

TRAINING ENVIRONMENT FOR RABBIT BUCKS: AN INTEGRAL REQUIREMENT IN ASSISTED REPRODUCTIVE TECHNOLOGY TOOL BOX

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ABSTRACT

An experiment was conducted at the Abubakar Tafawa Balewa University Bauchi using 10 matured rabbit bucks with an average weight of 2.7kg which were 26 weeks of age, 5 each of exotic and local breeds. The bucks were managed in their cages for easy identification. The rabbits were fed *ad libitum*. The trial was a 2*5 factorial design using 2 breeds and 5 replicates. The data generated were subjected to an analysis of variance (ANOVA). From the result, it was concluded that significant differences ($P < 0.05$) between the semen harvested from the bucks in training crate and those from non-training crate or environment of previous trials in some of the seminal traits. Therefore, the use of training crates enriches the environment of the bucks and also increases convenience for the trainer to collect semen without difficulties. It is however, recommended that further study be conducted to elucidate this findings.

Keywords: Training, Environment, Rabbit, Requirement, Reproductive, Technology, Tool.

INTRODUCTION

Artificial insemination (AI) is an important procedure in rabbit operation to improve production. As with most assisted reproductive technologies (ART), the practical application is a necessary technique to ensure ease of semen collection from the bucks. The need for basic training, cost benefit, efficient and the ease of use largely remain to be achieved or determined, and fertility is still at a lower efficiency than the commercially acceptable levels in most species (Maxwell *et al.*, 2004). Rabbit breeding can be beneficial in a great deal with adequate training for semen collection, because insemination can properly be planned to receive quality sperm cells. Male rabbits have greater sexual drive and greater qualitative semen production in spring and summer than in autumn and winter when they are not exposed to high environmental temperatures (Mathur *et al.*, 1989; Nizza *et al.*, 1997; Marrai *et al.*, 2002).

Fortune (1993) asserted that the genetic potential of animals is limited currently by the inability to obtain large numbers of gametes from genetically valuable animals. Thousands of sperm cells are never utilized in normal process of reproduction (Erickson, 1994). Therefore an efficient and effective method of collecting semen also requires good training as well as

conducive environment to enhance quality of semen. Animals instinctively thrive in environment that provides structures and clear behavioral boundaries. The practical knowledge of training rabbit bucks is an essential requirement in almost every aspect of modern reproductive technology. An AI technique depends not only on the availability of the buck for just semen but on pre-ejaculation handling for quality semen and favorable environment.

Reproductive techniques have made impressive advances since in the 1950s owing to the development of new and innovative technologies. Most of the advances were driven largely by commercial opportunities and potential improvement. Rabbit training is a fast developing area that needs considerable attention in assisted reproductive technology. This is because valuable animals that could be used despite limited muscle-skeletal injuries, sickness, and weakness and are infertile for natural breeding may not have been used, but have been selected for breeding. The opportunity for this individual to be included in the breeding recommendations becomes possible with the use of a training environment in conjunction with AI. Animal training emphasizes the shaping of desired behaviors through positive reinforcement, while animals enrichment refers

to the structuring of animal's environment to provide choices and promote natural behaviors. Amann (1970) and Almquist (1978) reported that sexual preparation prior to semen collection from the male animals increases the number of sperm cells obtained by as much as 100%.

This important milestone of animal training in a comfortable environment will greatly improve animal husbandry, facilitates the voluntary cooperation of the animals in every aspect from reproductive manipulation, procedures to feeding and breeding. It will also boost research activities in farm animals and provide a unique alternative to valuable individuals." Behavioral adjustment enhances the quality of life by reducing stress and encouraging a range of healthy species- typical behaviors"(ABI, 2013). The urgency to conceive a better and comfortable environment for training rabbits bucks for use in A.I. centre is cardinal towards the advancement of biotechnology researches; unfortunately there is a dearth of information on rabbit training crate for rabbit bucks. Therefore, the study was designed with the sole purpose of exploring the possibility of designing an ideal training crate for rabbit bucks use and to also compare the semen characteristics with others collected in non-training crate environment.

MATERIALS AND METHODS

The research was conducted at the Research and Teaching farm of the Abubakar Tafawa Balewa University, Bauchi. Bauchi is located in a Guinea savanna area. The location and climate were described by (Butswat and Choji, 1995). The study was conducted on two breed of bucks, improved and local. The improved bucks were predominantly New Zealand white and their reciprocal crosses. The data generated from 10 bucks; 5 each of improved and local breeds, with an average weight of 2.7kg at 26 weeks of age. The bucks were obtained from the National Veterinary Research institute, Vom, Bauchi State Agricultural Development Project (BSADP) and from reputable farmers from Bauchi and environs. The breeds were distinguished clearly by their coat color, body weight and size, head shape and size, ears and other basic indices.

Animal Management

The rabbits were housed individually in a flat cage measuring 0.56x0.4m equipped with plastic water and feed troughs. All cages were equally

kept in a naturally ventilated building roofed with asbestos having windows for adequate ventilation. The rabbit bucks were fed *ad-libitum* with 18% crude protein concentrate. The feed was supplemented by serving them with *Tridax procumbent*, *Amaranthus spp*, cabbage. Before the commencement of the trial, the rabbits were kept for three weeks to adapt to the local environment.

Experimental Design and Statistical Analysis

The experiment was designed to be a 2x5 factorial design with 2 breeds and 5 replicates. The data generated were subjected to the analysis of variance according to the generalized linear model procedure contained in the statistical package for social science (SPSS) software (1996).

Training Procedure and Collection

The Training Crate (TC) was designed according to the specifications depicted on fig.1. The bucks were introduced into the training crate in a rotational and alternate manner. A buck was first placed in the TC for about 2 minutes before a doe was exposed to the buck. The essence was for the buck to get acquainted to the environment. The bucks were engaged into a training period for semen collection. Semen collection and responses were noted on the 24th day after the commencement of the training. Ejaculates were collected using an improvised homemade artificial vagina as described by (Naughton *et al.*, 2003). The seminal characteristics were determined as described by (Zenjamis, 1970; Serenson, 1986; Zahraddeen *et al.*, 2006) for comparison with previous works. Fig.1 depicts the improvised training crate. It was made from wooden planks and metal iron rods. The training crate dimensions were measured by a flexible canvass tape rule. The training crate measures AB (150cm) and BC (70cm) represent the length and width respectively. The height at CE (80cm) and the edges were covered by a wooden plank while the four legs were made from hollowed metal rods. The choice of selecting these specifications was informed by earlier bucks or does who skipped off the crate. The projection above the platform was to guide against the bucks or does going beyond the full stretching of the trainer. The projection of the protectors round the training environment is represented by CF (40cm) above the platform.

RESULTS AND DISCUSSION

The overall results of the seminal characteristics for the two breeds are depicted in Table 1. The improved breed was generally superior to the indigenous breed ($P < 0.05$). Similar values for the overall results reported here are within the same range (Mathur *et al.*, 1989; Herbert and Adejumo, 1993; Herbert and Acha, 1995 and Zahraddeen *et al.*, 2006; 2007). These results however were in agreement with the earlier ones reported, but they, contradicted the report of (Chiroma, 2004) that mongrel rabbits were superior to the exotic breed. These variations in result could not only be attributed to the application of different criteria for evaluation of sperm abnormalities, use of different sperm processing technology and handling methods, but also to genetic and environmental factors as well as environmental enrichment (Hetto, 1977). McIntosh *et al.* (1980) also aligned that the display of sexual behavior and mating can be affected or/and modified by different factors including environmental changes and the effect of drugs such as alcohol and opiod agonists and antagonists. However, Fuentes *et al.*, (2004) in their findings asserted that environmental changes such as temperatures and photoperiod were so subtle that it was considered that they did not influence sexual behavior in the male New Zealand white rabbit.

CONCLUSION

Based on this study, it could be concluded that there was significant difference between semen harvested from bucks in a training environment and non-training environment. Therefore, the use of training crate enriches the environment of the bucks and also increases convenience for the trainer to train and collect semen without difficulties, since environment is one of the factors that influences the quality and quantity of semen.

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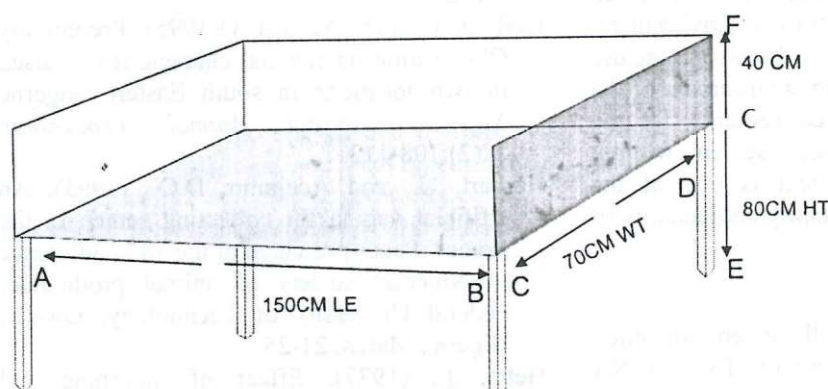
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Table 1: Seminal characteristics of improved and local breed of rabbits

Semen traits	improved breeds Mean ±SE	local breed Mean ±SE	Mean ±SE
Volume (ml)	0.62 ±0.14 ^a	0.49±0.16 ^b	0.55±0.10
Sperm concentration (x 10 ⁶ /ml)	98.11± 1. 12 ^z	91.71±1.28 ^b	94.91±0.81
Gel Volume (ml)	0.06 ±0.13 ^a	0.04 ±0.14 ^a	4.75±0.10
Total sperm per ejaculate (x10 ⁶)	60.60 ±1.48 ^a	44.67±1.69 ^b	52.63± 1.12
Live sperm (%)	71.39±0.93 ^z	63.00±1.06 ^b	67.19±0.71
Abnormal sperm (%)	28.80±0.97 ^a	36.71±1.10 ^b	32.75±0.73
Sperm motility (%)	70.34±1.37 ^a	60.65±1.56 ^b	65.49±1.00

a,b means on the same row having different superscript are significantly different from one another (P<0.05).



Length = LE, Width = WT, Height = HT

Figure 1. Training Crate for Rabbits