Efficacy of feeding Taramira seed and introduction of poultry birds in animals shed to control tick infestation on buffalo under field conditions

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Ticks are widely distributed in the tropical and subtropical regions worldwide and account for heavy production losses in livestock. These are haematophagous arthropod ectoparasites that infest livestock including dairy animals of all age groups and effect their health and productivity. Ticks suck large quantities of blood of their host resulting in anaemia and they produce ‘tick worry’ which is the result of tick bites, local skin reactions, blood loss and secondary fly attacks (Kemal et al. 2016). According to FAO (2004), an estimated 80% of the world’s cattle population remains infested with ticks. Ticks cause infirriation and restiveness in animals and causes huge economic losses to livestock by their direct effects like sucking blood, damaging the skin and hides, resulting in reduction in weight gain and milk yield and indirectly, act as vectors for transmitting infectious diseases (Spickett 2013, Grisi et al. 2014, Rafique et al. 2015). In India, due to tick infestation and tick borne diseases (TTBDs), the cumulative losses were recorded at 61076.46 million INR or USD787.63 million (Singh et al. 2022). It has been suggested that if global warming leads to temperature increases, the abundance of ticks will increase in some regions where ticks are endemic (Olwoch et al. 2009). While acaricides have shown effectiveness in reducing tick infestations, continuous and excessive use of acaricides has led to the development of resistance in ticks, rendering some chemical compounds ineffective (Abbas et al. 2014). To maintain the health and productivity of animals, it is imperative that appropriate and balanced control measures should be adopted against tick infestation in dairy animals.

Taramira (Eruca sativa) seeds are naturally enriched with GSLs and are cheap ingredients for several applications, from pest management in agriculture to human and animal health (Matteo et. al. 2018 and Giammini et. al. 2021). Livestock fed on taramira seed and cake are seen to be tick free. Poultry birds such as guinea fowl or chickens, are known for their tick-feeding behaviour. Keeping the above facts in view, an attempt was made to evaluate the efficacy of feeding Taramira seed and introduction of poultry birds in animals shed to control ticks infestation on buffalo under field conditions.

The study was conducted from July to September 2022, buffalo (45) reared under farmer’s field were randomly selected and distributed equally into three groups, i.e. T1 (control), T2 [Application of Amitraz on animal body (250 ppm) along with shed treatment with Malathiaon (5000 ppm)] and T3 (Feeding of Taramira seed @ 70 g/day/animal and introduction of poultry birds in animals shed). In T1 group, Amitraz diluted in clean water, was sprayed on the animal with a hand sprayer in the morning and was repeated at 15 days interval. After spraying, the animals were allowed to stand in sunlight for 1 h. Malathiaon diluted with clean water, was sprayed with hand sprayer in the shed as well as outside the shed in morning time and repeated at 15 days interval.

For T3, Taramira seeds were cleaned, dried, and ground into a coarse powder. The powdered Taramira seeds were mixed with concentrate mixture and fed to animal in morning time. Suitable housing facilities were provided to accommodate the poultry birds (Punjab brown) near the animal shed and were left free to roam in animal shed every day in morning between 5.00–8.00 AM. All animals were managed on traditional system of feeding and management. Before initiating the study, tick were counted on certain body parts of the animal to establish baseline tick infestation levels. The counting of ticks was done on neck, shoulder and peri-anal region at fortnightly intervals. The data were analyzed statistically in a completely randomized design, and the significance of the difference between treatments means was determined by using one-way ANOVA conducted with the help of SPSS computer software version 21. Mean differences among different treatments were then separated using Tukey’s test.

The results obtained on tick load in three groups are presented in Table 1. The results of the present study revealed that group T3 depicted a subsequent reduction in the ticks’ infestation from day 0 to the 60th day of the

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CONTROL OF TICK INFESTATION ON BUFFALO
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Table 1. Average tick load and percentage of protection after application of acaricides and biological interventions

<table>
<thead>
<tr>
<th>Day</th>
<th>Neck load</th>
<th>Shoulder load</th>
<th>Peri-anal region load</th>
<th>Total tick load</th>
<th>Group 1 (Control)</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 day</td>
<td>15.80 ±1.35</td>
<td>14.13 ±1.25</td>
<td>16.67 ±1.36</td>
<td>46.60 ±1.29</td>
<td>16.73 ±0.86</td>
<td>15.20 ±0.73</td>
<td>16.40 ±0.81</td>
</tr>
<tr>
<td>15 days</td>
<td>17.34a</td>
<td>15.91b</td>
<td>16.34a</td>
<td>49.59a</td>
<td>8.07b</td>
<td>5.26a</td>
<td>6.93a</td>
</tr>
<tr>
<td>30 days</td>
<td>19.20a</td>
<td>18.37b</td>
<td>17.54b</td>
<td>55.11b</td>
<td>4.17a</td>
<td>2.13a</td>
<td>2.06a</td>
</tr>
<tr>
<td>45 days</td>
<td>22.67c</td>
<td>21.07b</td>
<td>19.54b</td>
<td>63.28c</td>
<td>1.73c</td>
<td>1.20a</td>
<td>1.27b</td>
</tr>
<tr>
<td>60 days</td>
<td>23.07c</td>
<td>22.11b</td>
<td>22.34c</td>
<td>67.52c</td>
<td>1.06c</td>
<td>0.90a</td>
<td>1.00c</td>
</tr>
</tbody>
</table>

Notes: All treatments were given after the tick load on day 0 was random. Different superscripts in the same parameter indicate a significant difference (P<0.05).
distributed equally into three groups, i.e. T1 (control), T2 (Application of Amitraz on animal body (250 ppm) along with shed treatment with Malathion (5000 ppm)) and T3 (feeding of Taramira seed @ 70 g/day/animal and introduction of poultry birds in animals shed). The results of the study revealed that T1 showed a sudden decrease in the tick infestation within 15 days of intervention. However, T2 group depicted a subsequent reduction in the ticks’ infestation from day 0 to the 60th day of the treatment compared to the control. The animal bodies showed no tick infestation on the 60th day of the treatment in T3 group, whereas, the control showed a significant increase in the ticks’ infestation in all the regions with the passing of days. Based on the study, it was concluded that the feeding of Taramira seed and introduction of poultry birds in animals shed were able to reduce the tick load by 95%. This eco-friendly technology can be used by the dairy farmers at their dairy farm, as tick control is of utmost priority for the betterment of the health, production and productivity of buffalo.

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