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## DEVELOPMENT OF A DUMMY FOR SEMEN COLLECTION IN RABBITS

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### ABSTRACT

*In an attempt to make semen collection in rabbits easier, the feasibility of training male rabbits using a dummy with an artificial vagina (AV) inserted was investigated. Dummy was constructed using rabbit skin and frame of different dimensions of height, girth circumference and position of AV. Dummy A had height 12cm, girth circumference 40cm and position of AV 5cm from the floor in a hole, B had height 12 cm, girth circumference 33cm and position of AV 6cm in a slit behind, C had height 10cm, girth circumference 29.5cm and position of AV 7.5cm in a slit behind all with a length of 25.5cm. Animals were trained to use the dummy. Different methods used in the training were smearing of the dummy with faeces and urine from the doe, placing a doe on the dummy while introducing the dummy and placing the doe on the cage while introducing the dummy. Dummy C was successful with good and reproducible results. Ejaculate volume 0.45 mL, concentration  $119.9 \times 10^6$  spermatozoa/mL, massal motility was moderate, % live 67.95, % normal 71.55 and % abnormal 28.45. Commercial farmers and small scale farmers can make use of the dummy for semen collection for artificial insemination in rabbits as it can be easily assembled.*

**Keywords:** Artificial insemination, Dummy, Artificial virgina, Rabbits,

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### INTRODUCTION

The collection of semen is the initial step in Artificial Insemination (AI) and this is accomplished using the artificial vagina, digital manipulation (the gloved hand technique), or with an electroejaculator (Knox and Miller, 2018). Several studies in Artificial Insemination in rabbits have involved the use of AV in the collection of semen using cheap and simple devices constructed from easily accessible materials (Naughton 2003, Ewuola *et al.*, 2014, Ola, 2016). The use of dummy or phantom in the collection of semen has been recorded in boars, bulls, ostriches. However, there is little or no information on the use of dummies in rabbits. Another method involving the use of rabbit skin was reported by Bivin (1994), which is to place a rabbit skin in a cage with females to acquire a feminine odor. Thereafter the artificial vagina is grasped in the hand with the rabbit skin placed over the hand and the arm is presented to the male. The buck will usually mount and ejaculate into the AV. However, many bucks are apprehensive and as such will not make use of the artificial vagina. In this study we developed a dummy that will mimic the appearance of a doe using rabbit skin. We hypothesized that semen collection will be possible without the use of a teaser buck or doe.

### MATERIALS AND METHODS

#### Study site

The study was conducted at the Rabbit Unit of the University Teaching and Research Farm, University of Benin, Edo State, Nigeria. The Farm is situated on latitudes 6°24'11.4"N and longitudes 5°36'39.6"E (Google Maps, 2023).

#### Experimental Animals

A total number of 24 sexually matured-male rabbits (bucks) and 2 sexually-matured female rabbits (doe) were obtained from a reputable farm for this study. The animals were kept in hutches and provided with feed (19% CP), forages and water without restriction for the duration of the experiment.

#### Artificial vagina (AV)

The AV was made of a 3" T- connector polyvinyl chloride (PVC) pipe with 19.05x19.05x12.70 mm openings, a latex condom (non spermicidal) passed through the PVC pipe through one end and brought out at the other end such it is lying straight with the opening of the condom at one end and the closed portion at the other opening. The open end is rolled over the opening of the PVC pipe and secured firmly with the rubber band while the closed end of the condom is rolled over the other end and secured with rubber bands. The cut out slippers with the biro in the middle is pressed firmly into

the third opening of the T connector. Hot water is passed into it through the biro opening and screwed closed (Figure 1) (Asibor *et al.*, 2022).

### Dummy types

Three dummies used had same length of 25.5cm but differ in dimensions (height, girth circumference and position of AV from the floor) but had the same structure made with binding wires, stuffed with a thick foam for support and a flat foam to cover the wires before the skin was place on top to reduce the hardness when mounted. Dummy A (12cm, 40cm and 5cm from the floor in a hole), Dummy B (12 cm, 33cm and 6cm in a slit behind), Dummy C (10cm, 29.5cm and 7.5cm in a slit behind).



Figure 1: an LAV filled ready for use



Figure 2: The posterior of the dummy with the LAV inserted

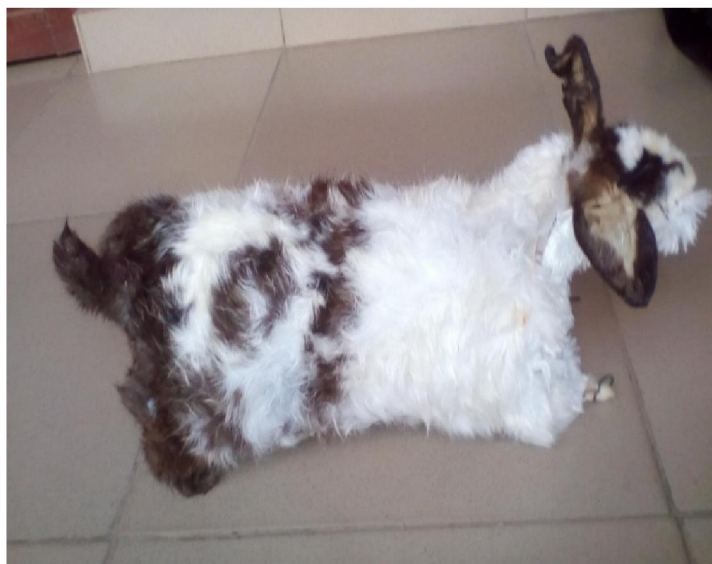


Figure 3: Side view of the dummy

**Table 1: Dimensions of the Dummy Frame**

	A	B	C
Height	12 cm	12 cm	10 cm
Width	40 cm	33 cm	29.5 cm
Position of AV/ height	4cm from the floor on a hole created	5cm, 6cm and 7cm in a slit created behind	7.5 cm in a slit created behind

### **Training the buck on how to use AV**

Animals were trained for dummy collection by exposing them to the dummy at different intervals (morning and evening). This was done 3 times in a week. Dummies were smeared with urine or faeces from the doe to enhance acceptability. At other times the males were allowed to mount the dummy with the live doe placed on top of the dummy. The live doe was also placed on top of the cage to stimulate the rabbit during training. The live doe was also placed in the cage for some minutes to allow the male mount the removed and introducing the dummy thereafter. The animals were trained for about four weeks. Once the animals were able to mount the dummy without the use of the live doe with successful ejaculation routinely (three times) when the dummy is introduced they were considered to be trained.

### **Semen Evaluation and Data Collection**

After each semen collection, semen samples were retrieved using a disposable pipette and semen volume was immediately read off in the graduated collection tube. Semen samples were visually checked for colour, dirt and urine contamination. Further analyses done in the laboratory included sperm motility under the light microscope at  $\times 400$ , percent live and dead and percent normal and abnormal spermatozoa after eosin-nigrosin staining and sperm concentration using the Neubauer improved haemocytometer.

### **Data analysis**

Data were statistically examined by analysis of variance (ANOVA) of Genstat 12<sup>th</sup> edition. The Duncan's New Multiple Range test was used to separate the mean differences at 5% level of significance.

## **RESULTS AND DISCUSSION**

### **Semen collection using dummy A**

Semen collection was carried out in the following way. The LAV was assembled and filled with warm water of about 45°C. The LAV was then inserted into the hole made in the thick foam at 4cm from the floor. After about 1-2 weeks the animals were observed to have recognized the dummy and would mount and thrust when the dummy was introduced into the pen. However, ejaculation was successful but only once for the period of the study. It was observed that the girth circumference of the dummy made it difficult for the rabbit to easily place its penis into the LAV and would thrust into the other areas hence make it difficult. According to Szymkowicz, (2012) the phantom constructed for semen collection in alpacas was also modified by slimming down the posterior end to accommodate smaller animals.

### **Semen collection using dummy B**

Method of dummy preparation was same as for dummy A. However, the modification to this dummy made it easier to adjust the LAV to different heights from the floor. This allowed the dummy to accommodate buck of different sizes. Ejaculation was successful but not consistent. For the period of the training ejaculation occurred twice. It was observed that even when adjustment was possible the girth circumference though smaller than dummy A was still an issue. The rabbit bucks would thrust into other areas than the LAV most of the times.

### **Semen collection using dummy C**

Method of dummy preparation was same as dummy A. Ejaculation using Dummy C was consistent after training. It was observed that the smaller girth circumference made it easier for the buck to locate the LAV with its penis.

### **Semen quality**

Semen volume recorded was  $0.45 \pm 0.05$  mL, with a progressive motility of  $73.68 \pm 0.34$  and was within range according to the reference value provided by the International Rabbit Reproduction Group (2005), stating that freshly collected rabbit semen of good quality ranges from 0.3 – 0.9 ml with 30 – 90 % progressive motility. Massal motility recorded was moderate. Percent live was  $67.95 \pm 0.15$  with percent normal and abnormal recorded as  $77.55 \pm 0.45$  and  $29 \pm 0.10$  which were within acceptable range according to WHO. (2010). Analysis of the sperm concentration from this study had a mean value of  $119.9 \times 10^6 \pm 32.65$  which was below average when compared to the normal range of sperm cell concentration of rabbit which is (150 –  $500 \times 10^6$ ) reported by Compos *et al.* (2014).

**Table 2: Quantitative and qualitative characteristics of rabbit buck semen collected with the Dummy**

Parameter	Dummy	SEM
Volume (mL)	0.45	0.05
Progressive motility(%)	73.68	0.34
Massal Motility	moderate	-
Live (%)	67.95	0.15
Normal (%)	71.55	0.45
Abnormal (%)	29	0.10
Concentration ( $\times 10^6$ cells/mL)	119.9	32.65

## CONCLUSION

From the results of semen analysis all parameters were within acceptable range for use in artificial insemination. Rabbit bucks can mount and ejaculate in the dummy for semen collection. However, the rabbit needs to be trained to achieve this. The dummy can serve as a tool for the commercial rabbit farmer to collect semen easily for the process of artificial insemination.

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