



Assessment of Libido and Semen Quality of Boar by using Low-cost Portable Wooden Dummy Sow

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ABSTRACT

Background: Artificial Insemination in pigs is much easier than other domestic species but the training of boar for the collection of semen is a big constraint. Certain boars are not acquainted with the fixed steel dummy sow and the surrounding environment. Hence, the dummy sows brought in the boar's pen. The steel dummy sow in comparison to wooden is too heavy and found difficult to bring in a boar's pen. Moreover, the wooden dummy sows are locally made and it becomes cost-effective too. The present study was designed to assess the libido and semen quality of boars by using locally made low-cost portable wooden dummy sows.

Methods: The study was conducted on 16 numbers of Large White Yorkshire (LWY) and Mizoram local Zovawk crossbred boars at the age of 10-12 months. The semen collection was done by using a homemade portable "wooden dummy sow" and steel made "fixed dummy sow." The training was done every morning before feeding and semen was collected twice a week by using the gloved hand method when the boars mounted over the dummy sow by holding protruded and erected corkscrew end of the penis firmly. During collection, libido characteristics of the boars were recorded and semen quality was determined.

Result: The duration of training taken by the boars for semen collection was significantly ($P < 0.01$) less in portable wooden dummies. The sexual behaviour and other behavioural traits were better when boars were trained on a portable wooden dummy. The mean semen volume, sperm mass activity, pH and sperm concentration of LWY crossbred boar was not significantly different between fixed steel and portable wooden dummy. The percentage of initial sperm motility and intact acrosome of boar spermatozoa was significantly ($P < 0.05$) higher in portable wooden dummy. In conclusion, the homemade portable "wooden dummy sow" was found to be very effective for the training and collection of semen from breedingboars.

Key words: Boar, Dummy sow, Libido, Semen collection, Semen quality assessment.

INTRODUCTION

Artificial insemination (AI) is one of the most widely used biotechnology for disseminating high-quality germplasm in the female reproductive tract to improve the genetic make-up (Kalita *et al.*, 2018; Murasing *et al.*, 2020b). In India, AI is gaining attention in the pig industry, notably in the North Eastern region (Haque *et al.*, 2019; Talukdar *et al.*, 2019). Pigs are considerably easier to breed than other domestic animals. Preferably, the boar should be trained at 8 to 10 months of age (Murasing *et al.*, 2020a). In certain cases, boar's training for semen collection is very challenging. Patience is necessary for training boars by using a mounting dummy (Althouse, 2007). The majority of boars can be trained for semen collection; however, certain boars may refuse to mount over the steel dummy sow indefinitely because of its height. To begin the collection process, the boars used to move to the collection pen daily to get acquainted with the dummy sow. Certain boars are not acquainted with the fixed dummy sow and the surrounding environment. Hence, the dummy sows brought in the boar's pen. The steel dummy sow in comparison to wooden is too heavy and found difficult to bring in a boar's pen. Moreover, the wooden dummy sows are locally made and it becomes cost-effective too. Hence, the present study was designed to record the training duration of boars for semen collection and to assess the libido and semen quality of boars by using different kind of dummy sow.

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MATERIALS AND METHODS

The study was conducted on 16 numbers of Large White Yorkshire (LWY) and Mizoram local Zovawk (75% LWY and 25% Zovawk) crossbred boars at the age of 10-12 months, maintained at ICAR- All India Coordinated Research Project on Pig, College of Veterinary Sciences and Animal Husbandry, Central Agricultural University, Selesih. The boars were randomly divided into two groups based on the dummies. All the boars were reared under a standard managemental feeding regime and housed in well-ventilated pens with adjacent exercising paddocks. The clean and fresh drinking water was always provided. Routine check-up of

sick animals was done and treated by qualified veterinarians. All the boars were vaccinated against swine fever and FMD.

Initially, the boars were separated and kept in an individual pen. After a month, the boars were exposed to the dummy sow in the respective pen daily in the morning before feeding. Following initial exposure to the dummy sow, the boar exhibited behavioural characteristics like biting, licking, pushing and mounting. The libido of the boar during the training period was enhanced by mimicking breeding sounds or mating songs and digital manipulation of the penis. When the boar exhibited innate sexual eagerness, mounted over a dummy sow and then semen was collected. Using a homemade portable “wooden dummy sow” and “fixed dummy sow” semen collection was performed by gloved hand technique by holding protruded and erected corkscrew end of the penis firmly. An intermittent pulsatile digital pressure was maintained tightly on the penis to obtain complete ejaculation. During collection, libido characteristics of the boars were recorded in terms of latency to mount, reaction time and ejaculation time. (Lindsay, 1969; Tamuli, 1982; King and Macpherson, 1973).

The sexual behaviour parameters, *i.e.* number of false mounts, number of times a boar sniffs the dummy, number of times boar shows a penile reaction, number of times boar urinate, number of times boar biting and number of times boar rubs the dummy was recorded (Godara *et al.*, 2018). Sexual behaviour of boar was recorded as method cited by Godara *et al.* (2018).

The home made portable “wooden dummy sow” was prepared by using a teak plant’s trunk costing around Rs.2000 in Mizoram. The total length of the wooden dummy sow was 2.8’ and the height was 2.0’. The height of the

wooden dummy sow was adjustable. The diameter of the teak plant’s trunk was 2.0’ and the length was 2.8’ (Fig 1). The lower portion was made up of an iron rod (costing around Rs.1000 in Mizoram), where the length was 1.6’ and breadth was 1.0’. When a boar mounts over the wooden dummy sow, his sheath should be below the back of the dummy sow. The dummy sow should be located in a designated semen collection room or pen and the total area of the pen was 10’×10’ with a non-slippery floor. Rubber breeding mats provide excellent footing. Once in the semen collection area, the boar should be subjected to no distractions (*i.e.*, no feeders and waterers). If a boar does not mount after two or three exposures to the dummy sow, it can be “tricked” by the technician into mounting by sprinkling semen from another boar.

The home made portable “wooden dummy sow” was prepared by investing in an around Rs.8,000 (including labour cost and paint), while the steel dummy sow was purchased from reputed company (IMV) with Rs.150,000.

The significant differences between the groups were determined by an independent sample t-test using the Statistical Product and Service Solutions, Version 20.0 software (SPSS Inc., Chicago, IL, USA).

RESULTS AND DISCUSSION

The duration of training taken by the boars for semen collection was observed in the present study that the boars required significantly ($P<0.01$) less time to train with a portable wooden dummy with a minimum investment of 20.0 ± 1.8 days. On the other hand, crossbred boars took a longer duration for training with a steel dummy for semen

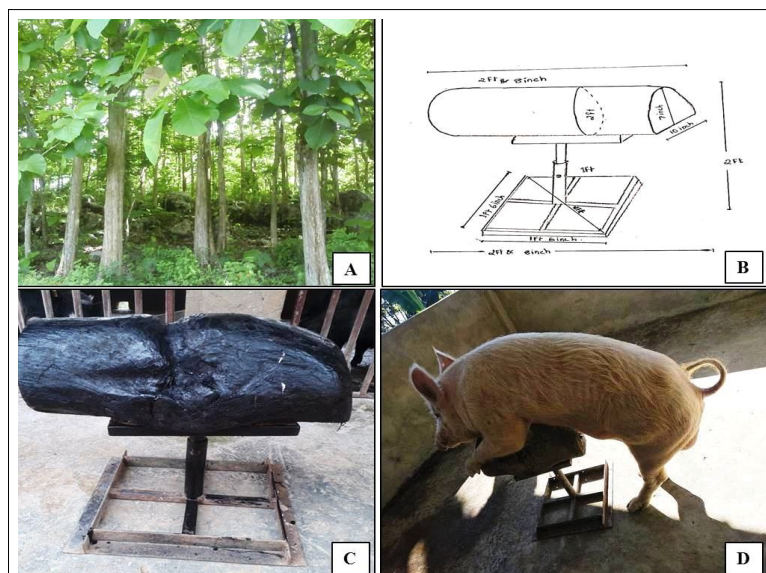


Fig 1: Portable wooden dummy sow.

A. Teak plant (*Tectonagrandis*). B. Teak plant's trunk measurement for preparation of dummy. C. Ready to use wooden dummy. D. Mounting over the dummy by breeding boar.

collection *i.e.* 28.2±1.3 days. Patra *et al.* (2014) reported a 63.6% success rate in training on fixed dummy with a 15 days average duration. These might be due to breed variation between studies and the presence of Zovawk inheritance, the indigenous breed of Mizoram, which is extremely ferocious (Mayengbam and Tolengkomba 2017), age of boars, shifting from own pen to collection pen, the micro climate of collection pen. Better results on the portable dummy may be due to the effect of human intervention (movement of dummy according to the position of boar as well as sloping of dummy for the easy mount). Results obtained after training on portable dummy imply that the age of boars and type of portable dummy was optimum for the training.

The mean frequency of sniffing, false mount, penile reaction, urination, biting and rubbing by boars on a portable wooden dummy was 2.49±0.16, 1.0±0.06, 0.94±0.15, 0.88±0.06, 3.81±0.10, 3.66±0.11, respectively. The corresponding values for fixed steel dummy were 2.00±0.14, 1.0±0.06, 0.80±0.16, 0.85±0.12, 3.54±0.19, 2.78±0.28, respectively. The mean sexual behaviour score showed by the boars during training on a portable wooden dummy was 3.89±0.19, whereas the corresponding value for the fixed steel dummy was 2.55±0.17. The sexual behavior and most of the behavioural traits during training were better when boars were trained on portable wooden dummy. Similar findings were also reported by Godara *et al.*, (2018). The superior results on portable wooden dummy might be due to the effect of micro climate and human interference.

In the present study, the mean latency to mount over steel and wooden dummy in LWY crossbred boar has been presented in Table 1. Statistical analysis revealed that the latency to mount significantly ($P<0.01$) differed between the groups. The latency to mount in case of the portable wooden dummy, the boars took less time. There was no significant difference in the number of mounting. It was found to be higher than that observed by Gogoi (1996). The variation of the findings might be due to the genetic make-up and height

of the boars as the crossbred boars were finding more easily to mount over the portable wooden dummy in comparison to a fixed steel dummy.

The mean reaction time was found to be significantly lower in portable wooden dummy in comparison to fixed steel dummy (Table 1). The result of the present study was lower than reported by Murty (1974); Tamuli (1982); Bujarbaruah (1989). The differences in findings with earlier workers might be due to the genetic make-up of the boars, the environmental factors, the height of the dummy, managerial factors, frequency and procedure of semen collection.

The mean ejaculation time did not differ significantly between the groups, but in the portable wooden dummy the mean ejaculation time was slightly low (Table 1). The present findings were found to be lower than that recorded by Gogoi (1996). The differences in mean ejaculation time of boar recorded in the present study with that of earlier workers might be due to the variation in the genetic make-up, age, environmental factors and body weight of the animals and the dummy used for semen collection.

In the present study, the mean semen volume, sperm mass activity, pH and sperm concentration of LWY crossbred boar was not significantly different between fixed steel and portable wooden dummy (Table 1). The semen volume excluding the gel portion was higher than those observed by Kantharaj (2001); Shylesh *et al.*, (2019). Hafez (1993) reported that the semen volume in boars ranges from 50-400 mL. The semen volume observed in the present study fall within the reported ranges. The sperm mass activity was in accordance with the observations of Luwang *et al.* (2021). According to Johnson *et al.* (2000), the pH of boar semen ejaculate was in the range of 7.2-7.5, which was in accordance with the findings in the current work. Semen ejaculates of the same animal can differ in their pH. The secretions coming from all the accessory sex glands which contributed higher percentages of volume to the ejaculate, increased the alkalinity of semen (Mann, 1974). The sperm concentration was in accordance with the observations of

Table 1: Service behaviour and semen quality of LWY crossbred boars by using different dummy sows for collection of semen.

Parameters	Steel dummy	Wooden dummy	t-value
Latency to mount (min)	2.20±0.11	1.63±0.10	-3.63**
Number of mounting	1.01±0.01	1.01±0.01	0.00 ^{NS}
Reaction time (min)	4.56±1.22	3.28±0.33	2.46*
Duration of ejaculation (min)	5.83±0.09	5.53±0.07	3.36 ^{NS}
Semen volume excluding gel portion (ml)	310.67±19.18	320.00±17.37	0.25 ^{NS}
Mass activity (+)	3.78±0.05	3.78±0.05	0.00 ^{NS}
Initial motility (%)	87.50±0.56	88.50±0.46	7.77*
pH	7.31±0.01	7.39±0.01	0.04 ^{NS}
Sperm concentration (10 ⁶ /ml)	174.00±2.54	184.67±3.06	0.14 ^{NS}
Live sperm (%)	85.66±0.64	86.16±0.54	0.59 ^{NS}
HOST positive(%)	62.44±1.46	65.69±1.40	1.41 ^{NS}
Intact acrosome(%)	84.10±0.68	86.77±0.84	2.13*
Abnormal sperm (loose head) (%)	2.40±0.16	2.05±0.16	1.14 ^{NS}
Abnormal Sperm (Bent tail) (%)	2.38±0.21	2.02±0.19	-1.25 ^{NS}

* $P<0.05$; ** $P<0.01$; ^{NS}Non significant

Lalrintluanga *et al.* (2016) and higher than the findings of Strzezek *et al.* (1995). As the frequency of collection increases the sperm concentration decreases. With increasing frequency, the ejaculate volume is mainly contributed by seminal fluid from accessory glands and there will be a reduction in the concentration.

The percentage of initial sperm motility and intact acrosome of boar spermatozoa was significantly ($P < 0.05$) higher in portable wooden dummy in comparison to fixed steel dummy (Table 1). The differences in initial sperm motility and intact acrosome of boar recorded in the present study might be due to the variation in the genetic make-up, age, environmental factors and the dummy used for semen collection. The percentage of live sperm and intact plasma membrane was also found to be higher in portable wooden dummy in comparison to fixed steel dummy, but the values were significantly not differed. The present finding of initial sperm motility and intact acrosome was in close agreement Luwang *et al.* (2021). The present findings were higher than that reported by Sangma *et al.* (2020). The differences in initial motility percentage among the boar might be due to genetic predisposition, body weight and individual physiological status of the boars. The percentage of live sperm was in close agreement with the observation reported by Luwang *et al.* (2021). The finding was higher than that reported by Sangma *et al.* (2020). The differences in the results could be attributable to differences in breed, age and the method of examining live sperm. The percentage of the intact plasma membrane was in close agreement with the observation reported by Sangma *et al.* (2020). The present finding was higher than that reported by Haque *et al.* (2018). The age of the animal and body weights, season, frequency, collecting method and evaluation method played a role in the variances of HOST responsive spermatozoa in this study.

The sperm abnormalities were found to be higher in fixed steel dummy in comparison to portable wooden dummy (Table 1). But the values did not differ significantly. The percentage of sperm abnormalities was in close agreement with the observation reported by Haque *et al.* (2018). For further processing, acceptable boar semen ejaculate should not exceed 20% of total morphological abnormalities (Johnson *et al.* 2000). The sperm abnormalities values obtained in this investigation were within the normal range.

CONCLUSION

The portable wooden dummy sow is very cheap to prepare and it can be used anywhere in the place. It is portable with adjustable height. It can easily use in the short breed of pigs. The LWY crossbred boars were easily and successfully trained on a portable wooden dummy with distinct sexual behaviour. The overall training duration, behavioural characteristics and semen quality found to be better in the portable wooden dummy as compared to the

fixed steel dummy. In conclusion, the homemade portable "wooden dummy sow" was found to be very effective for training of breeding boars with distinct sexual behaviour and semen quality.

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