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ANALYSIS OF PRODUCTION PARAMETERS FOR SELECTION OF BREEDING RABBITS

Meléndez Torrès C.

Universidad Pedagógica Experimental Libertador, Instituto Pedagógico Barquisimeto "Luis Beltrán Prieto Figueroa", Avenida José María Vargas con Avenida Las Palmas, Barquisimeto, Estado Lara, Venezuela.
Corresponding author: carloscamt@gmail.com

ABSTRACT

The objectives of this publication is to present the reproductive parameters that allow the selection of reproducers. The methodology was applied to a herd of domestic rabbits of a meat genetic line, composed of 160 breeding dams, 24 breeding sires and 2,000 young rabbits between 1 and 90 days of age, raised under typical edapho-climatic conditions of tropical countries. The herd was characterized with a recording system which included the variables that directly affect the levels of rabbit production. The herd was divided into six genetic groups to apply a mating system, in order to limit the evolution of consanguinity. The formula for the Reproductive Efficiency Index (REI) was designed as a tool for the selection of the best performing reproducers. The weight of the reproductive males was increased by 246 g from 2010 to 2013. The number of kits weaned per mother at each delivery was increased from 3.60 to 6.30. In conclusion, the applied methodology allowed the selection of the best reproducers of the herd, and thus was able to increase the production level
.

Keywords: Traceability, Reproductive Efficiency Index.

INTRODUCTION

The countries with a tropical climate have a very favorable edapho-climatic condition for livestock production, since they have a "spring" throughout the year, where the atmospheric conditions do not show drastic changes in the different periods of the year. This allows the breeding of both rabbits and other species in almost the same conditions during the twelve months of each year. However, this tropical climate is a limitation for the development of animals that have been genetically improved in temperate climates. Feed consumption, growth rate, fertility index, incidences of diseases may be affected by high environmental temperatures. For this reason, it is impossible to adopt a model exactly copied from countries where these animals were farmed, which, although they have been adapted, need a management according to these conditions.

One of the main questions for rabbit farmers is: How to select breeders efficiently? The present publication propose a methodology to improve production and reproduction of domestic rabbits, taking into account their individual performances.
The Food Safety Committee of the Spanish Association of Commercial Codification (AECOC, 1977) defines traceability as "the set of those pre-established and self-sufficient procedures that allow to know the history, the location, and the trajectory of a product or batch of products along the supply chain at a given moment, through certain tools". This statement motivated the monitoring that was done on each rabbit in the herd, from the mating plan until the culling of reproducers.
Lebas et al. (1996) stated that "the selection and the crossing are directed to two main objectives: 1.- increase in the numerical productivity per rabbit and year, or per rabbit cage

and year; 2.- increase the growth rate that allows the slaughter weight to be reached more quickly and the quality of the carcass and meat improved".
The Reproductive Efficiency Index (REI) (Meléndez, 2015), was obtained by dividing the number of kits produced by the doe divided by the length of the carrier of the doe and multiplied by 30 days. The result give the average monthly number of kits produced by the doe. REI and the weight at 90 days of males were the two criteria used to meet the two objectives defined by Lebas (1996).

MATERIALS AND METHODS

Animal management

Data were recorded in a rabbit farm on a herd of rabbits from a meat line, composed of 160 breeding does, 24 bucks, and an average of 2,000 young rabbits, at each step of breeding (lactation, rearing, fattening and replacements).
A mating plan based on six groups was used to limit the evolution of inbreeding. Each group was defined by the male, who determined the group of each new female that joined the herd. The total of the females were divided into 6 groups, defined with letters from A to F, as well as the males in six groups from 1 to 6. The mating was made as shown in figure 3. Daughters resulting from the mating of the male 1 with the females of group A, will join group B, and they will be mated with the male 2. And so on, until the females of group F mated with the male of group 6. Females born from group F will become the next reproducers of group 1. When this finally happens, at least thirty-six months have elapsed, which suggests that the original males of group 1 have already been replaced, therefore the new Group 1 breeders will never be found with their original ancestor.

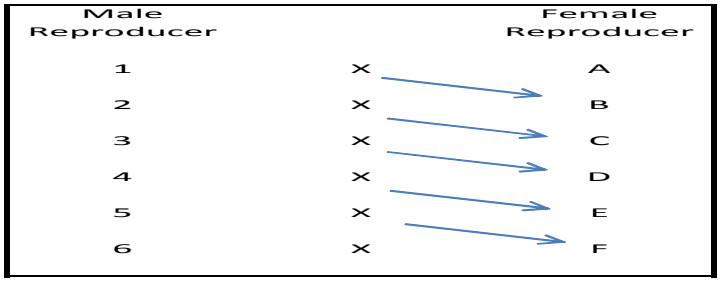

Figure 1. Mating system scheme

Weaning takes place after 30 days, with an interval between farrowings of 45 days. As an example, the identification of litter GL-01-024-03 would be litter 03 of the breeding female number 024 from house 1. At weaning, kits are transferred to fattening cage (two individuals per cage). From day 60 to day 90, they are weighed weekly.

Recording system and evaluation of breeders

Once in the reproductive stage, a registration form is used to collect the data necessary for the evaluation of each individual. Data collected were: breeding female files, breeding kit files, fattening kits, breeding males files, birth and mortality control files, breeding female ratio, breeding male ratio, among others of a logistical nature.
The methodology began with the identification of each of the reproductive males and females, as well as each of the litters, in order to apply traceability principles to each individual in the herd. Breeding males and females are identified with a number (example: BF-01-003, corresponds to breeding female number 003 of shed 01, BM-02-015, corresponds to breeding male number 15 of house 2). The following affiliate information were recorded for each

reproducers: a.-) Father and Mother. b.-) Date of Birth. c.-) Date of First Service. d.-) Maximum Date of Service. e.-) Coat (color or race). f.-) Mating Group.
The following productive parameters were recorded for each breeding doe: a.-) Date of Service. b.-) Reproductive Male. c.-) Palpation Date. d.-)Delivery Date. e.-) Number of Born Rabbits. f.-) Number of Weaned Rabbits. g.-) Weaning Weight. h.-) Interval between Births. i.-) Number of Accumulated Rabbits. j.-) Number of Accumulated Days. k.-) Reproductive Index.
All this information must be specified in the reproductive female file, allowing then the calculation of the Reproductive Efficiency Index (REI) (Meléndez, 2015). REI, was obtained by dividing the number of kits produced by the doe divided by the length of the carrier of the doe and multiplied by 30 days (figure 2). The result give the average monthly number of kits produced by the doe. REI of dams and the weight at 90 days of sires were the two criteria used for the selection.

$$\text{Reproductive Efficiency Index} = \frac{\text{Accumulated kits}}{\text{Accumulated days}} \text{ X 30 days} = \text{Num. kits/month}$$

$$\text{Reproductive Efficiency Index} = \frac{\text{48 kits / year}}{\text{365 days}} \text{ X 30 days} = \text{4 kits/month}$$

Figure 2. Formula to calculate the Reproductive Efficiency Index

Average performances of breeders
Average weight of breeding males and average number of kits per kindling doe were calculated from 2010 to 2013.

RESULTS AND DISCUSSION

Data recording system
Figure 3 presents the form used to record data for the breeding does.

		Father	Mother		Date of birth		Date of first service		Top service date	Race	Set
FM-201		RM-101	FM-101		01/01/10		15/05/10		15/06/10	XX	A
Num	Data of service	Date of birth	Born kids	Weaned kits	Weaning weigth	Accum kits	Calving interval	Accum days	reproduct efficiency index	Observations	
1	15-06-18	17-07-18	8	6	500	6	0	0	0		
2	25-07-18	26-08-18	9	6	500	12	40	40	9,00		
3	09-09-18	11-10-18	7	6	500	18	46	86	6,28		
4	22-10-18	23-11-18	8	6	500	24	43	129	5,58		
5	02-12-18	03-01-19	7	6	500	30	41	170	5,29		
6	12-01-19	13-02-19	8	6	500	36	41	211	5,12		
7	25-02-19	29-03-19	8	6	500	42	44	255	4,94		
8	11-04-19	13-05-19	7	6	500	48	45	300	4,80		

Figure 3. Breeding doe form model

Average performances of breeders

From 2010 to 2013, the average weight of breeding males increased by 246 g. (table 1). On the same period, the number of kits weaned per kindling doe increased from 3.60 to 6.30 (table 1).

Table 1: Average weight of breeding males (kg) and number of kits weaned per kindling doe from 2010 to 2013.

Year	2010	2011	2012	2013
Average weight of breeding males at 90 days (Kg)	2,614	2,656	2,816	2,860
Rabbits weaned by kindling doe	3,60	4,80	5,60	6,30

CONCLUSIONS

With the implementation of a recording system and an evaluation of breeding rabbits, it was possible to increase the weight of the reproductive males by 246 g and to increase also the number of kits weaned per kindling doe from 3.60 to 6.30 between 2010 and 2013.

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