Seasonal Influence on Metabolic Diseases Incidence Rate in Dairy Animals of Namakkal and Karur Districts of Tamil Nadu

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Abstract

Metabolic disorders of cattle are a group of diseases that affect dairy cows immediately after parturition. There are several metabolic disorders identified in dairy cows during the first month immediately after parturition. In dairy farming, metabolic diseases such as ketosis, milk fever and downer cow syndrome are the most common expensive disease entities in such lactating dairy animals. The study of metabolic diseases incidence rate due to predisposing factors especially seasonal influence is very much important and which can help in providing overall view of the impact of these diseases. Namakkal and Karur districts of Tamil Nadu were purposively selected for the present study. Data were collected regarding seasonal occurrence of diseases from the respondent farmers by personal interview method, using pretested interview schedule. The data so collected were analysed by using percentage analysis and Chi-square analysis. About 40 per cent each of the ketosis affected animals and milk fever affected animals and about 53 per cent of the downer cow syndrome were found to be prevalent during summer season.

Keywords: Metabolic diseases, Season, Dairy animals

Introduction

The livestock sector particularly dairy farming plays a significant role in securing the livelihood of rural farmers by providing income and employment generation in rural areas. However, this sector is facing several disease problems due to introduction of exotic germ plasm for higher productivity and changing global climate which cause huge economic loss resulting from mortality and low productivity of animals (Singh and Shivprasad, 2008). The economic implications of animal diseases are becoming increasingly important at both farm and national levels, as diseases cause avoidable waste of scare resources, especially among cross breeds, as they stand more susceptible to diseases, hardships and contingencies peculiar to our climate (Thirunavukkarasu et al., 2010a and Rupasitiwari et al., 2013).

Dairy animals suffer from many diseases; some of these diseases are common with other livestock species, while a few are specific to dairy animals. Metabolic disorders of cattle are a group of diseases that affect dairy cows immediately after parturition. There are several metabolic disorders identified in dairy cows during the first month immediately after parturition. In dairy farming, metabolic diseases such as

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ketosis, milk fever and downer cow syndrome are the most common expensive disease entities in such lactating dairy animals (Kaneene and Scott, 1990). The study of metabolic diseases incidence rate due to predisposing factors especially seasonal influence is very much important and which can help in providing overall view of the impact of these diseases. This can contribute estimating the extent of the losses to be avoided. Keeping the above facts in view, this study was conducted in Karur and Namakkal districts of the Tamil Nadu State, which might be characterised by specific Western agro-climatic factors.

Methodology

Namakkal and Karur districts of Tamil Nadu were purposively selected for the present study, as these districts are under different agro climatic zones viz., the Namakkal district comes under the North Western agro climatic zone and Karur district falls under the Cauvery Delta zone of Tamil Nadu. Both the districts are experiencing frequent occurrence of metabolic diseases in dairy animals. For the present study, metabolic diseases of dairy animals such as ketosis, milk fever and downer cow syndrome were chosen with the help of veterinarians. 180 households having affected cow or buffalo were selected through multistage random sampling technique. From the dairy farmers so selected, relevant data pertaining to the period of two years (2010-11 and 2011-12) were collected to achieve the objectives of the study. The data were collected during the months of October 2012 and June 2013. Data were collected regarding seasonal occurrence of diseases from the respondent farmers by personal interview method, using pretested interview schedule. The data so collected were analysed by using percentage analysis and Chi-square analysis. Chi-square ($\chi^2$) analysis was used to test the hypothesis – H0: the factors are independent. The sample value of the test statistic used for this hypothesis is $\chi^2$.

$$\chi^2 = \sum \frac{(f_0 - f_e)^2}{f_e}$$

Where,

$\chi^2$ is the chi-square symbol;
$f_0$ is the observed frequency; and
$f_e$ is the expected frequency;

Results and Discussion

Season-wise prevalence of metabolic diseases in dairy animals is shown in Table 1. About 43 per cent of the cows affected by metabolic diseases were found to be prevalent during summer when compared to south west monsoon (18.72 per cent), north east monsoon (17.01 per cent) and winter (9.52 per cent). Similar scenario was observed for individual metabolic diseases as shown in the table. About 40 per cent each of the ketosis affected animals and milk fever affected animals and about 53 per cent of the downer cow syndrome were found to be prevalent during summer season. Erb and Grohn (1988) had found that the significant association between downer cow syndrome and season for which the highest risk might be the summer and same was noticed by them in milk fever also. Heat stress and green fodder shortage in addition to specific etiological factors
Table 1: Season Wise Prevalence of Metabolic Diseases in Dairy Animals

(in numbers)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Winter</th>
<th>Summer</th>
<th>SW monsoon</th>
<th>NE monsoon</th>
<th>Total</th>
<th>Winter</th>
<th>Summer</th>
<th>SW monsoon</th>
<th>NE monsoon</th>
<th>Total</th>
<th>Winter</th>
<th>Summer</th>
<th>SW monsoon</th>
<th>NE monsoon</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ketosis</td>
<td>2 (1.59)(^a)</td>
<td>9 (5.92)(^a)</td>
<td>8 (4.28)(^a)</td>
<td>3 (1.55)(^a)</td>
<td>22 (1.32)(^a)</td>
<td>1 (1.89)(^a)</td>
<td>2 (1.19)(^a)</td>
<td>8 (2.25)(^a)</td>
<td>3 (1.49)(^a)</td>
<td>13 (5.37)(^a)</td>
<td>10 (3.41)(^a)</td>
<td>4 (1.44)(^a)</td>
<td>30 (2.96)(^a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk fever</td>
<td>5 (3.97)(^a)</td>
<td>25 (16.45)(^a)</td>
<td>19 (10.16)(^a)</td>
<td>15 (7.73)(^a)</td>
<td>64 (9.71)(^a)</td>
<td>2 (2.63)(^a)</td>
<td>10 (1.11)(^a)</td>
<td>5 (4.72)(^a)</td>
<td>19 (5.34)(^a)</td>
<td>7 (3.47)(^a)</td>
<td>35 (14.46)(^a)</td>
<td>24 (8.19)(^a)</td>
<td>17 (6.12)(^a)</td>
<td>83 (8.18)(^a)</td>
<td></td>
</tr>
<tr>
<td>Downer cow syndrome</td>
<td>5 (3.97)(^a)</td>
<td>32 (21.05)(^a)</td>
<td>8 (4.28)(^a)</td>
<td>15 (7.73)(^a)</td>
<td>60 (9.10)(^a)</td>
<td>5 (5.56)(^a)</td>
<td>2 (1.89)(^a)</td>
<td>7 (1.97)(^a)</td>
<td>2 (4.8)(^a)</td>
<td>5 (2.48)(^a)</td>
<td>7 (1.97)(^a)</td>
<td>10 (3.41)(^a)</td>
<td>15 (5.40)(^a)</td>
<td>67 (6.60)(^a)</td>
<td></td>
</tr>
<tr>
<td>No. of animals affected</td>
<td>12 (9.52)(^a)</td>
<td>66 (43.42)(^a)</td>
<td>35 (23.97)(^a)</td>
<td>33 (17.01)(^a)</td>
<td>146 (22.15)(^a)</td>
<td>3 (3.95)(^a)</td>
<td>19 (21.11)(^a)</td>
<td>9 (8.49)(^a)</td>
<td>3 (3.57)(^a)</td>
<td>34 (9.55)(^a)</td>
<td>15 (7.43)(^a)</td>
<td>85 (35.12)(^a)</td>
<td>44 (15.02)(^a)</td>
<td>36 (12.95)(^a)</td>
<td>180 (17.73)(^a)</td>
</tr>
<tr>
<td>with metabolic diseases</td>
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<tr>
<td>No. of animals free from</td>
<td>114 (90.48)(^a)</td>
<td>86 (56.58)(^a)</td>
<td>152 (81.28)(^a)</td>
<td>161 (82.99)(^a)</td>
<td>513 (77.85)(^a)</td>
<td>73 (96.05)(^a)</td>
<td>71 (78.89)(^a)</td>
<td>97 (91.51)(^a)</td>
<td>81 (96.43)(^a)</td>
<td>322 (90.45)(^a)</td>
<td>187 (92.57)(^a)</td>
<td>157 (64.88)(^a)</td>
<td>249 (84.98)(^a)</td>
<td>242 (87.05)(^a)</td>
<td>835 (82.27)(^a)</td>
</tr>
<tr>
<td>metabolic diseases</td>
<td>126 (100.00)(^a)</td>
<td>152 (100.00)(^a)</td>
<td>187 (100.00)(^a)</td>
<td>194 (100.00)(^a)</td>
<td>659 (100.00)(^a)</td>
<td>76 (100.00)(^a)</td>
<td>90 (100.00)(^a)</td>
<td>106 (100.00)(^a)</td>
<td>84 (100.00)(^a)</td>
<td>356 (100.00)(^a)</td>
<td>202 (100.00)(^a)</td>
<td>242 (100.00)(^a)</td>
<td>293 (100.00)(^a)</td>
<td>278 (100.00)(^a)</td>
<td>1015 (100.00)(^a)</td>
</tr>
</tbody>
</table>

\(^a\) - Figures in parentheses indicate percentage to total number of animals observed (Column-wise)
\(^b\) - Figures in parentheses indicate percentage to total number of affected animals due to respective diseases (Row-wise)

Prevalence of Ketosis in dairy animals is associated with seasons (\(\chi^2=4.51\); P<0.05);
Prevalence of Milk fever in dairy animals is associated with seasons (\(\chi^2=5.31\); P<0.05);
Prevalence of Downer cow syndrome in dairy animals is highly associated with seasons in bovines (\(\chi^2=23.30**\); P<0.01);
Prevalence of metabolic diseases in dairy animals are highly associated with seasons (\(\chi^2=47.20**\); P<0.01).

Shanlax International Journal of Veterinary Science 15
might be the reason for the prevalence of such metabolic diseases during summer season. But this study was in contrast with no significant seasonal patterns for milk fever as reported by Grohn et al. (1989). Soto et al. (2003) stated that the heat stress is a common condition predisposing dairy cattle to eat less and be more susceptible to ketosis and other metabolic diseases.

In case of buffaloes, about one half of the affected animals of each ketosis and milk fever and about three fourth of the animals affected by downer cow syndrome were found to be prevalent during summer. The scenario was found to be more intensive during summer in case of buffaloes, when compared to cows as they are more susceptible to heat stress. Among different season the prevalence of metabolic diseases were in the order of summer (47.22 per cent), south west monsoon (24.44 per cent), north east monsoon (20.00 per cent) and winter (8.33 per cent). The prevalence of ketosis and milk fever were associated with seasons at five per cent level, whereas downer cow syndrome and overall prevalence of metabolic diseases were found highly significant at one per cent level in Chi square analysis.

**Conclusion**

Regarding seasonality pattern, summer attracts more metabolic diseases than other season. This is because of non availability of fodder and other essential nutrients due to drought.

**References**


