International Journal of Agriculture Sciences
ISSN: 0975-3710&E-ISSN: 0975-9107, Volume 8, Issue 52, 2016, pp.-2569-2573.
Available online at http://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000217

Research Article

ASSESSMENT LEVEL ABOUT THE AWARENESS OF FARMERS IN SOUTH-BIHAR ALLUVIAL PLAIN ZONE ON THE PERFORMANCE TRAITS OF CATTLE AND BUFFALO

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Received: September 05, 2016; Revised: September 07, 2016; Accepted: September 08, 2016; Published: October 30, 2016

Abstract- Performance traits among dairy animals mainly consist of growth, production, and reproduction traits. A proper awareness regarding these traits among the dairy farmers contributes to the increased milk production and maintenance of good health of the dairy animals i.e. cattle and buffalo. A study was conducted in South–Bihar Alluvial Plain Zone to assess the level of awareness about performance traits of dairy animals. An index was developed to measure the level of awareness based on the response and suggestion of the experts of animal husbandry, including scientists and veterinarian doctors. Awareness index value for different traits as body weight at the birth, average daily milk yield, peak yield, fat percentage, lactation length, dry period, age at puberty, age at first calving, service period, service per conception, calving interval was found to be 0.58, 0.80, 0.60, 0.43, 0.68, 0.40, 0.37, 0.71, 0.31, 0.15, and 0.46 respectively. Similarly, index value for overall level of awareness of the dairy farmers regarding performance traits of cattle and buffalo was found to be 0.55.

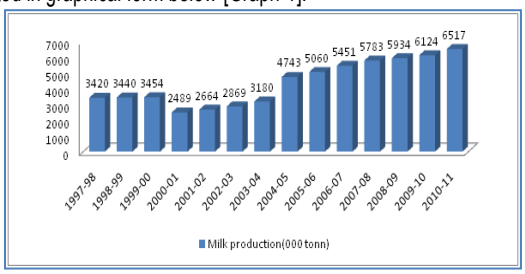
Keywords- Growth traits, Production traits, Reproduction traits, Body weight at the birth, Average daily milk yield, Peak yield, Fat percentage, Lactation length, Dry period, Age at puberty, Age at first calving, Service period, Service per conception, Calving interval.

Citation: Kumar Sanjeev, et al., (2016) Assessment Level About the Awareness of Farmers in South-Bihar Alluvial Plain Zone on the Performance Traits of Cattle and Buffalo. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 8, Issue 52, pp.-2569-2573.

Academic Editor / Reviewer: Viradiya Yagnesh Ashokbhai

Introduction

Performance traits mainly consist of growth, production, and reproduction traits. A proper awareness regarding these traits among the dairy farmers contributes to the increased milk production and good health of the dairy animals i.e. cattle and buffalo. Bihar is witnessing an increase in milk production. As per the 17th livestock census in 2003, the total number of buffalo was 5743 thousand, which became 6690 thousand in 18th livestock census of 2007. [1,2]From the analysis of secondary data it can be said that milk production has been increasing since 1997-98, and after the formation of new state Jharkhand from Bihar on November 15th 2000[10], the growth has been more visible. The milk production in 2001-2002 was 2664 thousand tonnes which reached to 6517 thousand tonnes in 2010-11 [2,3]. This represents one of the agrarian aspect of the state of which its economy is heavily dependent i.e. agriculture based economy. The growth can be represented in graphical form below [Graph-1].



Graph-1 Year-wise milk production (000 tonnes) in Bihar from 1997-98 to 2010- 11.

Milk productivity can be increased if the dairy farmers have sufficient awareness about these traits. Achieving the ideal or near about optimum trait would ensure no loss of milk and calf, both being economic function. This awareness will contribute in increasing and sustained level of milk production in the longer term. For this a study was conducted in South–Bihar Alluvial Plain Zone to assess the level of awareness about performance traits of dairy animals. For performance trait, three major components namely growth performance trait, production performance traits, and reproduction performance traits were taken. For growth performance traits, body weight at the birth (BW) was taken as sub-component. For production performance traits, average daily milk yield, peak yield, fat per centage, lactation length, and dry period were taken as sub-components while for reproduction performance traits, age at puberty (APP), age at first calving (AFC), service period (SP), service per conception, calving interval(CI) were taken as components and based on this, an index was developed to measure the level of awareness among dairy farmers regarding performance traits of cattle and buffalo in the study area.

MaterialsandMethods

For assessment of the level of awareness of the farmers, the study was undertaken in Bihar (South-Bihar Alluvial Plains Zone). This agro-climatic zone was purposively selected because it has the highest number of desi cattle, highest number of buffalo and rank 2nd in cross bred cattle and thus the highest number of total cattle among the three agro-climatic zones in Bihar [3]. Only those farmers who were having at least three milch animal as well as who were decision maker in the -

house hold was taken as respondent. For the study, South-Bihar Alluvial Plain Zone was selected purposefully from where two districts and under each district, two blocks and from each block two villages were selected randomly. Twenty respondents were selected randomly from each village constituting the total sample size of 160 respondents. An index was developed [4] based on extensive review of literature and also with the help of concerned experts related to growth, production and reproduction growth performance traits. Total 131 statements were made through literature and expert opinion under different component. These statements were sent to 40 different animal husbandry experts for their evaluation. Out of 40 judges, five judges evaluation was discarded due to vague evaluation. Judges were asked to indicate degree of relevancy on each statement with three point continuum i.e. 'Most relevant, Relevant and Not Relevant' with the scoring of 3, 2, and 1, respectively. The 'Relevancy weight age' (RW) were worked out for all the selected statements individually by using the following formula-

$$RW = \frac{(\text{Most relevant response} * 3 + \text{Relevant response} * 2 + \text{Not relevant response} * 1)}{\text{Maximum possible score}}$$

Statements having relevancy weight age more than 0.75 were selected for the index. By this procedure, final 89 statements for the index were selected, modified and rewritten as per the comments of judges. Based on respondent's response for the different statements, '0' score was given for having no awareness, '1' was given in case of awareness. In case of negative statements, vice-versa was followed. Total score was calculated for each respondent under different performance traits. Index value was calculated using following formulae:

$$\text{Index value} = \text{Obtained score} / \text{Maximum possible score}$$

Result and Discussion

Table-1 *Level of awareness among dairy farmers about body weight at the birth*

Sl	Category	Frequency	Per centage	Index value
1	Low(<0.47)	2	1.25	0.58
2	Medium(0.47-0.58)	100	62.50	
3	High(>0.58)	58	36.25	

It was revealed from the study [Table-1] that 62.50 per cent of the dairy farmers were having medium (0.47-0.58) level of awareness for bodyweight at the birth, followed by 36.50 per cent having high (>0.58) level and only 1.25 per cent of them possessed low (<0.47) level of awareness. This may be attributed to the factor that farmers are very much aware of weight of calf at the time of birth being the amount of care needed to the conceived animals. Index value for body weight at the birth was found to be 0.58 indicating that general level of awareness among dairy farmers to be 58 per cent.

Table-2 *Level of awareness among dairy farmers about average daily milk yield*

Sl	Category	Frequency	Per centage	Index value
1.	Low(<0.60)	25	15.62	0.80
2.	Medium(0.60-0.64)	28	17.50	
3.	High(>0.64)	107	66.87	

It was observed [Table-2] that 66.87 per cent of the dairy farmers were having high (>0.64) level of awareness, followed by 17.50 per cent having medium (0.60-0.64) level, and 15.62 per cent of them possessed low (<0.60) level of awareness. This may be due to reason that average daily milk is directly related to the income generation of the respondents. Index value was found to be 0.80 suggesting general level of awareness about average daily milk yield among respondents to be 80 per cent.

Table-3 *Level of awareness among dairy farmers about peak yield*

Sl	Category	Frequency	Per centage	Index value
1.	Low(<0.37)	7	4.37	0.60
2.	Medium(0.37-0.44)	35	21.87	
3.	High(>0.44)	118	73.75	

From the study it was revealed [Table-3] that 73.75 per cent of the dairy farmers were having high (>0.44) level of awareness, followed by 21.87 per cent of the them possessed medium (0.37-0.44) level, and only 4.37 per cent of the them possessed low (<0.37) level of awareness regarding peak yield. The reason may be again related with their economic output. Index value for was peak yield found to be 0.60 suggesting general level of awareness about average peak yield trait among dairy farmers to be 60 per cent.

Table-4 Level of awareness among dairy farmers about fat per centage of milk

Sl	Category	Frequency	Per centage	Index value
1.	Low(<0.38)	20	12.50	0.43
2.	Medium(0.38-0.42)	120	75.00	
3.	High(>0.42)	20	12.50	

It was reported from the study [Table-4] that 75.00 per cent of the dairy farmers were having medium (0.38-0.42) level of awareness, followed by 12.50 per cent of each of them having high (>0.42) and low (<0.38) level of awareness. The possible reason for less awareness about fat per cent of milk may be attributed to the factor that milk selling in the study area is largely based on volume, rather than fat per cent. Index value was found to be 0.43 suggesting that general level of awareness about fat per cent among respondents to be 43 per cent.

Table-5 *Level of awareness among dairy farmers about lactation length*

Sl	Category	Frequency	Per centage	Index value
1.	Low(<0.56)	28	17.50	0.68
2.	Medium(0.56-0.67)	50	31.25	
3.	High(>0.67)	82	51.25	

It is revealed [Table-5] that 51.25 per cent of the dairy farmers were having high (>0.67) level of awareness, followed by 31.25 per cent possessed medium (0.56-0.67) level, and 17.50 per cent of the them possessed low (<0.56) level of awareness about lactation length. The possible reason for more awareness about lactation length may be attributed to the factors that it contributed to more milk yield. Index value was found to be 0.68 suggesting general level of awareness about lactation length among respondents to be 68 per cent.

Table-6 *Level of awareness among dairy farmers about dry period*

Sl	Category	Frequency	Per centage	Index value
1.	Low(<0.26)	11	6.87	0.40
2.	Medium(0.26-0.34)	64	40.00	
3.	High(>0.34)	85	53.12	

It was reported [Table-6] that 53.12 per cent of the dairy farmers were having high (>0.34) level of awareness, followed by 40.00 per cent possessed medium (0.26-0.34) level and 6.87 per cent of the them possessed low (<0.26) level of awareness. Possible reason for more awareness about dry period may be attributed to the factor that, it is the time when farmers have to feed their animals and there is no milk production. So it is a liability in terms of farm economics for farmers. Index value for dry period was found to be 0.40 suggesting general level of awareness about dry period among respondents to be 40 per cent.

Table-7 *Level of awareness among dairy farmers about age at puberty*

Sl	Category	Frequency	Per centage	Index value
1.	Low(<0.27)	28	17.50	0.37
2.	Medium(0.27-0.32)	93	58.12	
3.	High(>0.32)	39	24.37	

List of finally selected statements for the awareness index for performance traits of cattle and buffalo

Sl. no	Growth Performance Traits
Body weight	
1.	Do you know that nutritive feed at the pregnancy period of cattle increases body weight of the calf?
2.	Do you know that cows in good body conditions at calving produces higher milk yield?
3.	Do you know that mean weight of Non-descript cattle calf is 20-24 kg?
4.	Do you know that mean weight of Murrah calf is 28-32 kg?
5.	Do you know that mean weight of HF crossbred calf is 26-28 kg?
6.	Do you know that mean weight of Jersey crossbred calf is 24-26 kg?
7.	Do you know that balance feeding during dry period increases body weight of calves?
8.	Do you think that body weight at the time of weaning is important?
	Production Performance Traits
	Average Daily Milk Yield
9.	Do you know that average milk yield of crossbred cattle is near about 6 liter per day?
10.	Do you know that average milk yield of non-discript cattle is near about 2-4 liter per day?
11.	Do you know that average milk yield of Murrah / Murrah grade is near about 4-5 liter per day?
12.	Do you think Mineral-mixture have enhancing effect over milk production?
13.	Do you think that feeding concentrate along with feed will increase milk production?
14.	Do you know that milk yield decreases from 7th to 8th weeks of pregnancy of the buffalo?
15.	Do you know that decrease in water-supply decreases the milk production significantly?
16.	Do you know that bovine milked at unequal interval leads to decrease in milk yield?
17.	Do you know that average milking time is 5 to 6 minute for proper milk let-down?
18.	Do you know that consecutive incomplete milking reduces milk yield for entire lactation period?
19.	Do you know that increased body size and udder increases the milk production?
20.	Do you think that mortality of calf influences the average milk yield in bovine?
21.	Do you know that supplementary feed has enhancing effect over milk yield?
22.	Do you know that milking twice a day increases milk yield than those milked at once a day?
	Peak Yield
23.	Do you know that balance feeding have an enhancing effect over peak yield?
24.	Do you know that extra concentrate at the rate of 1 kg for every 2 to 2.5 liters of milk should be provided to the lactating cattle?
25.	Do you know that salt and mineral supplements should be given to achieve and maintain the peak yield?
26.	Do you know that incomplete milking leads to decrease in milk yield as well as peak yield?
27.	Do you know that stopping last three months milking (Dry period) is necessary to increase the milk yield in the next lactation?
28.	Do you think that reproductive infections or problems affect the peak milk yield?
	Fat per centage
29.	Do you know that milk fat per centage of buffalo milk is higher than any other bovine?
30.	Do you know that balance feed increases the milk fat per centage?
31.	Do you know that Milk fat per centage for the Murrah buffalo is around 6 %?
32.	Do you know that Milk fat per centage for the non-descript cattle 3 to 4 %?
33.	Do you know that Milk fat per centage for the HF crossbred is around 3 to 4 %?
34.	Do you know that Milk fat per centage for the Jersey crossbred is around 4 to 5 %?
35.	Do you know that milk fat per centage are helpful in provide remunerative price to farmers?
	Lactation Length
36.	Do you know that average Lactation length of Jersey crossbred is 305 days?
37.	Do you know that average Lactation length of HF crossbred is 305 days?
38.	Do you know that average Lactation length of Non-descript cattle is 250-300 days?
39.	Do you know that average Lactation length of Murrah /Murrah grade is near about 270-320 days?
40.	Do you think good health increases the lactation length of the bovine?
41.	Do you know that there is increase in fat per centage of the milk as lactation length advances?
42.	Do you think that maintaining good, hygienic housing, water balanced feeding and taking necessary preventive steps against common diseases will maintain a uniform lactation length?
43.	Do you think that full hand milking is the best method of milking?
44.	Do you think that cows calving in late fall to spring produce more milk (up to 8% more) than cows calving in the summer?
45.	Do you think that high rate of calf mortality decreases the lactation length of bovines?
	Dry period.
46.	Do you know that the length of dry period of HF crossbred is around 90 days or three months?
47.	Do you know that the length of dry period of Jersey crossbred is around 90 days or three months?
48.	Do you know that the length of dry period of non-descript cattle is around 150 days or 5 months?
49.	Do you know that the length of dry period of Murrah/Murrah grade is around 120 days or 4 months?
50.	Do you think that dry period acts as involution period during which she rests and prepares for the next milk cycle.
51.	Do you know that dairy cows are usually dried-off for two months prior to the next calving?
52.	Do you know that improper feeding at the time of dry period reduces the milk yield and lactation length of the bovine?
	Reproductive traits
	Age at Puberty(APP)
53.	Do you know that Age at Puberty for the Jersey crossbred is 16-20 months?
54.	Do you know that Age at Puberty for the HF crossbred is 18 to 20 months?
55.	Do you know that Age at Puberty for the non-descript cattle is around 26 months?
56.	Do you know that Age at Puberty for the Murrah/Murrah grade is 30-32 months?
57.	Is it desirable to have rapid body growth to reach puberty?
58.	Do you think that growth rate and body weight are more important determinants of puberty than age.
	Age at First Calving(AFC)
59.	Do you know that age at first calving for the Jersey crossbred cattle is 26 to 30 months?
60.	Do you know that age at first calving for the HF crossbred cattle is 30 to 32 months?
61.	Do you know that age at first calving for the non-descript cattle is more or equal to 36 to 40 months?
62.	Do you know that age at first calving for the Murrah or Murrah grade is 40 to 42 months?

63.	Do you think that early age at the time of first calving is helpful in more production of milk?
64.	Do you think that early age at the time of first calving produces more calf per bovine (calf crop)?
65.	Do you think that balance feed and nutrient feed are helpful in attainment of early age at first calving?
66.	Do you think that delayed age at calving reduces the milk production?
67.	Do you think that healthy body growth has effect on age at first calving?
	Service Period (SP)
68.	Do you know that the service period for the Jersey crossbred is 80-90 days?
69.	Do you know that the service period for the HF crossbred is 80-90 days?
70.	Do you know that the service period for the non-descript cattle is 140 to 160 days?
71.	Do you know that the service period for the Murrah/Murrah grade is 90 to 130 days?
72.	Do you think that weaning will reduce the service period of bovines?
73.	Do you know the characteristics of pregnancy confirmation in bovine?
	Service per Conception
74.	Do you know that average service per conception for Jersey crossbred is 1.8?
75.	Do you know that average service per conception for HF crossbred is 1.8?
76.	Do you know that average service per conception for Non-descript cattle is 3?
77.	Do you know that average service per conception for Murrah /Murrah grade is 2 to 2.3?
78.	Do you check the reproductive infection of the bovine before the A.I.
	Calving Interval(CI)
79.	Do you know that Calving interval for the Jersey cross bred is 350 to 370 days?
80.	Do you know that Calving interval for the HF cross bred is 350 to 370 days?
81.	Do you know that Calving interval for the non-descript cattle is 420 to 440 days?
82.	Do you know that Calving interval for the Murrah/Murrah grade buffalo is around 420-440 days?
83.	Does successful AI or mating reduces the calving interval?
84.	Do you think that calving interval is affected by seasonal pattern of calving in buffaloes?
85.	Do you know that increase in calving interval leads to the production loss of milk and calf?
86.	Do you think that increase in calving interval will reduce the economic turn over?
87.	Do you have keep the record of the calving interval of your cattle?

From the study it was observed [Table-7] that 58.12 per cent of the dairy farmers were having medium(0.27-0.32) level of awareness, followed by 24.37 per cent having high(>0.32) level of awareness, and 17.50 per cent of them possessed low (<0.27) level of awareness. This high level of awareness may be due to the reason that this is the time when calf comes to puberty for the first time. Index value was found to be 0.37. It suggested that general level of awareness about age at puberty among respondents was found to be 37 per cent.

Table-8 *Level of awareness among dairy farmers about age at first calving*

Sl	Category	Frequency	Per centage	Index value
1.	Low(<0.58)	65	40.63	0.71
2.	Medium(0.58-0.64)	14	8.75	
3.	High(>0.64)	81	50.62	

It was revealed [Table-8] that 50.62 per cent of the dairy farmers were having high (>0.64) level of awareness, followed by 40.63 per cent having low (<0.58) level, and 8.75 per cent of them possessed medium (0.58-0.64) level of awareness. Index value was found to be 0.71 suggesting general level of awareness about age at first calving among respondents to be 71 per cent.

Table-9 *Level of awareness among dairy farmers about service period*

Sl	Category	Frequency	Per centage	Index value
1.	Low(<0.35)	129	80.62	0.31
2.	Medium(<0.35-0.37)	10	6.25	
3.	High(>0.37)	21	13.13	

It was reported from the study [Table-9] that 80.62 per cent of the dairy farmers were having low (<0.35) level of awareness, followed by 13.13 per cent having medium (<0.35-0.37) level of awareness, and 6.25 per cent of them possessed high (>0.37) level of awareness regarding service period. Majority of the respondents were having low awareness. This may be because this information is technical in nature and need expertise through training. Index valuewas found to be 0.71 suggesting general level of awareness among respondents to be 31 per cent.

Table-10 *Level of awareness among dairy farmers about service per conception*

Sl	Category	Frequency	Per centage	Index value
1.	Low(<0.17)	81	50.62	0.15
2.	Medium(0.17-0.28)	41	25.62	
3.	High(>0.28)	38	23.75	

It was reported from the study [Table-10] that 50.62 per cent of the dairy farmers were having low (<0.17) level of awareness, followed by 25.62 per cent having medium (0.17-0.28) level, and 23.75 per cent of them possessed high (>0.28) level of awareness for service per conception. Majority of the respondents were having low awareness. This again may be because this information is technical nature and need expertise through training. Index value was found to be 0.15 suggesting general level of awareness about service per conception among dairy farmers to be 15 per cent.

Table-11 *Level of awareness among dairy farmers about calving interval*

Sl	Category	Frequency	Per centage	Index value
1.	Low(<0.43)	38	23.75	0.46
2.	Medium(0.43-0.47)	76	47.50	
3.	High(>0.47)	46	28.75	

It was revealed from the study [Table-11] that 47.50 per cent of the dairy farmers were having medium (0.43-0.47) level of awareness, followed by 28.75 per cent of them possessed high (>0.47) level, and 23.75 per cent of the them possessed low (<0.43) level of awareness for calving interval. Majority of them were having low awareness. Index value for was found to be 0.46 suggesting general level of awareness about calving interval trait among respondents to be 46 per cent.

Table-12 *Overall awareness about performance traits of cattle and buffalo among dairy farmers*

Sl	Category	Frequency	per centage	index value
1.	Low(<0.51)	61	38.12	0.55
2.	Medium(0.51-0.61)	48	30.00	
3.	High(>0.61)	51	31.88	

It was concluded [Table-12] that 38.12 per cent of the respondents were having low (<0.51) level of awareness, followed by 31.88 per cent having high (>0.61) level of awareness, and 30 per cent of them possessed medium (0.51-0.61) level of awareness regarding performance traits of cattle and buffalo. The organization for overall low awareness may be attributed to inadequate or no training programme, less awareness programmes in the study area. Index value for was found to be 0.55. The value suggested that general level of awareness about performance traits of cattle and buffalo among dairy farmers to be 55 per cent. In relatively similar aspect i.e. studies on knowledge about reproductive traits among

farmers of Karnal district and udder health care by Meena, (2000) [5], and Tak (2010) [8] respectively reported medium level of knowledge level. Prakash (2009) [6] reported that age at first calving of cross bred cows, local cows and buffaloes of Self Help Group members were significantly lower than that of non-members. Singh (2001) [7] in Haryana reported that knowledge of small, medium and large farmers about late maturity was 49.33 per cent, 52.66 per cent, 55.66 per cent respectively. Verma (2012) [9] in Uttar Pradesh revealed that in case of buffalo based farmers, majority were having a high level of knowledge regarding productive practices of dairy animals, followed by medium level and low knowledge level. It can be concluded that for growth performance traits, medium level of awareness was found among the dairy farmers for the body weight at the birth. Among production performance trait, most of the respondents were having high level of awareness for average daily milk yield, peak yield, lactation length and dry period, while medium level of awareness for fat per centage. For reproduction performance traits**,** most of the respondents were having medium level of awareness for age at puberty and calving interval, while low level of awareness for service period and service per conception and high level of awareness for the age of the first calving.

Conclusion

Awareness of the farmers about performance trait of the bovines is one of the important areas to be emphasized for optimum production and utilization of resources. For optimum performance of bovine under given geographical region, it is essential to have awareness regarding these traits, and if there is any gap in production and performance of bovine it can be bridged with the help of further training and awareness programmes. All these factors help in sustaining the growth, particularly with the germ-plasm and breed available in the state, the potential must be trapped. This would help in exploring the new opportunity in dairy sector. The general low awareness particularly regarding fat per cent and other traits can be overcome by training. Further, the infrastructure for the cooperative system can be strengthened to support more knowledge base by more training and awareness programme.

Acknowledgement

The ICAR-JRF has financially supported the study through Junior Research Fellowship and facilities provided by ICAR-National Dairy Research Institute, Karnal (India) for conducting this work is duly acknowledged.

Conflict of Interest: None declared

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