

DESCRIPTIVE MODEL FOR RABBIT GENETIC RESOURCES DATA BANK

KHALIL M.H.

Department of Animal Production, Faculty of Agriculture at Moshtohor,
Zagazig University, Moshtohor, QALYUBIA - Egypt

SUMMARY : A proposed model of descriptors for rabbit genetic resources data bank entry is presented. A final recommendation is also presented to safeguard valuable breeds/strains from danger of extinction. For each breed/strain represented in a country, there will be one master record (for physical characteristics) and several slave records (for performance characteristics). The latter record will depend on the number of publications available. The condensed documentation format reported here corresponds

to the FAO data bank methodology (FAO, 1986) used for swine, although suitable modifications were made to reflect the unique biology of rabbits. The descriptive model for any breed/strain must include data on distribution, physical characteristics (e.g. colour, temperament, body parts...) and performance characteristics (e.g. reproductive efficiency, lactational and maternal behaviour, adaptability to environmental conditions, growth rate and survival, feed conversion ratio, carcass characteristics, etc...).

RESUME : Modèle descriptif d'une banque de données consacrée aux ressources génétiques du lapin.

L'auteur présente un modèle de descripteurs destinés à la constitution d'une banque de données sur les ressources génétiques cunicoles. Des recommandations sont également présentées pour sauvegarder les races ou lignées utiles mais en danger d'extinction. Pour chaque race ou souche représentées dans un pays, il y aura un enregistrement principal (pour les caractéristiques physiques) et plusieurs enregistrements associés (pour les performances). Ce dernier type dépendra du nombre de publications disponibles. Le format condensé de collecte d'information

présenté par l'auteur correspond à la méthodologie employée pour la banque de données de la FAO consacrée au porc (FAO, 1986). Toutefois certaines modifications ont été apportées pour tenir compte de la biologie particulière du lapin. Pour une race ou une souche données le modèle de description doit inclure des données sur sa distribution, ses caractéristiques physiques (p. ex. couleur, comportement général, parties du corps...) ainsi que sur ses performances (p. ex. efficacité de reproduction, production laitière, comportement maternel, adaptabilité à des conditions variées, vitesse de croissance, taux de survie, indice de consommation, caractéristiques de la carcasse...).

INTRODUCTION

There are over 100 breeds and varieties of rabbit in the U.S.A. (LUKEFAHR, 1985 ; ARBA, 1991). Baladi and Giza White of the Near East/Africa, the Sichuan White and Japanese Large White from Asia, the Criollo of Latin America, and the so-called improved breeds from Europe and North America, e.g. Fauve de Bourgogne, Dendermonde White, California and New Zealand White, serve as examples of local genetic stock representation. Performances, origin and domestic use of recognized breed populations are needed to register. Based upon breed registration entries, it would appear that some breeds may be in threat of extinction as "country populations", e.g. Carmagnola in Italy and Giza White in Egypt. For this purpose, an attempt for ten years was taken in Italy to evaluate the production performance of local-breed population of Carmagnola Grey rabbits and to preserve such breed (PAGANO TOSCANO *et al*, 1992).

The purpose of this article is to present a model of descriptive variables for rabbit genetic resources data bank inclusion.

DESCRIPTIVE MODEL FOR RABBIT GENETIC RESOURCES DATA BANK

In the scientific literature there are limited available evaluation reports on local rabbit breed characterizations, rates of exotic breed adaptation, crossbred performances and environmental production

variables, especially from the developing countries. Reports on topics and issues related to genetic conservation and preservation are even more rare, and have primarily been confined to groups of American and European rabbits geneticists, most notably in France, Italy and Spain as well as in Egypt. Such pertinent production systems and inventory data are needed to facilitate more successful planning and implementation of rabbit breeding programs. Data bank methodologies for animal genetic resources have been developed by the FAO (FAO, 1986; RUANE, 1993) and could be modified to include rabbits, as proposed by MAIJALA and SIMON (1987). For this reason, a questionnaire form has already been circulated by a WRSA executive committee to develop a standardized format of suitable descriptors for breed/strains characterizations of rabbits

1. Extraction and preparation of data:

The person preparing and extracting data on breed characteristics and for assembling them in an approved Descriptor List is called **compiler**. The **Data Bank (DB)** is a pool of information on breed characteristics within defined environments. The data for the Data Bank will be derived from various published or unpublished **sources**. The **Descriptor List** is comprehensive and covering all aspects of the breed characteristics. It was derived from trials in different countries and covers all possible traits of interest. The Descriptor List is divided into two components:

- Master Record :

This record refers to physical characteristics of the breed. Such record for the breed or strain need not necessarily be derived from a single Source, but from a number of Sources.

- Slave Record.

This consists of performance characteristics of a group of animals of a breed or strain. Every source will result in one slave record. In exceptional circumstances, an author may have published two or more papers covering different traits in each paper but all derived from the same group of animals maintained over the same time period. The information from these sources could be pooled into a single slave record.

After a complete exercise, the end result is one Master Record for each breed or crossbred and a larger number of Slave Records for each breed or crossbred. Each Slave Record derives from one source, i.e. each source contributes a slave record for each breed or crossbred reported.

The master record is made up of breed descriptive data and is qualitative in nature. Attempts have been made in the descriptor lists to categorise

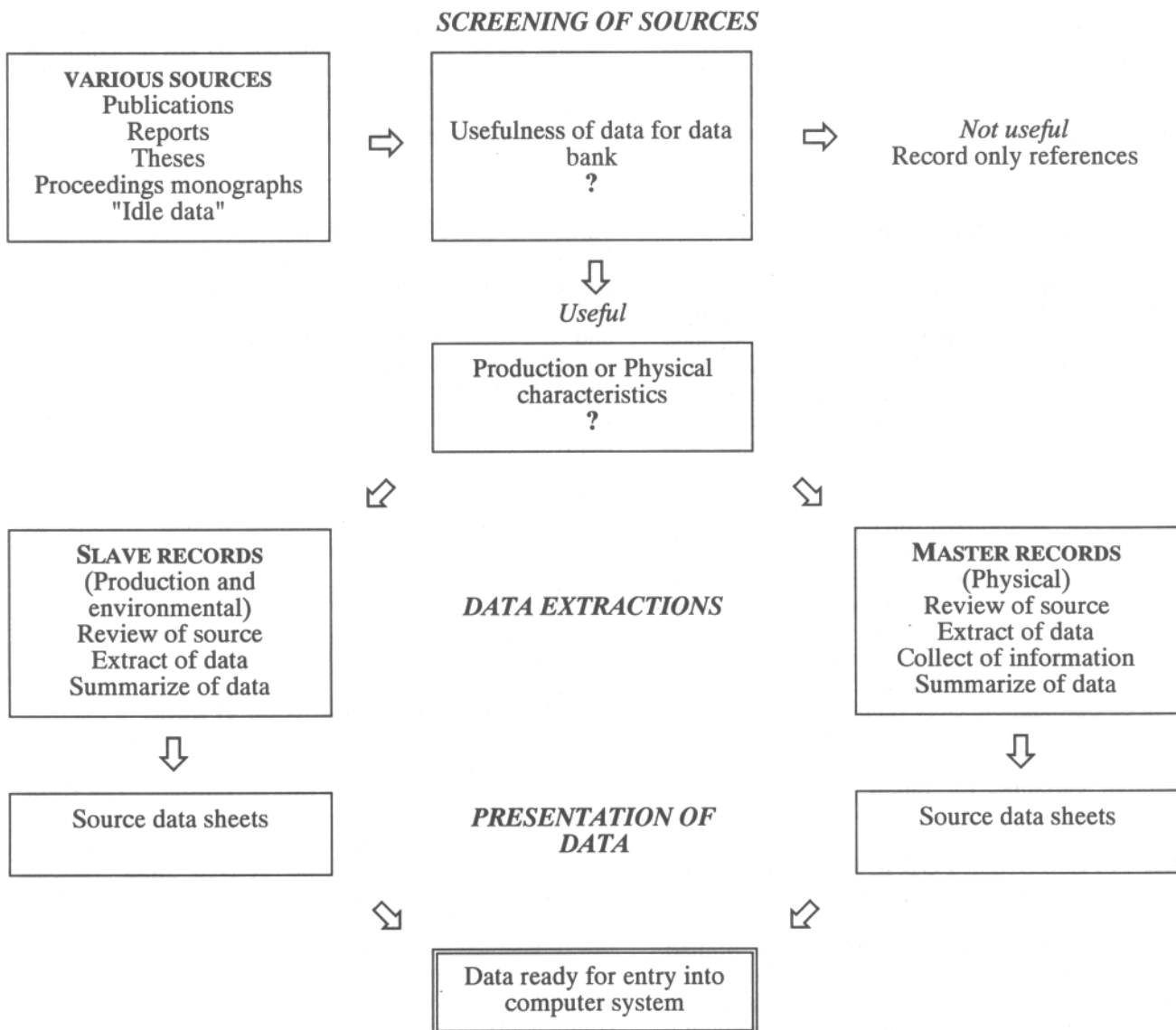
descriptors such as body colours and size, temperament and belly shape into fixed format alternatives (e.g. straight vs curved; short, medium or long and colour percent). For other traits, for example, resistance to diseases and parasites, free format fields for word description are allowed. Usually very few publications are available which describe the physical features of a breed of rabbits. All sources after 1960 should be given in slave records to be used later in developing the data bank.

2. Presentation of data for bank entry:

The master and slave records should be prepared separately. Direct entry of data from source into the computer system is not possible. It is therefore suggested that the extracted data be written on a sheet of paper, the **source data sheet**. The resulting source data sheets derived from the various sources are now ready for entry into the system.

A summarized flow chart is given below for the data extraction and presentation.

FLOW CHART FOR EXTRACTION AND PREPARATION OF DATA



3. The content of the Master and Slave records:**First: Master record****1 - Breed name**

Use name in Standard of Perfection (ARBA, 1991) or any World Dictionary of rabbit breeds, strains and varieties, if the breed is given in the dictionary.

2 - Breed name synonyms**3 - Strains within breeds****4 - General information and breed description****4.1 Country and population data****4.1.1 Country name 1 (give data census or estimate)**

4.1.1.1 Population size

4.1.1.2 Census data

4.1.1.3 Estimated value

4.1.1.4 Unspecified

4.1.1.5 Herd sizes

	Governmental farm	Commercial farm	Village farm	Communally owned herds
Mean	x	x	x	x
Range	x	x	x	x
<i>Distribution (%)</i> :				
1-10 animals	x	x	x	x
11-50 animals	x	x	x	x
51-100 animals	x	x	x	x
101-200 animals	x	x	x	x
>200 animals	x	x	x	x

4.1.1.6 Origin of breed (Indigenous or exotic)

Indigenous

4.1.1.7 Immigration

Immigration of animals of the same or different breeds in recent years.

4.1.1.8 Conservation programme

Conservation for live animals, frozen embryos, etc...

4.1.2 Country name 2

4.1.n Country name n

4.2 Colour

Fill in fixed format fields or write description in the free format description field, (e.g. colour 1, colour 2, etc, distinctive colour marking for males and females).

4.3 Head

Profile, convex, concave or straight.

4.4 Ears

Erect, lop or semi-lop.

4.5 Body parts

4.5.1 Back (straight or markedly convex ventrally).

4.5.2 Belly (pot or not pot-bellied).

4.5.3 Skin (smooth or wrinkled).

4.5.4 Tail (straight or curly).

4.6 Basic temperament (for males or females):

docile, moderately tractable or wild.

4.7 Interest of the breed

Main use and special characteristics as disease resistance, adaptability to hot climate, etc...

4.8 Genetic characteristics

Genetic distances to other breeds, marker genes known, chromosomal abnormalities, etc...

5. Master record prepared by :

5.1 Name:

5.2 Title: [Dr., Mr., Miss, etc.]

5.3 Address:

5.4 Affiliation: [organization, company, consultant,.... etc.]

5.5 Date of preparation :

Second: Slave Record (example)**1 - Breed name of Master record : Giza White (GW)****2 - Breed/strain type of slave record : 100% Baladi rabbits****3 - Strain (or distinct within-breed type)****4 - Period of data :**

	Year	Month	Day
From	1975	10	
To	1983	9	

5 - Data form prepared by:

5.1 Name: M.H. KHALIL

5.2 Title: Dr.

5.3 Address: 8 Hassien Sadek street, Discrete No 75, 8th region, Nasr city, Cairo, Egypt.

5.4 Affiliation: Department of Animal Production, Faculty of Agriculture at Moshtohor, Zagazig University, Qalyoubia Governorate, Egypt.

5.5 Date of preparation: e.g. 1993:10:5

6 - Bibliographical reference of source document

KHALIL *et al.* (1987a&b), KHALIL *et al.* (1989), KHALIL and SOLIMAN (1989), EL-SAYAAD *et al.* (1990), KHALIL and KHALIL (1991). (see reference section).

7 - Data type and analysis

7.1 Data

Adjusted for environmental or other factors.

7.2 Treatment of data

Analytical.

8 - Reliability code:

1= highly reliable (according to FAO data bank regulation system).

9 - Country in which data were recorded: Egypt

9.1 Country subdivision:

Qalyoubia Governorate, Moshtohor.

10 - Terrestrial environment:

Mediterranean woodland and scrub.

11 - Elevation and topography:

Valley, slope, well drained.

12 - Climate

Rain fall, relative humidity, temperature (data not available).

13 - Socio-management system : Semi-intensive

14 - Type of farm : Experimental station.

15 - Degree of management supervision :

Supervision by scientific staff of investigation project.

16 - Mating method : natural (hand mating)

17 - Herd size

	Total
17.1 Number of breeding does	86
17.2 Number of replacement does	28
17.3 Number of breeding bucks	17
17.4 Number of reserve bucks	15
17.5 Number of litters:	
born	359
weaned	319
17.6 Number of young:	
born	2282
weaned at 35 days	1210
marketed at 12 weeks	662

18 - Nutrition

18.1 Concentrates (KHALIL *et al.*, 1987ab)

18.2 Water (available free)

18.3 Seasonality of nutrition

Berseem available from December to next May.

19 - Housing

19.1 Wired cages, indoors rabbitry

19.2 Light-dark constant photoperiod

20 - Diseases and parasites (data not available)

e.g. Pasteurellosis, mastitis, coicidosis, ear mites, intestinal and reproductive diseases.

21 - Measures against diseases and parasites :

strict culling, sanitation, selection of healthy stock.

22 - Performance

22.1 Body weight (grams)

	Age	N	Mean	SD	Range
Birth		532	58	7	
21-Day		431	205	70	
Weaning (35 days)		351	408	169	
Post-weaning :					
6-week weight		793	546	138	
8-week weight		648	692	183	
10-week weight		503	870	228	
12-week weight		462	1052	281	
Maturity:					
Breeding does		218	2810	283	
Stud bucks					
Slaughter weight					
Fasted or non-fasted					
Other body weights (free format field)					

22.2 Average daily gain (grams)

	Age	N	Mean	SD	Range
Pre-weaning		351	10	0.5	
Post-weaning					
Feed conversion for growth (free-format field)					

22.3 Body measurements (data not available)

	Age	N	Mean	SD	Range
Chest circumference					
Body length					
Loin width					
Thigh circumference					
Other body measurements (free format field)					

22.4 Carcass traits (grams)

	Age	N	Mean	SD	Range
Hot Carcass weight	12	24	710		
Carcass length					
Dressing percentage	12	24	50%		
Giblets weight	12	24	68		
Skin weight	12	24	211		
Abdominal fat (%)					
Loin weight	12	24	197		
Forequarter weight	12	24	338		
Meat: bone ratio					
Lean percentage					
other carcass traits (free format field)					

22.5 Reproduction

22.5.1 Sexual maturity (months)

	N	Mean	SD	Range
Age at 1st ejaculate (not available)				
Age at 1st mating (buck)		9.0		
Age at 1st mating (doe)	873	10.3		

22.5.2 Reproductive cycle (days)

	N	Mean	SD	Range
60 days - (4 litters per annum)				
Gestation length	873	31.3		
Remating schedule	873	10		
Pregnancy detection (abdominal palpation - 10 days post mating)				
Number of teats	218	8		

22.5.3 Fertility

	N	Mean	SD	Range
Conception rate (%)				
Number of service per conception	873	2.4		
Number of services per kindling				
Days open (interval from kindling to conception)				
Kindling interval				

22.5.4 Fecundity (litters)

	N	Mean	SD	Range
Litter size adjusted for parity:				
at birth	359	6.36	2.01	
at 21-days weaning (5 weeks) post-weaning	311	4.68	1.89	

24.3 Other genetic parameter
free format field).

	N	Mean	SD	Range
22.5.5 Litter weight				
at birth	359	326	94	
21-days				
Weaning	311	2000	887	
22.5.6 Milk yield (kg) : Maternal and lactation behaviour (data not available).				

22.5.7 Nest quality

22.5.8 Semen characteristics

22.5.9 Reproductive disorders
Mastitis, enteritis, ... etc

	N	Mean	SD	Range
22.5.10 Prenatal mortality (litters)				
Embryonic (%)				
Abortion (%)				
Still births (%)				

	N	Mean	SD	Range
22.6 Postnatal mortality (litters)				
Pre-weaning (%)	359	28.1		
Post-weaning (%)				
Doe longevity (days)				

23 - Physiology (reaction to climatic stress)	Sex	Age	N	Mean	SD	Range
Rectal temperature						
Pulse rate						
Respiration rate						

24 - Genetic parameters

24.1 Repeatability	Estimate	SE
Weight of doe at conception	0.64	0.09
Litter size at birth	0.09	0.10
Litter weight at birth	0.14	0.11
Number of services per conception	0.06	0.04
Gestation length	0.06	0.06
7-days milk yield	0.08	0.07
Litter weight at 21 days	0.10	0.07
Litter gain at 21 days	0.11	0.07
Prewaning litter mortality	0.05	0.06
Litter size at weaning (5 weeks)	0.02	0.07
Litter weight at weaning (5 weeks)	0.06	0.07
Prewaning litter gain	0.03	0.06
Average bunny weight at weaning	0.07	0.04
Total milk yield (35 days)	0.17	0.08

24.2 Heritability	Estimate	SE
Days open	0.064	0.182
Gestation length	0.45	0.13
Number born alive	0.182	0.173
Litter size at birth	0.25	0.168
Litter weight at birth	0.40	0.198
Litter size at weaning	0.27	0.185
Litter weight at weaning	0.47	0.286
Prewaning litter mortality	0.15	0.095
Prewaning litter gain	0.118	0.220
Prewaning daily gain in litter	0.106	0.218
Average bunny weight at weaning	0.62	0.261
5-week weight	0.48	0.05
12-week weight	0.37	0.17

GENERAL RECOMMENDATION:

It is recommended to the **WRSA** (in Co-Ordination with **FAO**) that the existing executive Committee be assigned the responsibility of developing and promoting proper conservation and management policies for rabbit breed populations, as well as the duty to safeguard valuable breeds which are in danger of extinction. In certain cases the **ARBA** could likely subsidize rabbit producer which maintain endangered breed populations (**LUKEFAHR**, 1988). Similarly, **WRSA** should rigorously pursue ongoing efforts to align its mission closely with the **FAO**, and other key agencies, to delegate and publicize regional data bank centers of rabbit germplasm conservation, and to encourage rabbit geneticist/scientists in each country to join the National Committee to the institute for Animal Genetic Resources Regional Data Banks systems network.

Immediate crossbreeding following importation has been observed in numerous cases before either local or exotic genotypes have been properly evaluated under similar environmental conditions. Therefore, there is a great need to identify, sample, test, classify and conserve the world's resources of rabbit germ plasm for the purposes of productivity enhancement and future food security. This objective should be reviewed as government policy among and within nations.

Received : October 25, 1993.
Accepted : December 12, 1993.

BIBLIOGRAPHY

ARBA, 1991. Standard of perfection. Standard breed rabbits and cavies. *The American Rabbit Breeders Association, Inc., Bloomington, Illinois, USA.*

EL-SAYAAD G.A.E., AFIFI E.A., ABDELLA M.M., EL-MADHAGI K.S.S., 1990. Effect of dietary protein level, fiber level breed and other factors on rabbit performance. III. Carcass traits, meat composition and blood components of growing rabbits. *Annals of Agricultural Science, Moshtohor, Egypt*, 28 (4): 2141-2165.

FAO, 1986. Animal genetic resources data bank. 2. Descriptor lists for cattle, buffalo, pigs, sheep and goats. *F.A.O. Animal Production and Health Paper*. 59/2: 150pp.

KHALIL M.H., 1993. Genetic evaluation of the lactational performance in Giza White rabbits and its relation with preweaning litter traits. *Egyptian J. Rabbit Science*, 5, (In press).

KHALIL M.H., SOLIMAN, A.M., 1989. Genetic analysis for some reproductive traits in doe rabbits. *J. Appl. Rabbit Res.*, 12 (4), 205-208.

KHALIL M.H., KHALIL H.H., 1991. Genetic and phenotypic parameters for weaning and

- preweaning body weights and gain in Bouscat and Giza White rabbits. *J. Appl. Rabbit Res.*, **14**, 44-51.
- KHALIL M.H., OWEN J.B., AFIFI E.A., 1987a. A genetic analysis of litter traits in Bauscat and Giza White rabbits. *Anim. Prod.*, **45**, 123-134.
- KHALIL M.H., AFIFI E.A., OWEN J.B., 1987b. A genetic analysis of body weight traits in young Bauscat and Giza White rabbits. *Anim. Prod.*, **45**, 135-144.
- KHALIL M.H., AFIFI E.A., KADRY A.E.H., 1989. Genetic analysis of weight of doe rabbits during gestation and its phenotypic relationship with reproductive efficiency at kindling. *J. Appl. Rabbit Res.*, **12** (1), 45-51.
- LUKEFAHR S.D., 1985. A note on an estimate of the world's domestic rabbit population. *J. Appl. Rabbit Res.* **8**, 157.
- LUKEFAHR S.D., 1988. Conservation of global rabbit germplasm resources. *4th World Rabbit congress, Budapest, Hungary, 10-14 October, 1988.*
- MAIJALA K., SIMON D., 1987. Plan for European data banks on animal genetic resources. *In: Proc. 38th Annual Meeting of the European Association of Animal Production. 28th September- 1st October, 1987, Lisbon, Portugal.*
- RUANE J., 1993. Documenting the World's Domestic Animal Resources. *In UNEP-FAO, 1993. Animal Genetic Resources Information, 11, 13-21.*
- PAGANO TOSCANO G., LAZZARONI C., ZOCCARATO I., BENATTI G., 1992. Conservation and improvement of the Carmagnola Grey rabbit. *J. Appl. Rabbit Res.*, **15**, 240-246
-