HOUSING CONDITIONS OF GROWING RABBITS IN BRAZIL

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ABSTRACT

Information about rabbit production systems in Brazil is scarce. The objective of this study was to describe the facilities and housing characteristics of Brazilian growing rabbit farms. Data about farm purpose, animals (breed and age), cages, feeders, and drinkers were collected from 11 farms (3 pet farms, 4 meat farms, and 4 universities). A total of 290 cages holding 843 rabbits were evaluated. Rabbits in meat farms had a higher average age than those in pet farms and universities. The breed number within each farm varied from 1 to 18, with pet farms showing the largest number of breeds. The cage system most implemented by the farmers was flat-deck. Wire cages were observed in 90.9% of the farms. The number of rabbits per cage varied from 1 to 10 rabbits, with an average of 3.1 ± 1.8 rabbits/cage. The average area and height of the cages was 0.43 ± 0.1 m² and 44.2 ± 6.5 cm, with an average of 7.2 ± 3.4 rabbits/m². All cages were clean in 45.4% of the farms. No completely dirty cages were observed. Three farms had unsafe cages; of these, one had 60.9% of the cages with some safety problem. Metal and clay feeders were common, with 45.5% of feeders being inside-cage feeders. The average rabbit/feeder ratio was 2.2 ± 1.2, with 9.1% of the farms with more than 4 rabbits/feeder. All feeders were clean. The main system and type of drinker used was the automatic nipple drinker (72.7%). Regarding the cleanliness of the drinkers, 27.3% of the farms had dirty drinkers and two farms (18.2%) had malfunctioning drinkers. A variation of facilities and equipment was observed among Brazilian rabbit farms. No housing standardization was observed, and the housing conditions depended on the purpose of the farm, accessibility to equipment, and costs.

Key words: Cage, Drinker, Feeder, Stocking density.

INTRODUCTION

In recent years, the Brazilian rabbit market has faced changes. The estimated production of meat rabbits in the country has decreased from 2040 tons in 2007 to 1307 tons in 2017 (FAO, 2019). However, an increase in pet rabbit production has been shown (Machado and Ferreira, 2014). In 2014, 73.5% of rabbit farms indexed in the Brazilian Scientific Association of Rabbitry (ACBC) worked with pet rabbit breeds (Machado and Ferreira, 2014). From 2013 to 2018, the population growth of other pet animals (reptiles and small mammals, including rabbits) was 5.7%, reaching 2.3 million in 2018 (ABINPET, 2019).

There is little information available about Brazilian rabbit farms. Rabbit farms tend to be small (20 to 100 does) and are a secondary activity for most of the farmers, who work mainly with meat and pet rabbits, with little exploitation of by-products (Machado and Ferreira, 2014). South-Central Brazil contains most of the pet and meat rabbit farmers (Machado and Ferreira, 2014; Heker, 2015). However, the housing characteristics of these farms are unknown. The objective of this study was to describe the housing characteristics of Brazilian growing rabbit farms.

MATERIALS AND METHODS

Eleven rabbit farms in South and Southeast Brazil (São Paulo, Minas Gerais and Paraná State) were visited by one evaluator between June 2018 and March 2019. Four were meat farms, three were university rabbitries and three were pet rabbit producers. This study was approved by the Animal Use Committee of Pontifícia Universidade Católica do Paraná (PUCPR).

Rabbits that were at the end of their growing phase were included for evaluation in the meat and university rabbitries. For pet farms, animals that had been weaned and were available for sale were

considered. This is because the rabbits were not kept until the end of the fattening stage in this type of production. Because of the teaching and research characteristics associated with the university rabbitries, rabbits under maintenance that were not yet in reproduction categories (does and bucks) were considered in the evaluations. Data were collected via interviews with the farmers and by visual examination of the rabbitries. Cages, feeders, and drinkers were evaluated according to type, functionality, cleaning, security, and density. All evaluated parameters and their definitions are described in Table 1. The data were collected by the same person in all farms. For descriptive statistics, data were evaluated using Microsoft Excel Office 365.

Table 1: Parameters studied with regard to the farm, cage, feeder, and drinker in growing rabbit farms

Variable	Parameter	Definition
Farm	Purpose	Meat, pet, or university purposes
	Rabbit age	Age of rabbits in cages evaluated
	Breed	Breeds raised on the farm
Cage	System of cage	Battery, flat-deck (with metal/wood stand or suspended by chains) or Californian system
	Type of cage	Wood, wire.
	Area	Measured by multiplying length by width of the cage
	Height	Measured from bottom to cage ceiling
	Rabbits/cage	Number of rabbits per cage
	Stocking density	Number of rabbits per m²
	Cleaning	Clean, partially dirty (less than 25% of the cage) and dirty (more than 25% of cage)
	Safety	Safe: without elements that can cause rabbit wounds; Not safe: presence of components of the cage that can cause injury (for example, loose wire, hole, or rust)
Feeder	Type	Feeder material used (metal, clay, or plastic)
	Placement	Inside or outside the cage
	Size	Length of the feeder (cm)
	Rabbits/feeder	Number of rabbits per feeder
	Cleaning	Clean: no dirt in the feeder; Dirty: any dirt (such as feces or mud) in the feeder.
Drinker	Type	Drinker type (nipple or bowl – metal, clay, or plastic) and system (automatic, manual, or both)
	Rabbits/drinker	Number of rabbits per drinker
	Functionality	Proper functioning: no problems with the drinker; Malfunction: the drinker is dripping or does not release water properly
	Cleaning	Clean: no dirt on the drinker; Dirty: dirt (such as feces, mud, or rust) on the drinker

RESULTS AND DISCUSSION

A total of 290 cages holding 843 rabbits were evaluated in 11 farms. The number of cages and animals evaluated (Table 2) varied according to the size of the farm and any sale or slaughter of rabbits before the visit. Some farms had many cages with rabbits in the beginning of the growing phase, that were not included in this study.

The average age of the rabbits in the pet, university, and meat farms were 11, 13, and 14 weeks, respectively. Pet farmers sell young rabbits that are more visually acceptable to clients. For meat and research rabbits, a rabbit weight of 2.5–3 kg is more desirable (Machado and Ferreira, 2014).

Table 2: The characteristics and number of evaluated cages and rabbits of 11 Brazilian rabbit farms

Farm	Purpose	Cages	Rabbits	Breeds	Age (weeks)		
					Average	Minimum	Maximum
A	Pet	27	57	18	8	8	9
B	Pet	22	30	11	13	6	16
C	Pet	8	11	4	11	8	13
D	University	5	19	2	7	7	7
E	University	23	136	1	9	9	9
J	University	42	46	1	25	24	30
K	University	22	105	8	16	14	20
F	Meat	30	139	3	7.5	7.5	17
G	Meat	17	46	2	13	7	14
H	Meat	37	183	6	11	11	11
I	Meat	57	71	2	18	18	18

The rabbit breeds observed during the evaluations were: Angora, Botucatu, Californian, Blanc de Bouscat, Flemish Giant, English Spot, Chinchilla, Creme d'Argent, Rex, Fuzzy Lop, American Fuzzy Lop, Polish, Hotot, Lionhead, Mini Angora, Miniature Lion, Mini Rex, Miniature Dutch, Mini Lop, Netherland Dwarf, New Zealand (white and black), Champagne d'Argent, Teddy Dwerg and various crossbreeds of these. The breed number within one farm varied from 1 to 18, and the average for pet, meat and university farms was 11, 3 and 3, respectively. Valentim *et al.* (2018), in a study with pet rabbit farmers, showed that a great number of breeds, especially miniature, are common in these farms. For meat rabbits, the main breeds found were consistent with those reported by Machado and Ferreira (2014) for meat rabbit production in Brazil.

The cage system that was most implemented by the farmers was flat-deck (72.7%), with 36.35% of these cages suspended by wire or chains and the other 36.35% supported with wood or metal stands. The EFSA report (2005) showed that two to three tiers are more common for growing rabbits, but this was not observed in the present study. The Californian cage system was observed in 18.2% of the farms and the battery system was used in one farm (9.1%). The cage materials observed were wire (90.9%) and wood (9.1%). Wood was used for columns and the cage floor, with the use of hexagonal mesh screens for the walls and ceiling. Wire mesh floors are more appropriate for growing rabbits, because they are easier to clean and avoid hygiene problems (EFSA, 2005). However, the cheaper cost of wood and its availability can explain the use of wood floors by farmers (Baruwa, 2014).

The number of rabbits per cage varied from 1 to 10, with an average of 3.1±1.8 rabbits/cage (Table 3). A maximum recommended group size for growing rabbits is 7–9 (EFSA, 2005), but one farm (9.1%) had 10 rabbits per cage in this study. The average area of the cages was 0.43±0.1 m², varying from 0.23 to 0.7 m². In this study, an average of 7.2±3.4 rabbits/m² was observed, with a maximum of 12.3 rabbits/m². The cage height varied from 35 to 60 cm, with an average of 44.2±6.5 cm. A minimum height of 30–35 cm is considered acceptable for a meat rabbit cage (Princz *et al.*, 2008).

All cages were clean in 45.4% of the farms during the visit. Only one farm had more than 50% of its cages classified as partially dirty. Completely dirty cages were not observed in this study. Regarding the safety of the cages, three farms had unsafe cages; in one of these, 60.9% of the cages had some form of safety problem. Inadequate equipment predisposes rabbits to wounds and should be fixed or replaced immediately (NFACC, 2018).

Table 3. Area (m²), height (cm), rabbits/cage, stocking density (rabbits/m²), cleaning (%), and safety (%) of growing rabbit cages in Brazilian rabbit farms

| Farm | Number of cages | Area | Height | Rabbits/ cage | Stocking density | Cleaning | | | Safety | |
						Clean	Partially dirty	Dirty	Safe	Unsafe
A	27	0.36	45	2.1	5.9	100	0	0	100	0
B	22	0.23	45	1.4	6.0	40.9	59.1	0	100	0
C	8	0.33	60	1.4	4.2	75	25	0	100	0
D	5	0.70	50	3.8	5.4	100	0	0	100	0
E	23	0.48	45	5.9	12.3	91.3	8.7	0	39.1	60.9
F	30	0.48	40	4.6	9.7	100	0	0	100	0
G	17	0.24	35	2.7	11.3	100	0	0	100	0
H	37	0.54	41.6	4.9	9.1	97.3	2.7	0	100	0
I	57	0.36	40	1.2	3.5	100	0	0	100	0
J	42	0.48	40	1.1	2.3	69	31	0	95.2	4.8
K	22	0.48	45	4.8	9.9	95.5	4.5	0	77.3	22.7

During the visits, it was observed that 36.4% of the farms used rectangular metal feeders (ranging from 12 to 14 cm in length), 36.4% used only round clay feeders (ranging from 12 to 25 cm in diameter) and three farms (27.2%) used more than one type of feeder (ranging from 8 to 60 cm), including feeders made from materials besides metal and clay, such as plastic. Regarding feeder

position, 45.5% of the farms placed the feeder inside the cage, 36.4% used outside feeders and 18.2% used both inside and outside feeders.

With regard to feeder size, 63.6% of the farms used a single feeder size, 18.2% used two different feeder sizes and 18.2% used three or more than three different feeder sizes. The average rabbit/feeder ratio was 2.2±1.2, with 88.8% of farms having less than 3 rabbits/feeder, 9.1% of the farms with a ratio between 3 and 4, and 9.1% with more than 4 rabbits/feeder. Regarding feeder cleanliness, 100% of the evaluated cages had clean feeders. This result indicated that the farms abided by the recommendation that the feeder must be cleaned if contamination is observed or after removal of the rabbits from the cage (NFACC, 2018).

The main system and type of drinker used was the automatic nipple drinker (72.7%); the use of a manual system with bowls was observed in 9.1% of the farms and the use of both systems was observed in 18.2% of the farms. In the farm that used only a manual drinker system, the equipment used was a clay bowl. In the farms that used both systems, one used clay bowls and nipple drinkers and one used various materials (clay, plastic and metal) and nipple drinkers. With regard to the cleanliness of the drinkers, 27.3% of the farms had dirty drinkers (with a range of 4.5% to 28.6% of the cages affected); of these, one farm had only nipple drinkers and two had other types of drinker. Two farms (18.2%) had malfunctioning drinkers (with 5.4% to 40% of the cages affected), mainly in the form of a water leak. An inefficient watering system is an example of poor management in terms of rabbit husbandry and clean water needs to be available *ad libitum* (EFSA, 2005).

CONCLUSIONS

Rabbit production facilities and equipment vary between farms in Brazil, with no housing standardization. The housing conditions depend on the purpose of the farm, the accessibility to equipment, and the costs.

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