Effect of Cypermethrin in Management of Tick Infestation in a Commercial Poultry Farm

Sirigreddy Sivajothi*, Bhavanam S. Reddy¹ and Pyreddy A. Reddy²

¹Department of Veterinary Parasitology, Sri Venkateswara Veterinary University, Andhra Pradesh, India
²Department of Veterinary Clinical Complex (Veterinary Medicine), Sri Venkateswara Veterinary University, Andhra Pradesh, India

Received Date: June 18, 2017, Accepted Date: July 27, 2017, Published Date: August 02, 2017.

*Corresponding author: Sirigreddy Sivajothi, College of Veterinary Science, Sri Venkateswara Veterinary University, Proddatur–516360, Andhra Pradesh, India, E-mail: sivajothi579@gmail.com.

Abstract

Severe soft tick infestation was noticed in a commercial poultry farm near Proddatur of Andhra Pradesh. Thirty birds were selected for the study and were divided into three groups. Group-I was kept as the control without any treatment. Group-II was treated with single application of cypermethrin by spray and group-III was treated with two applications of cypermethrin one on the 0th day and second on the 7th day of observation of tick infestation. The tick intensity was reduced by 39.6, 59.5, 77.5, 75 and 61.2% on 1st, 3rd, 7th, 14th and 21st days respectively on post treatment in group-II. In group-III improvement was noticed by the reduction in the tick population by 83.3, 60.8, 77.4, 89.5 and 96.5% on 1st, 3rd, 7th, 14th and 21st day respectively upon post treatment. In both the groups, significant differences on improvement were observed when compared to the untreated group (p ≤ 0.01). But, in the group-III significant difference was observed on the 21st day of treatment. It might be due to spraying of the second dose of cypermethrin which would have prevented reinfestation in the farm.

Keywords: Cypermethrin; Poultry farm; Tick

Introduction

In India, Poultry farming developed as one of the most intensive forms of animal husbandry activities. Among the different number of biological invasions, parasitic diseases result into morbidity and mortality in tropical countries [1]. The presence of the parasitic infections in association with other concurrent infections results in loss of productivity. Most common external parasites of poultry include lice, ticks, mites and flies. Nymphs and adults of the parasites cause restlessness, debility and anemia [2]. An infestation with the Poultry soft tick *Argas persicus* represent a major ectoparasitic problem worldwide in poultry and is affecting egg and meat production. Ticks particularly, *Argas* species is an efficient reservoir and/or vector for many micro organisms and causes tick worry, paralysis and transmits microbial and viral diseases [3]. *Argas persicus* burden was 3.25 per bird and a single tick sucked 18.57 ml blood daily and thus 60.0 ml of blood is sucked by ticks per bird daily. During the life cycle, *Argas persicus* shows larval, nymphaal and adult stages. It transmits *Borrelia anserina* which is the causative agent of fowl Spirochaetosis [4]. A chemical insecticide poses causes health risks and environmental problems and chemicals alone lead to rapid development of the resistance in birds [5]. The synthetic pyrethroids are used for control of different ectoparasitic infestations in different animals [6,7]. Literature availability is very less in the management of tick infestation in Indian Poultry forms. Therefore, the aim of the present work is to study the effect of cypermethrin in treating the soft tick infestation in a commercial poultry farm.

Materials and Methods

A commercial poultry farm consisting of 562 layers was suffering from soft tick infestation near Proddatur of Andhra Pradesh, India during September, 2014. Affected birds were observed with slow growth, restlessness, itching, damaged skin and feathers. Most of the ticks were observed in the wing, breast regions and also observed in the crevices of building. Ticks and their larval stages were collected from individual birds and from crevices. Collected ticks were processed for their identification [8]. Morphological identification of the ticks was done by the position of head and mouthparts relative to the thorax and abdomen and shape of the body. Confirmation was done based on the presence of a ventral (sub-terminal) capitulum, absence of sputum or festoons and legs, which were unarmed [9].

Thirty birds were selected for the study, among those ten birds (Group-I) were considered as control. Group-II was treated with single application of cypermethrin (10% W/V) at the rate of 1 ml/liter of water and group-III was treated with double applications of cypermethrin as first application on the 0th day and second on the 7th day of observation. Spraying of cypermethrin was done until the birds become completely wet. Farm premises were also sprayed with cypermethrin (2 ml/liter of water) to treat the ticks on the floors.

Pretreatment tick intensity was determined by counting the number of adult ticks on individual birds. Sprayed birds were inspected visually for the presence of the number of ticks on 1st, 3rd, 7th, 14th and 21st day of post-treatments to count the number of ticks on each bird. The efficacy of the drug was determined on the basis of percentage a reduction of the tick as per Khater et al. [10] the reduction (%) in the number of adult ticks on each bird was calculated.

\[
\text{Tick reduction} (\%) = \left(\frac{\text{Pre treatment count} - \text{Post treatment count}}{\text{Pre treatment count}}\right) \times 100.
\]

The data collected were analyzed statistically with SPSS software. Statistical analysis was done among the three groups to know the difference by Chi-square test [11].

Results and Discussion

In both, the groups (II and III), the significant reduction in the adult tick count was reduced by the first application of cypermethrin. Response to the cypermethrin against soft tick infestation was presented in the Table 1. The soft tick intensity was reduced by 39.6, 59.5, 77.5, 75 and 61.2% on 1st, 3rd, 7th, 14th and 21st day respectively of post treatment in the group II. In the third group treated with double application of cypermethrin showed reduction percentage by 83.3, 60.8, 77.4, 89.5 and 96.5 % on 1st, 3rd, 7th, 14th and 21st day of post treatment respectively. In both groups, improvement was observed and there were significant differences from the untreated group (p ≤ 0.01). But, in the group - III birds have significantly differed at the 21st day of treatment.
the treated groups. But, on the 14th day of examination variation was noticed in the tick count and was statistical significant (Chi-square value: 4.31).

The present study shows the efficacy of cypermethrin against the A. persicus affected commercial poultry farm. It was reported that soft tick infestation occurs in tropical and sub-tropical regions including warm temperate environments. All the soft ticks protected under the shelter of crevices, rocks and caves [12].

In the present study, most of the ticks were observed in the wing and breast regions. Number of ticks were observed in these regions might be due to the presence of fewer feathers, soft, fleshy nature of the skin which is suitable for easy sucking of blood and tissue fluids for ticks [13]. The reduction in the tick count was gradual in both the treated groups. Prolonged effect of cypermethrin against tick infestation mainly because drug sticks to the surfaces of the ticks for weeks and killing any bypassing insects. Also, microencapsulation of the pyrethroids prolonged their activity to many weeks with greater stability as the microcapsules adhere to the insect skeleton and the pyrethroids absorbed through the chitin to produce its toxic effect [14,15].

Table 1: Table showing the clinical efficacy of acaricides. (*Statistically significant (p ≤ 0.05)).

<table>
<thead>
<tr>
<th>Groups</th>
<th>0th day</th>
<th>1st day</th>
<th>On 3rd day</th>
<th>After Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ticks/Bird</td>
<td>Ticks/Bird</td>
<td>% Reduction</td>
<td>Ticks/Bird</td>
</tr>
<tr>
<td>Group-1</td>
<td>11.8 ± 0.72</td>
<td>10.9 ± 0.40</td>
<td>11 ± 0.47</td>
<td>12.1 ± 0.60</td>
</tr>
<tr>
<td>Group-2</td>
<td>11.6 ± 0.54</td>
<td>7 ± 0.59</td>
<td>39.6</td>
<td>4.7 ± 0.51</td>
</tr>
<tr>
<td>Group-3</td>
<td>11.5 ± 0.54</td>
<td>7.1 ± 0.31</td>
<td>38.3</td>
<td>4.5 ± 0.26</td>
</tr>
<tr>
<td>Chi-square test</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.84</td>
</tr>
</tbody>
</table>

Present communication reports the application of cypermethrin in a week interval resolves the soft tick infestation in poultry farm along with other practices.

**Acknowledgement**

The authors are thankful to the owners of the poultry farm and authorities of Sri Venkateswara Veterinary University, Tirupati.

**Conflict of Interest**

The authors declared that there are no conflicts of interest.

**References**

13. Blu AA, Agbede RIS, Peace P. Studies on Ectoparasites of Poultry in...


*Corresponding author: Sirigireddy Sivajothi, College of Veterinary Science, Sri Venkateswara Veterinary University, Proddatur–516360, Andhra Pradesh, India, E-mail: sivajothi579@gmail.com.

Received Date: June 18, 2017, Accepted Date: July 27, 2017, Published Date: August 02, 2017.

Copyright: © 2017 Sivajothi S, et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.