



ISSN: 2456-2912

NAAS Rating (2025): 4.61

VET 2025; SP-10(12): 122-124

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Received: 04-11-2025

Accepted: 05-12-2025

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## Effect of tick shield on tick infestation and milk production in dairy cattle

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**DOI:** <https://www.doi.org/10.22271/veterinary.2025.v10.i12Sb.2862>

### Abstract

Tick infestation is a major constraint affecting health, productivity, and welfare of dairy cattle under tropical field conditions. Heavy tick burden leads to blood loss, irritation, reduced milk yield, poor milk quality, and transmission of tick-borne diseases, causing substantial economic losses to farmers. A Front Line Demonstration (FLD) was conducted by Krishi Vigyan Kendra, Kundrakudi, Sivagangai district, Tamil Nadu, to evaluate the field efficacy of Tick Shield for controlling tick infestation in dairy cattle and calves. Animals with moderate to severe tick infestation were selected, and Tick Shield was applied as per the recommended dosage. Observations were recorded before treatment and on the 7th, 14th, and 21st days after application. Results showed a significant and progressive reduction in tick infestation from 100% before treatment to 7% by the 21<sup>st</sup> day. Correspondingly, improvements were observed in milk yield, milk fat percentage, and Solid Not Fat (SNF) content. The demonstration clearly revealed that Tick Shield is an effective, farmer-friendly, and economical ectoparasitic control measure, contributing to improved animal health, milk productivity, and farmer satisfaction under field conditions.

**Keywords:** Tick infestation, tick shield, ectoparasite control, dairy cattle, milk yield

### Introduction

Ticks are obligate blood-sucking ectoparasites belonging to the class *Arachnida* and are considered one of the most serious parasitic constraints affecting livestock production worldwide. They are second only to mosquitoes as vectors of diseases and are capable of transmitting a wide range of bacterial, protozoal, viral, and toxin-mediated infections to animals and humans (Rajput *et al.*, 2006; Ghosh *et al.*, 2007) <sup>[8, 5]</sup>. In dairy cattle, tick infestation leads to direct losses through blood sucking, irritation, skin damage, and stress, and indirect losses by transmitting haemoprotozoan diseases such as babesiosis, anaplasmosis, and theileriosis (Jonsson, 2006) <sup>[6]</sup>.

Heavy tick infestation in dairy animals results in anemia, reduced feed intake, lowered milk yield, poor milk quality, impaired reproductive performance, and increased susceptibility to secondary infections (De Castro, 1997; Ghosh *et al.*, 2007) <sup>[2, 5]</sup>. Economic losses due to ticks are substantial, particularly in tropical and subtropical regions, where climatic conditions favor their survival and multiplication throughout the year (Minjauw and McLeod, 2003) <sup>[7]</sup>.

In India, the warm and humid climate, coupled with traditional housing systems, poor hygiene, and limited adoption of scientific parasite control practices, provides ideal conditions for tick proliferation. Small and marginal dairy farmers often depend on irregular or improper use of chemical acaricides, which has led to issues such as development of acaricide resistance, residues in milk and meat, environmental contamination, and increased cost of treatment (George *et al.*, 2004; Abbas *et al.*, 2014) <sup>[4, 1]</sup>. In addition, lack of awareness regarding correct dosage, application methods, and integrated tick management further aggravates the problem under field conditions. Considering these constraints, there is a pressing need to demonstrate effective, safe, economical, and farmer-friendly ectoparasitic control measures that can be easily adopted under rural dairy farming systems. Front Line Demonstrations play a crucial role in validating the field-level performance of such technologies and enhancing farmer confidence through visible results.

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The present study was therefore undertaken as a front line demonstration to assess the effectiveness of tick shield in controlling tick infestation and improving milk yield and milk quality parameters in dairy cattle managed under rural farming conditions.

## **Materials and Methods**

### **Study Area**

The Front Line Demonstration was conducted by Krishi Vigyan Kendra, Kundrakudi, in Thamarakki village of Sivagangai district, Tamil Nadu, India. The village is predominantly agrarian in nature, with dairy farming serving as an important subsidiary occupation for small and marginal farmers. The area falls under a semi-arid tropical climatic zone, characterized by hot summers, moderate rainfall, and mild winters. Dairy animals in the village mainly consist of indigenous and crossbred cattle maintained under traditional housing systems with limited scientific management practices. Due to favourable climatic conditions, close animal housing, and irregular ectoparasite control measures, tick infestation is commonly observed throughout the year in the study area. Hence, Thamarakki village was purposively selected to evaluate the field-level effectiveness of Tick Shield under real farming conditions.

### **Selection of Animals**

Lactating dairy cattle and calves exhibiting moderate to heavy tick infestation were selected from farmer-managed herds. All selected animals were maintained under traditional feeding and housing systems without routine ectoparasitic treatment prior to the demonstration. Baseline observations were recorded for each animal before intervention, including degree of tick infestation, daily milk yield, milk fat percentage, and solid not fat (SNF) content.

### **Demonstration of Tick Shield**

The ectoparasiticide product Tick Shield was demonstrated for the control of tick infestation in dairy cattle under field conditions. The product was applied topically to the selected animals strictly as per the manufacturer's recommended dosage and application procedure. Observations were recorded before treatment and subsequently on the 7<sup>th</sup>, 14<sup>th</sup>, and 21<sup>st</sup> days after application.

### **Data Collection and Parameters Recorded**

During each observation period, the percentage of tick infestation was assessed through visual examination of commonly infested body regions. Milk yield was recorded on a daily basis for each animal. Milk samples were collected and analyzed for fat percentage and solid not fat content using standard milk testing methods. General animal health and comfort status were evaluated based on behavioural responses, visible irritation, coat condition, and overall alertness.

### **Farmer Awareness and Extension Activities**

Along with the field demonstration, participating farmers were educated through on-field interactions on the economic impact of tick infestation, importance of regular ectoparasite control, correct method and timing of application of Tick Shield, and benefits of adopting scientific tick management practices. Farmer feedback on ease of application, effectiveness, and acceptability of the demonstrated technology was collected during follow-up visits.

## **Results and Discussion**

The Front Line Demonstration on the application of Tick Shield clearly demonstrated its effectiveness in reducing tick infestation and improving milk production and quality parameters in dairy cattle under field conditions. The results obtained before treatment and at different intervals after application are presented and discussed below.

### **Effect of tick shield on tick infestation**

Before application of Tick Shield, all selected dairy cattle exhibited heavy tick infestation, indicating 100 percent prevalence. Following topical application, a rapid and progressive reduction in tick infestation was observed. By the 7<sup>th</sup> day after treatment, tick infestation reduced considerably, indicating the quick ectoparasiticide action of Tick Shield. Further reduction was recorded on the 14<sup>th</sup> day, and by the 21<sup>st</sup> day post-treatment, tick infestation was reduced to minimal levels.

The marked reduction in tick load may be attributed to the effective contact action of the ectoparasiticide, leading to detachment and death of ticks. Reduction in ectoparasite burden also resulted in visible improvement in animal comfort, reduced irritation, and improved coat condition. Similar findings have been reported earlier, where effective tick control significantly reduced ectoparasite prevalence and associated production losses in dairy cattle.

### **Effect of tick shield on milk yield**

A consistent and gradual improvement in milk yield was observed following Tick Shield application. The average milk yield recorded before treatment was comparatively low, which can be attributed to stress, blood loss, and irritation caused by heavy tick infestation. After treatment, milk yield increased steadily on the 7<sup>th</sup>, 14<sup>th</sup>, and 21<sup>st</sup> days.

The improvement in milk yield can be explained by reduced parasitic stress, improved feed intake, better nutrient utilization, and restoration of normal physiological functions following effective tick control. These findings clearly indicate that tick infestation has a direct negative impact on milk production and that its effective control leads to tangible production benefits under field conditions.

### **Effect of tick shield on milk quality parameters**

#### **Milk Fat Percentage**

Milk fat percentage showed a noticeable and progressive increase after application of Tick Shield. The improvement in fat percentage may be due to better metabolic efficiency and improved energy balance in treated animals following reduction of ectoparasitic stress.

#### **Solid Not Fat (SNF)**

Similarly, SNF content showed a steady increase during the post-treatment observation period. Improvement in SNF reflects better milk quality and improved overall health and nutritional status of the animals.

### **Animal Comfort and Farmer Perception**

Apart from quantitative improvements, treated animals exhibited improved comfort levels, reduced scratching and restlessness, better coat shine, and increased alertness. Farmers reported ease of application, absence of adverse reactions, visible reduction in ticks, and improvement in milk yield within a short period. The high level of farmer satisfaction indicates good acceptability and adoptability of Tick Shield under rural dairy farming systems.

**Table 1:** Effect of tick shield on tick infestation, milk yield and milk quality parameters in dairy cattle under field conditions

Parameter	Before Treatment	7 Days After Treatment	14 Days After Treatment	21 Days After Treatment
Tick infestation (%)	100	32	13	7
Milk yield (litres/day/animal)	7.2	8.4	8.7	9.0
Milk fat (%)	3.54	3.82	4.08	4.16
SNF (%)	8.20	8.45	8.67	8.76
Animal comfort status	Poor	Moderate	Good	Very good

**Fig 1:** Demonstration of topical application of tick shield on dairy cattle under field conditions**Fig 2:** Milk collection and evaluation of milk quality parameters following ectoparasite control

## Discussion

The results of the present front line demonstration clearly establish the close relationship between tick infestation and dairy animal productivity. Heavy tick infestation negatively affected milk yield and milk quality parameters, whereas effective control using Tick Shield resulted in significant improvements. The progressive reduction in tick load and corresponding increase in milk yield, fat percentage, and SNF highlight the importance of regular ectoparasite management in dairy farming. The findings are in agreement with earlier studies reporting that effective tick control reduces stress, blood loss, and disease transmission, thereby enhancing production performance and overall animal health. The present demonstration further confirms that Tick Shield is an effective, farmer-friendly, and practical ectoparasitic control option suitable for adoption under field conditions.

## Conclusion

The present Front Line Demonstration clearly demonstrated that application of Tick Shield is highly effective in controlling tick infestation in dairy cattle under field conditions. A significant and progressive reduction in tick load was observed following treatment, which was accompanied by notable improvements in milk yield, milk fat percentage, and solid not fat content. Effective tick control also resulted in improved animal comfort, better health status, and increased farmer satisfaction. The findings emphasize that regular ectoparasite management plays a vital role in enhancing dairy productivity and milk quality. Based on the field-level performance and farmer acceptance, Tick Shield can be recommended as a safe, economical, and farmer-friendly ectoparasitic control measure for adoption in rural dairy farming systems.

**Conflict of Interest:** Not available

**Financial Support:** Not available

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## How to Cite This Article

Ramakrishnan V, Vimalendran L, Alimudeen S. Effect of tick shield on tick infestation and milk production in dairy cattle. *International Journal of Veterinary Sciences and Animal Husbandry.* 2025;SP-10(12):122-124.

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