SELECTION CRITERIA OF BULLS FOR STUD SERVICE UNDER EXTENSIVE CATTLE MANAGEMENT SYSTEM IN EASTERN DISTRICTS: FARMERS' PERCEPTION

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Abstract

There is a need to design integrated set of criteria considering farmers' perspective also in implementing stud bull selection for successful natural breeding program. A study was conducted to assess the selection criteria used in selecting bulls for stud service in the large herds bulls for breeding farmers using two cohorts of farmers who received stud bulls for breeding in Batticaloa district. The study cohorts consisted of 56 farmers. The data collection was done by using structured questionnaire and analyses were done using descriptive statistics. Among different external characteristics, bodyweight of the bull was the primary criteria considered by all the farmers. Additionally, there were 18 other external characteristics considered as criteria for selection of stud bull commonly by two groups of farmers in the study area. However, the study revealed that the farmers paid no attention on some important survival and reproduction related characters irrespective to the study group. As perceived by farmers, short hair length, straight horn, small ear with erect orientation, small ear, small dewlap, long tail and light body colour are the external characteristics that should be possessed by a stud bull for breeding other than the heavy body. Farmer awareness on considering the importance of reproductive characteristics in stud bull selection needs to be enhanced in the area. The findings of this study will be useful for relevant authorities in determining the selection criteria for stud bulls in implementing natural breeding programs successfully in the area.

Keywords: Natural breeding, Selection criteria, Stud bull, Batticaloa

INTRODUCTION

Non-descript type local cattle and buffaloes with poor inherent potential for milk production have been upgrading as per the national breeding policy guidelines (DAPH, 2010). Upgrading the national herd is mainly done through Artificial Insemination (AI). The national milch cows and heifers population has been reported as 301,140 and 174, 440 respectively for the year (Department of Census and Statistics, 2015) whereas for the same the targets and performance of AI are 268,134 and 228, 890 respectively (DAPH, 2015). Nevertheless, national AI network facility is inaccessible for large herd owners in the remote areas in eastern districts. As indicated above, the present national AI coverage is only 29% of the breedable cow population. Therefore, need for studs in natural breeding is very crucial. This indicates that an enormous number of cows, especially in the large herds of the dry and intermediate climatic zones are still under unplanned breeding. Breeding these cows with genetically improved and, especially certified stud bulls would be the appropriate strategy to increase milk production potential of national herd of cows. It is a common phenomenon that large herds comprising more than 100 heads of cattle and buffaloes are mainly reared extensively in the areas of intermediate and dry zone. As per the farm registration survey (DAPH, 2008), out of the total number of cows and herds in Sri Lanka there were 66% of the cows and the 70% of herds available in the areas of intermediates and dry zone. Majority of these herds have no access to AI and thus, natural breeding is the only option.

As reported by Perera and Jayasuriya (2008) identified that limitations of the AI programme, with only 10-15% of breedable cows being served by AI, and only 12-15% of calving attributable to AI, was one of the main drawbacks in cattle breeding in Sri Lanka. However, according to the recent reports around 27% of total calving in the country could be attributable to AI (DAPH, 2017). Though there was an evidence of improvement, lack of proper and regular natural breeding (stud) service in the areas where AI services are not accesible is a major concern for several decades. Natural breeding is practiced using a selected stud bull or it taken place in uncontrolled manner, especially in free rearing large sized cattle herds. Natural breeding is mostly practiced in Dry Zone areas where the extensive management system is practiced with abundant land areas. The Department of Animal Production and Health is responsible line Department for animal breeding activities, including facilitating natural breeding in Sri Lanka. Providing quality bull calves to farmers who do not have access to AI services in Eastern Area of the country to facilitate natural breeding in 2004 was one of such intervention (DAPH, 2009). Under this program bull calves were selected and procured directly from the National Livestock Development Board (NLDB) farms and also from farms registered under the milk collecting program. As a promotion, the calves were provided to the farmers at 50% concessionary rate. (DAPH, 2009, 2014).

Though the most precise selection can be done with the estimation of breeding values etc. in general, type characters are considered when stud bulls are selected for natural breeding activities in Sri Lanka. A properly selected superior bull can enhance performance of future herds, and reduce the risk of genetic erosion. Selection of suitable bulls for natural stud service is traditionally performed by the farmers through their long-standing hands on experience. The selection indices they used vary from area to area and also according to the purpose. Under the current context, though not formally declared, the extensive cattle production system practiced in Dry Zone areas mainly targets for the purpose of beef production, and the selection criteria also in relation to that purpose. However, the Animal Breeding Policy (DAPH, 2010) of Sri Lanka specifies that extensive production system in the Dry Zone of Sri Lanka is for improving milk production through systematic upgrading process using improved Zebu dairy breeds. Hence, in the absence of formulated selection criteria, taking the national recommendation in to account while assessing the field requirement in order to fulfill the farmers' objective of breeding is a challenge. Thus, the present study was conducted to identify the effective selection criteria when selecting the stud bulls for extensively managed cattle herds in the Dry Zone, taking two cases of stud bull distribution in Batticloa District into consideration.

MATERIALS AND METHODS

Study Area Selection

The study was conducted in Batticaloa District of the Eastern Province of Sri Lanka where the stud bulls were provided for natural breeding during the period starting from September to November in 2017.

Sampling Procedure

The information about the farmers was collected from the range veterinary offices in Batticaloa district and categorized into two groups according to the farmers who were using the stud bulls given on two different occasions. The study sample consisted with a total of 56 cattle farmers representing 26 farmers belong to case 1 and 30 farmers belong to case 2 of stud bull distribution.

Method of Data Collection

The survey was conducted by using a pre-tested structured questionnaire. The questionnaire was validated and finalized based on pre-test done at the sampling location. Structure of the questionnaire includes the fields on farmers background, herd composition, details of bulls, mating system and factors considered in selecting stud bulls.

Method of Data Analysis

The data were categorized as per the structure of the questionnaire. The data was analysed by descriptive analysis using Excel (2013) software and statistical package MINITAB version 15.0. The two sample T-test was performed to compare the significance between the two groups. Weighted percentage values were used to compare the perception of two groups of farmers on selection criteria. Mean comparisons were also performed to evaluate the process of price determination of two groups of farmers based on body weight.

RESULTS AND DISCUSSION

Overall comparison of the selection criteria

The study considered the two groups of farmers who received stud bulls through two different occasions which were considered as two cases in the study. The two groups of farmers are from the same study location and their characteristics is given in the Table 1.

Characteristics of a stud bull according to farmers' perception

The two groups of stud bulls given by the two programs were compared based on the perception of farmers on breeding male animal. According to the farmers' perception the stud bull with heavier body are better performing than those having lighter body weight. Thus, the valuation of the stud bull is done depending on the body weight. It was revealed that there is a significant difference (P<0.05) in the average body weights of the stud bulls distributed between Case 1 (kg 229.2 ± 5.8) and Case 2 (kg 263.0 ± 4.4). Since differences of body weight always correspond to the money values (Rs. 49,135 ± 2277 and Rs. 58, 764 ± 1931, respectively for the cases 1 and 2) in the two cases, farmers have perceived the value of animals differently in the two cases considered. Thus, the primary consideration of valuing the stud bull is the body weight of the animal irrespective to the breed or pedigree information. This is because of the fact that bull selection is one of the most important

cost for cattle breeders. Costs per calf, especially in smallholder operations increases invariably by lowered bull fertility, reduced cow fertility and by bull deaths. Since the study location belong to Dry Zone where the extensive system of rearing is practiced, bull selection costs are exacerbated by the requirement of high bull numbers.

Apart from the body weight as a primary criterion, a stud bull is selected based on certain phenotypic criteria as perceived by farmers. The criteria considered by the groups of farmers in the two cases were comparable. Table 2 illustrates the characteristics that farmers considered in selecting the stud bull categorized according to the importance. The importance of each criteria was assessed by number of positive entries given by farmers during the survey. Accordingly, there were 18 different criteria identified by farmers to be considered in selection of a stud bull. Out of them eight criteria which received 100% scoring were the most critical as perceived by farmers (Table 2). It is important to note that four characters, namely aggression, presence of testicle, scrotal size and resistance to parasites were considered as least important criterion to be considered in stud bull selection.

As reported by Rice (1993), bull fertility could be properly assessed by examination of the testicles (palpation of scrotal contents and measurement of scrotal circumference/size), examination of the penis, collection and evaluation of semen, prepuce and sheath palpation of internal sex organs, assessing the bull's desire (libido) and ability to serve females (serving ability). Apart from those structural soundness of the legs, eyes, feet, and general structure of the bull are also important. Further, Jain and Muladno (2009) pointed out that the stud bull needs to be selected on the basis of its pedigree performance, its breed characteristics and structural, and health condition. However, the farmers in the present study have paid attention mostly on body structure and health condition where genetic integrity and reproductive performance are almost ignored.

Table 1: Composition of two cattle populations (case 1 and case 2)

Animal category	Number in case 1	Number in case 2
Dry cows	269	693
Milking cows	460	644
Stud bull	59	49

Table 2: Phenotypic characteristics used in stud bull selection by farmers

No	Criteria	Level of importance as scored		
		Most important (>80)	Moderately important (80-50)	Least important (<50)
1	Disease	✓ (100)	-	-
2	Hair	-	✓	-
3	Forehead	✓	-	-
4	Horn	✓ (100)	-	-
5	Ear	✓	-	-
6	Dewlap	✓ (100)	-	-
7	Naval Flap	✓ (100)	-	-
8	Tail Length	✓ (100)	-	-
9	Thickness of tail hair	✓	-	-
10	Eyes	✓	-	-
11	Hooves	✓	-	-
12	Legs	✓ (100)	-	-
13	Presence of two testicle	-	-	✓
14	Aggression	-	-	✓
15	Scrotal Size	-	-	✓
16	Walk	✓ (100)	-	-
17	Resistance to parasites		-	✓
18	Body colour	✓ (100)	-	-

Farmers perception of choice within the criteria used for stud bull selection is depicted in Table 3. As shown, farmers' preference varied within the criteria of selection. However, majority of farmers did not like stud bulls with long hair with medium sized ears, dewlap and tails which could attribute to any resemblance of a European cattle breed.

According to the farmers' perception, the most preferred characteristics of a stud bull are short hair, curved horn, erect and small ears, large dewlap, long tail and light body color. Moser (2006) stated that bull selection is one of the most important producer decisions and, as such, requires advance preparation and effort to make a successful decision. To effectively select sires, the farmers must not only be well experienced in difference in their performance, but also the accurate and objective assessment of the resources available and management conditions possible. Correct decision made at bull selection directly influence on the future performance of the herd in long run and production and management risk as immediate effect. Therefore, educating the farmers to make correct decision based on a self-assessment of their own farm situation is an effective strategy in making decision on stud bull selection.

CONCLUSION

Farmers in Batticoloa District perceive that the stud bull suitable for extensive system of management in the Dry Zone should possesses a heavy body, short hair, straight horn, erectly oriented small ears, small dewlap, long tail and light color body.

SUGGESTIONS

A standard criteria based on scientific reasoning should be developed for the selection of stud bulls for natural breeding in Dry zone in order to generalize the selection procedure within the zone.

Table 3: Percentage of farmers which preferred different characteristics of stud bulls

Criteria	Description/ variation	Final score
Hair length	Short	74.4
	Medium	25.6
	Long	0
Horn	Straight	37
	Curved	63
Ear Orientation	Erect	92
	Drooping	08
Ear	Small	93
	Medium	0
	Large	07
Dewlap	Small	07
	Medium	0
	Large	93
Tail length	Short	0
	Medium	1.5
	Large	98.5
Body color	Dark	10.5
	Light	89.5

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