion, the two groups of countries which are characterized by a move to rationalization in rabbit production , for their domestic consumption (Group 2) or for export (Group 3) are at an intermediate stage. In these countries rabbits are traditionaly bred for home consumption as in the case of the countries just mentioned. They are trying to transform their rabbit production to reach a similar situation to that of the Group 1 (rabbit producer–consumer countries) through rationalization, increasing the size of their rabbit farms, setting up pelleted feed plants and slaughterhouses, together with technical services.

Their success will depend largely on the development of their domestic market (creation of a demand for commercially produced rabbit meat) and of potential export markets through an increase in Western Europe consumption.

The group 5 of rabbit business countries is that of countries where rabbit meat consumption is not traditional and where the production is geared to export. This group 5 is of relatively low

importance, and this is unlikely to change without an increase in domestic rabbit consumption, situation which is highly improbable.

The situation in countries where rabbbits are bred as a hobby (Group 6) is quite specific as production units are not in any way geared to meat production. But as we have already said this category of countries is of great importance as it ensures the survival of original genetic resources which are essential to the evolution of the rational rabbit production.

OTHER USES OF THE DOMESTIC RABBIT

Aside the meat production, the domestic rabbit is be used for the production of angora wool and rabbit fur as well as for laboratory purposes, hobby activity or as pet animal . Angora wool production reviewed by ROUGEOT & THEBAULT (1984) is completely different to rabbit meat. The breeds used (angora rabbits) are not the same, farms are managed differently , and farmers are different. There are few links between the two types of production but in certain conditions, young angora rabbits may be slaughtered and sold as rabbit meat. This has been assumed to occur on a large scale in China by LEBAS *et al.* (1984) but was not confirmed by CHEEKE et PATTON (1987) in the account of their travel in China. Angora wool production worldwide is dominated by China with about 90 % of world production (Table 11).

TABLE 11

PRODUCTION OF ANGORA WOOL WORLWIDE

Country	Production/years (tonnes)	Reference
ALBANIA	< 10	
ARGENTINA	400	THEBAULT & de ROCHAMBEAU, 1989
BRAZIL	< 10	
BULGARIA	< 10	
CANADA	< 10	
CHILE	90	NEUMAN KAPPEL, 1985
CHILE	550	THEBAULT & de ROCHAMBEAU, 1989
CHINA	2.000	ROUGEOT & THEBAULT, 1984
CHINA	6 000	THEBAULT & de ROCHAMBEAU, 1989
CHINA	9.000	ZHANG, 1989
CZECHOSLOVAKIA	60	THEBAULT & de ROCHAMBEAU, 1989
FRANCE	100	ROUGEOT & THEBAULT, 1984
FRANCE	210	THEBAULT & de ROCHAMBEAU, 1989
GERMANY	20	ROUGEOT & THEBAULT, 1984
HUNGARY	120	KURDI *et al.* 1988
HUNGARY	180	THEBAULT & de ROCHAMBEAU, 1989
INDIA	100	LEBAS, 1985
PERU	30	PURINA-PERU, 1992
POLAND	< 10	
PORTUGAL	< 10	

French angora wool production is not so high (100 to 200 tonnes according to the year of production) but is of special quality (bristly wool) as a result of the genetic type of the angoras used in France (THEBAULT & de ROCHAMBEAU, 1989). With this angora type, the wool must be plucked while it is sheared with the german angora type, the last one being used in practically all countries except France.

Angora wool is mainly processed in Italy (2000 t.), Japan (2000 t.) and Germany (500 t.). France, India and Chile generally process in their own production, but import/export activities may be important. Angora wool is used to make luxury clothes (French type angora) and underwear for countries with a cold climate (German-type angora). The main markets for these products are Japan, North East of Europe and the United States.

India, appears to be an exception as angora wool in produced, processed and sold in the country itself.

Unlike rabbit meat, angora wool production is also an international activity. The wool is generally produced in one country, processed in a second and very often the finished product is sold in yet a third. The wool is easily stored for many years, so international speculation is frequent.

Rabbit fur production is generally a by-product of the meat, rather than a true production: a crude pelt is obtained for each slaugthered rabbit. The quality of pelts is of low grade if the animals are slaugthered too young, i.e. before 3 months of age (intensive production). However, in Russia or Poland, the fur may be the primary product with carcass as by-product. When this is the case, the animals are killed at a minimum of 5 months of age to obtain good quality pelts, i.e. without moulting areas.

Very little information is available on the use of rabbits as laboratory animals. In the past, rabbits sold to laboratories were produced in the same housing conditions as rabbits bred commercially for slaugthering. But they are now increasingly produced is well conditionned rabbitries and have a specific pathogen free status (mainly coccidia and pasteurella free). This development has reduced the number of production units. In Japan, for example, the 300 000 rabbits used annually in laboratories are produced by only 30 breeders (FUJITA, 1988). In the USA, rabbit production for laboratories is considered a good source of income, and breeders involved in this sector of production fight hard to "hang on to their privileges". As a result, production figures are not available.

In France, an estimated 100 000 laboratory rabbits a year are used for biomedical and other scientific purposes. The figures for the Netherlands and Czechoslovakia are 15 000 and 50 000.

In some countries (where people perhaps have nothing to do better ?) the use of rabbits as laboratory animals has come under increasing assault from animal rights organizations. This happens in the USA with the HARE organization (Humans Against Rabbit Exploitation) and also in some Northern European countries. As a normal consequence, the use of rabbits has declined where replacement can be found, in some tests on cosmetics for example.

"Hobby rabbit breeding" is common in the USA or in Germany. Breeders are generally members of clubs or associations. The ARBA (American Rabbit Breeders Association) chartered about 340 clubs with a total membership of 33 000. In Germany, the similar association ("ZDK" or Central Association of German Rabbit Breeders) has over 170 000 members. There are numerous rabbit shows and competitions at local, national or international level in many

countries around the world. These exhibitions are frequent in the USA, Germany, Eastern France, Switzerland, the United Kingdom or in Italy.

The average breeding stock for hobbyist is generally small, 5 to 10 adults, with males and females in almost equal proportion. The annual production is small because of the low number of litters programmed by the breeder (1 to 3) and also because of a frequent litter size reduction, generally to 4 or 5 bunnies. This reduction is applied at litter's birth to produce better-looking animals at weaning and afterward. Unlike meat production, always "quality" (external aspect) of animals comes before quantity, in the hobby sector.

RABBIT RESEARCH WORLDWIDE

The volume of rabbit production worlwide is hard to estimate, but evaluations are even more difficult in the case of rabbit research activities worldwide. As a matter of fact, rabbits are used as biological material for many experiences where the rabbit itself is not in fact the object of the research, but only the supplier of spermatozoa, of T leucocyte, or of a reproductive tract with 2 separate uterine horns.

To gain an idea of research activity on the rabbit itself, studied as a production animal, the number of publications on rabbit recorded for the years 1990 and 1991 in 3 different abstracts reviews of the CAB-International were compliled.

In *"Nutrition Abstracts and Reviews – Series B"*, all publications with the rabbit key-word in the subject index were selected.

In *"Animal Breeding Abstracts"*, the rabbit key-word was not appropriate to our purpose, so were selected from the "others mammals" section, all publications concerning rabbit, which were not in the "NAR".

Similarly, publications on the rabbit for which a summary had been written for the Veterinary Bulletin, were selected from the *"Index Veterinarius"* in the "other mammals" section. Effectively, many publications on rabbits are recorded in the *"Index Veterinarius"*, but a high proportion of these are not real research publications. Only the most significant are selected to be abstracted, and we have taken only the latest ones.

Publications on basic physiology were excluded. For laboratories identification, one laboratory for each postal adress was selected, which sometimes involves some difficulties with the language. For example, a laboratory in Budapest was given an adresss in Magyar, English or German depending on the journal where the original papers were published

The 2 year span of this study (1990 & 1991) provides a "state of the art" picture of this sector of activity. A study over a longer period would have taken more laboratories into account but with only 1 or 2 publications during the whole period, and it is not certain that such laboratories all work primarly on rabbit. For example, some laboratories working on cattle nutrition, sometimes use rabbits to study the poisonous effect of certain plants, at a low cost in experimental animals. Once these tests are over and results published, the laboratories return to the cattle nutrition or management only. The information obtained may be important from the rabbit's point of view, but these laboratories connot be said to be involved in rabbit nutrition research.

A total of 463 publications for 218 laboratories in 42 countries was recorded during our compilation of publications on the rabbit in the 3 reviews of abstracts over 2 years (Table 12). 237 recorded publications, i.e. 51.2 % of the total, were produced by the first five countries (the USA – Italy – Spain – Germany and France). Each of these countries produced 44 to 51 publications wich were recorded over the two–year period. Hungary was the sixth in line with 30 publications, and India and Egypt were in seventh position with 22 recorded publications each.

It should be noted that in the leading group of 5 countries, 3 belong to our Group 1 of "Producer–Consumers countries" and 2 to Group 6 of "Hobby Breeding countries". For the 3 countries of the Group 1, the importance of rabbit research may be related to the economic weight of production. But for the 2 countries in Group 6, the importance of publications on the rabbit is mainly related to the general high level of research activity in these countries. For mainy laboratories involved in animal research, the rabbit is a practical animal, small enough to be raised or killed at low cost and at the same time an animal of real economic value to Agricultural or Veterinary Universities. The small number of publications from the ex–USSR also has to be emphasized. This does not means that there is little activity in rabbit research, only that publications don't easily reach the western countries. We have more information on China than on the ex–USSR.

The main subject of the publications is "nutrition", including studies on the digestive tract : 36.2 % of the total. In second position, are the publications on pathology (25.9 %). The number was probably excessive according to normal true research activity in this area. This is a consequence of a "publication fever" due to the observation and description of the VHD (Viral Haemorraghic Disease) in many regions or countries. The very small number of publications on rabbit physiology does not reflect the importance of activity in this area : normally these publications were excluded from our compilation and the 4 remaining ones are maintained only because they were published by laboratories publishing also on other subjects.

Once the adress of laboratories publishing on rabbit had been found, we observed that 129 of them had published only one recorded paper over the period : 59.2% of the laboratories (129 out of 218) for only 25.9% of the publications (129 out of 463). But the first 12 laboratories (5.5% of the total) had published almost the same amount, i.e. 25.5 % of all recorded publications (Table 13). The 4 main "publication centers" are first in France with the INRA Research Center in Toulouse, the Oregon State University's Rabbit Research Center at Corvallis is in second place, while Spain has two centers, the Polytechnic University of Valencia (UPV) and the Madrid School of Agriculture (ESTIA). In the leading group of 12 publication centers, the 8 others are in Hungary (3), Italy (2), Belgium (1) and Germany (1). Eleven of these laboratories are european and only one is in the USA.

The method we have used to estimate rabbit research activity worldwide may be open to criticism. In France, for example, 44 publications were recorded to represent 2 year's output. Althoug in 1990, the "5e Journées de la Recherche Cunicole" (5th Rabbit Research Days in France) produced 62 papers from France and 11 from other countries, and none of these publications were recorded in the abstracts reviews. Rabbit Research events of this kind are organized in different countries (Spain, Belgium, Italy, Hungary, Germany etc...) with or without the help of the local WRSA branch. Many papers are published at these occasions, but only few are abstracted in the CAB–International reviews, which may never receive them. Even if they are reveived, not all papers are abstracted, as in the case of the last World Rabbit Congress in Budapest in 1988.

TABLE 12
NUMBER OF PUBLICATIONS ON THE RABBIT AS A PRODUCTION ANIMAL,

recorded in *"Nutrition Abstracts & Review"*, *"Animal Breeding Abstracts"* and in the *"Veterinary Bulletin"* during the years 1990 & 1991. Number of laboratories and repartition of the publications according to 7 main subjects.

Country	Number Laborat.	Number of Publications (1) TOTAL	nutr	meat	path	gene	mana	repro	physio
Australia	1	3	3						
Austria	2	2			2				
Belgium	4	13	8		4			1	
Brazil	9	12	4		3	2	1	2	
Bulgaria	3	10	1		7		1	1	
Canada	1	1			1				
Chile	1	2						1	1
China	10	18	3		8	1	3	3	
Colombia	1	1	1						
Czechoslovakia	5	11	3		3	3	1	1	
Denmark	2	3	2				1		
Egypt	8	22	7		3	8	2	1	1
France	17	44	14	2	14	8	5	1	
Germany	21	46	12	4	18	2	3	6	1
Ghana	1	1					1		
Haiti	1	1	1						
Hungary	8	30	13		5	2	4	6	
India	9	22	8	2	5	2	3	2	
Indonesia	1	4	4						
Israel	1	1			1				
Italy	26	49	14	2	11	1	12	9	
Japan	5	5	1		2	1		1	
Kenya	1	1			1				
Korea (south)	5	5			2	2		1	
Mexico	2	2	2						
Netherlands	5	7	5	1				1	
Poland	6	9	2		5		2		
Portugal	1	1				1			
Roumania	2	2	1		1				
Spain	14	47	17	5	4	7	1	13	
Sweden	1	1			1				
Switzerland	3	3	2		1				
Taiwan	2	2	2						
Thailand	1	3				3			
Tunisia	1	6	2			1	1	2	
Turkey	1	1				1			
United Kingdom	5	5	3		1			1	
USA	17	51	24	4	12	5	2	3	1
USSR	4	4	1		2	1			
Venezuela	1	1	1						
Yugoslavia	5	5	2		1		1	1	
Zimbabwe	1	1			1				
TOTAL	**218**	**463**	**168**	**20**	**120**	**51**	**44**	**56**	**4**

(1) nutr=Nutrition; path=Pathology; gene=Genetics; mana=Management; repro=reproduction; physio=Physiology

TABLE 13

THE MAIN LABORATORIES INVOLVED IN RABBIT RESEARCH,
with a minimun of 3 publications recorded for the years 1990 & 1991 in "NAR", "ABA" or "VB"

(Country – City, Organization and/or Adress
Number of publications recorded: main subjects in importance order)

Australia – Armidale, University of New England
3 publications: nutrition

Belgium – Merelbeke, Gov. Research Station for Small Stock Husbandry
9 publications: nutrition – reproduction

Brazil – Sao Paulo, FCAVJ-UNESP, Rodovia Carlos Tomanni, Jaboticabal
3 publications: nutrition

Bulgaria – Sofia, Central Research Institut of Veterinary Medecine
3 publications: pathology
Bulgaria – Stara Zagova , Inst. Zoot. & Med Vet.
3 publications: nutrition – reproduction – management
Bulgaria – Vratsa, Research Institut for Veterinary preparations
4 publications: pathology

China – Nanjing, Nanjing Agricultural University
6 publications: pathology – reproduction – nutrition
China – Shanghai, College of Agriculture
3 publications: reproduction – genetics

Czechoslovakia – Brno, Veterinary Research Institut, Hudvoca 70
3 Publications: pathology
Czechoslovakia – Nitra, Research Institut for Animal Production
3 publications: management – genetics – reproduction

Egypt – Mansoura, Faculty of Agriculture
4 publications: pathology – nutrition
Egypt – Qualioba, Zagazig University, Faculty of Agriculture at Moshtohor, Banha Branch
5 publications: genetics
Egypt – Zagazig, Zagazig University, Faculty. of Agriculture at Moshtohor
6 publications: genetics – management – nutrition

France – Castanet-Tolosan, INRA Centre de Recherches de Toulouse
16 publications: nutrition – genetics – reproduction – meat
France – Nouzilly, INRA Station de Pathologie Aviaire et de Parasitologie
3 publications: pathology
France – Ploufragan, CNEVA, Unité de Pathologie Cunicole
7 publications: pathology – nutrition
France – Toulouse, Ecole Nationale Vétérinaire de Toulouse
4 publications: pathology

Germany – Giessen, Justus-Liebieg Universität
4 publications: nutrition – meat – genetics – pathology
Germany – Hanover, Tierärtlische Hochschule
8 publications: pathology – nutrition
Germany – Neu-Ulrichstein Homberg/Ohm, Hessische Landesanstalt für Tierzucht
5 publications: nutrition – reproduction – management
Germany – Rostock, Wilhelm Pieck Universität
4 publications: meat – genetics – management
Germany – Stuttgart, Universität Hohenheim
3 publications: nutrition – reproduction – management

(to be continued on the next page)

(Sequel of the TABLE 13)

Hungary – Budapest, Central Veterinary Diagnostic Institute
3 publications: pathologie
Hungary – Budapest, Department of Animal Nutrition, University of Veterinary Science
7 publications: nutrition – pathology
Hungary – Gödöllö, Department of Animal Physiology & Health, University of Agricultural Science
7 publications: nutrition – reproduction
Hungary – Kaposvar, Agricultural University
9 publications: reproduction – management – genetics – nutrition

India – Izatnagar, Indian Veterinary Research Institute (IVRI), Uttar Pradesh
4 publications: nutrition – genetics – reproduction
India – Palampur, IVRI Regional Sation, Kangra Valley, Himachal Pradesh
6 publications: nutrition – pathology
India – Rasendranagar, Andhra Pradesh Agricultural University
3 publications: nutrition – meat

Indonesia – Bogor, Research Institute for Animal Production
4 publications: nutrition

Italy – Bari, Dipart. di Produzione Animale
3 publications: nutrition – meat – reprtoduction
Italy – Padova, Istituto di Zootecnica
7 publications: nutrition – reproduction – meat – management
Italy – Palermo, Istituto di Zootecnica Generale
3 publications: nutrition – reproduction
Italy – Viterbo, Istituto di Zootecnia, Universita di Viterbo
8 publications: management – reproduction – pathology

Netherlands – Utrecht, University of Utrecht
3 publications: nutrition – meat

Nigeria – Zaria, Department of Animal Science, Ahmadu Bello University
3 publications: nutrition

Spain – Madrid, Dep. Higiene y Technologia de los Alimentos, Facultad Veterinaria
5 publications: meat – nutrition
Spain – Madrid, Departmento de Produccion animal, ESTI Agronomos, Ciudad Universitaria
12 publications: nutrition – reproduction
Spain – Valencia, Depart. de Ciencia Animal, Universidad Politecnica de Valencia
14 publications: reproduction – genetics – nutrition – meat – management
Spain – Zaragoza, Dep. Genetics, Facultad Veterinaria
3 publications: genetics

Thailand – Chulaongkorn, Faculty of Veterinary Science
3 publications: genetics

Tunisia – Mateur, Ecole Superieure d'Agriculture
6 publications: reproduction – nutrition – genetics – management

USA – Baton Rouge, Center for Small Farm Research
5 publications: nutrition – reproduction – management
USA – Corvallis, University of Oregon
14 publications: nutrition – pathology – meat
USA – Greenport N.Y., Foreign Animal Diseases Diagnostic Laboratory
3 publications: pathology
USA – Nashville, Dept. Agricultural Science, Tenessee State University
5 publications: nutrition – meat
USA – Normal, Alabama A & M University
6 publications: genetics – meat – management
USA – Provo, Department of Animal Science, Brigham Young University, Utah
3 publications: nutrition – reproduction

We were able to include in our compilation papers on the rabbit produced at national or international meetings, but we cannot be sure that we have exhaustive information on these events worldwide. If we were to include such information in our compilation, we certainly would privilege those countries where we are sure our information is correct (France, Italy, Spain,...), and penalize others (for example, South America or Far East). Our estimation based on abstracts reviews is therefore to be taken as a minimal but unbiased estimation, where the ex–USSR is the only notable absentee.

Nevetheless, if any laboratory is very actively involved in rabbit research, it will have been detected by our methods. If any laboratory we have not mentioned, considers itself to be very active in the field, we are able to put forward advice on increasing its publication output. From an international point of view, research is of no interest for the community unless results are published.

BIBLIOGRAPHY

BERGAOUI R., 1990. L'élevage du lapin en Tunisie peut résoudre le problème de déficit en viande du pays. *2ème conférence sur la production et la génétique du lapin dans la région méditéranéenne, 16 pp.*

CAMPS J., 1988. El futuro de la cunicultura en España y en la CEE. *in* Cursillo Cunicultura Basico, *Extrona SA ed., Viladecavalls España, 221–227*

CANCELLOTI F., COLIN M., PRIGENT A.Y., 1990. Account of the seminar on rabbit haemorrhagic disease (VHD). *Cuni–Sciences, 6, 1–11*

CHEEKE P.R., PATTON N.M., 1987. Rabbit production and research in the people's republic of China. *J. Appl. Rabbit Res., 10, 68–75*

CHEEKE P.R., PATTON N.M., LUKEFAHR S.D., McNITT J.I., 1987. Rabbit Production. *The interstate Printers & Publishers Inc. ed., Danville USA 472 pp.*

FINZI A., 1991. Rabbit production in developing countries. *Conference at the International Purina's Rabbit Days, Sept.1991 Treviso (Italy)*

FINZI A., 1988. Problems of rabbit production in developing countries. *Proceedings 4th World Rabbit Congress, Budapest, 1, 64–78*

FINZI A., AMICI A., 1988. Free range rabbit breeding system: new technologies. *Proceedings 4th World Rabbit Congress, Budapest, 1, 276–285*

FUJITA J.. 1988. Rabbit breeding in Japan. *Proceedings 4th World Rabbit Congress, Budapest, 1, 42–43*

JOUVE D., 1989. Le lapin hongrois: sa place sur les marchés français et européens. *Cuniculture, 16, 83–87*

KURDI Cs., RADNAI I., ZELEI I., TOTH M., 1988. Tasks and works of the Angora Rabbit Production Company LTD. *Proceedings 4th World Rabbit Congress, Budapest, 1*, 341–344

LEBAS F., 1985. Compte rendu d'une mission d'étude sur la production et la recherche cunicoles en Inde. *Document interne INRA*

LEBAS F., COUDERT P., ROUVIER R., de ROCHAMBEAU H., 1984. Le Lapin, Elevage et Pathologie. *FAO ed. Rome Italy, 298 pp*

NEUMANN KAPELL M., 1985. Rabbit production in Chile. *J. Appl. Rabbit Res., 8, 143–144*

PRIGENT A.Y., 1989. La production cunicole russe: la fourrure avant tout. *L'Eleveur de Lapins, N°28, 38*

PU J.B., PELANT R.K., 1990. Rabbit production in Sichuan province, China. *J. Appl. Rabbit Res., 13, 26–31*

PURINA PERU S.A. , 1992. Present situation of the Rabbit production in Peru. *Answer to an internal Purina International Questionnaire*

RAI R.B., SINGH D., SINGH R.N., 1985. Studies on mortality pattern in rabbits. Indian Vet. Med. J., **9**, 26–30

ROUGEOT J., THEBAULT R.G., 1984. Le Lapin Angora, sa toison son élevage. *Les éditions du point vétérinaire ed. Maisons–Alfort, France, 182 pp.*

SINQUIN J.P., 1989. La production du lapin en Malaisie. *Cuniculture, 16, 212–213*

THEBAULT R.G., de ROCHAMBEAU H., 1989. Le lapin angora: production et amélioration génétique. *INRA Prod. Anim., 2, 145–154*

ZANG F.Y.,1989. The rabbit industry in China. *J. Appl. Rabbit Res., 12, 278–279*