Studies on Cattle Health and Tick Infestation in Rural and Urban Areas of Saharanpur

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Abstract
India is an agriculture-based country where animal husbandry and dairy farming contribute significantly to the national economy and rural livelihood. Tick infestation is one of the major problems affecting cattle health and milk production in dairy farms. The present study was sconducted to investigate cattle breeds, milk production, tick infestation, and treatment practices in urban and rural areas of Saharanpur district, Uttar Pradesh, India. Data were collected through field surveys, direct observations, interviews with dairy owners, and consultations with veterinary practitioners. The study revealed that Murrah buffalo was the most dominant and preferred breed in both urban and rural areas due to its high milk yield and better adaptability. Milk production was comparatively higher in rural dairy farms because of better feeding practices, hygiene, and environmental conditions. The most common tick species identified were *Rhipicephalus microplus* and *Hyalomma* species, which were mainly observed around the ears and neck regions of cattle. Tick-infested animals showed symptoms such as anemia, weakness, fever, irritation, and reduced milk production. Commonly used anti-tick medicines included Ivermectin, Deltamethrin, and Cypermethrin, while antibiotics were mainly used for secondary bacterial infections. The findings suggest that proper farm hygiene, balanced nutrition, regular veterinary care, and effective tick control measures are essential for improving cattle health and dairy productivity.

Keywords: Dairy farming, Tick infestation, *Rhipicephalus microplus*, Murrah buffalo, Milk production, Saharanpur, Cattle health.

1. Introduction

India is an agriculture-based country where agriculture and animal husbandry contribute significantly to the Indian economy and dairy farming. They play an important role in increasing the country's income, production, trade, employment, and milk-related businesses. India has a largest cattle population in the world with over 192 million cattle (RK Pundir., 2022). Due to the COVID-19 pandemic, the country suffered economic losses, and the dairy industry was also affected. During the lockdown, cleanliness in animal husbandry farms decreased, which increased the possibility of the spread of parasites and external infections in cows and buffaloes.

Ticks are of major concern in the 21st century. There are number of research literature is available that ticks are related to the transmission of disease pathogens to human and animals (Chhillar et al., 2014, Ghosh et al., 2007, Ramzan.et.al., 2021).

Ticks are external parasites that attach to the skin of animals and suck their blood. Mainly buffaloes, cows, goats, sheep, and other

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domestic animals are affected by ticks (Debbarma et al., 2017, Patel et al., 2012, Correa-Caldero´,L.A.-R.(2002). Due to tick infestation, animals show symptoms such as anemia, pale skin, weakness, loss of body weight, and decreased. Sometimes ticks also act as carriers of various pathogens (disease-causing organisms). They can spread serious diseases from one animal to another (Soomro et al., 2014 Khalil et al., 2018, Balasubramanian et al., 2019, Ranganathan et al. 2021). The present study is proposed to examine the effect of ticks on the health of cows and buffaloes in dairy farms. In this research, we conducted a review study on the identification of ticks, analyzed their life cycle and impact on cattle's health at selective localities of Saharanpur District of U.P, India.

2. Methodology

2.1 Study Area

The present study was conducted in selected urban areas of Saharanpur city and rural areas of Behat, Saharanpur district, Uttar Pradesh, India. The region has subtropical climatic conditions favorable for tick survival and reproduction.

2.2 Study Design

The study was based on field surveys, observational analysis, and collection of information regarding cattle species, dairy farming practices, tick infestation, and animal health conditions in rural and urban areas.

2.3 Selection of Animals and Dairy Farms

Different dairy farms, cattle shelters, and household dairy units were selected randomly from rural and urban localities. Buffaloes, cows, and calves of different breeds and age groups were included in the study, with special emphasis on Murrah buffaloes.

2.4 Collection of Data

Data were collected through direct field observations, interviews with dairy owners, consultations with local veterinary practitioners, and records obtained from the veterinary hospital of Saharanpur block. Information regarding milk production, hygiene conditions, feeding practices, tick infestation, and commonly used medicines was recorded.

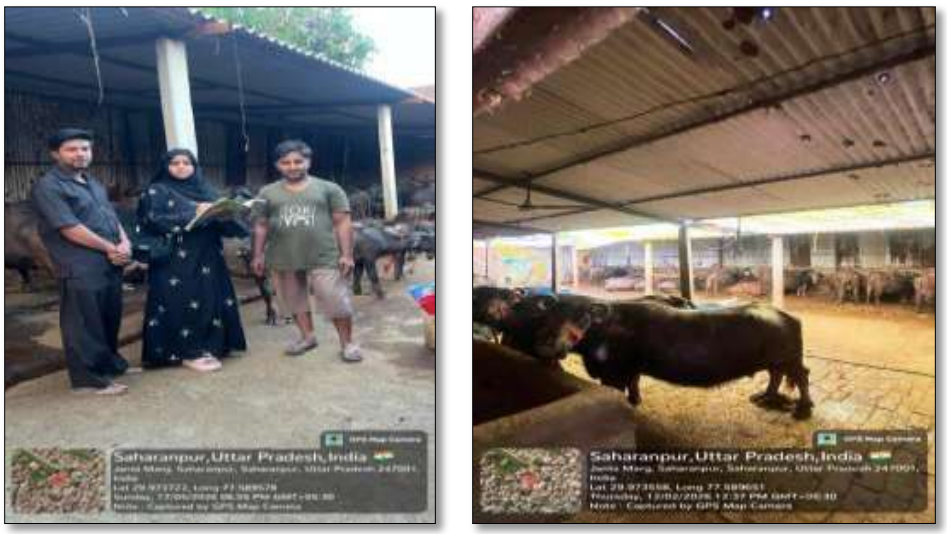

Fig.1&2: Field visit of dairies to collect information

2.5 Tick Collection and Identification

Ticks were collected manually from different body parts of cattle such as ears, neck, udder, tail region, and groin area using forceps and suitable equipment without harming the animals

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(Raktim et al., 2019). Collected ticks were preserved and identified on the basis of their morphological characteristics using standard veterinary parasitological methods.

2.6 Assessment of Health Parameters

Clinical symptoms associated with tick infestation including anemia, pale skin, weakness, irritation, weight loss, reduced appetite, and decreased milk production were observed and recorded during the study.

2.7 Information Regarding Antibiotics and Tick Control Measures

Information regarding commonly used antibiotics, acaricides, anti-tick medicines, and preventive management practices was collected from veterinary doctors and dairy farm owners.

2.8 Statistical and Comparative Analysis

Collected data were compiled and analyzed descriptively. Comparative observations were made between rural and urban areas regarding tick prevalence, farm hygiene, cattle management, and health conditions of dairy animals.

3. Results and Discussion

3.1 Commonly found breed of buffalo in Saharanpur Urban vs. rural area

As our results showed that all among the breeds, Murrah is most widely used for dairy farming, 70% in both Urban and rural area of saharanpur. Murrah is great choice for dairy farming because it produce a higher quantity of milk at lower cost and climatic conditions of Saharanpur are also favorable for adaptations to Murrah breed. After murrah, the buffalo breeds found in Saharanpur are Rajasthani and Desi almost 10-15 %. (Fig.2 and Table1) .

Table 1: showing the distribution % of cattle's breed in Saharanpur

Buffalo Breed	Distribution % in Urban Area	Distribution % in Rural Area
Murrah	50-60%	60-65%
Rajasthani	15-18	08-10%
Desi	8%	10-12%
HF Cross	5-8%	2%
Sahiwal (cow)	8%	5%
others	5-10%	3-8%

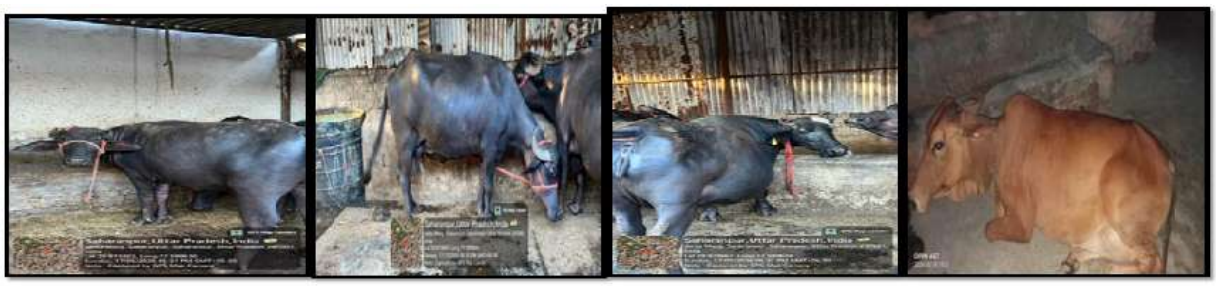

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Fig.2: images of commonly found cattle's breed in Saharanpur

3.2 Milk production highest in rural area as compared to urban area

We found in our results that after murrah, the highest milk- producing buffaloes are Sahiwal and rajasthani breed. But we found the milk producing capacity of the same breed is change in Urban vs rural area. (Table-2). In our survey, we found that the space provided in the cattle farm is quite small in urban areas as compared to rural area, that is why the cattle in the sheds are kept in close confinement (Fig.3a and b). Due to the cattle being tethered in close proximity, it becomes difficult to maintain proper hygiene among them. Apart from space, feed quality is also a separate factor for milk production. The feed given to animals in village is much fresher and green as compared to urban areas. All these results proved that milk production depends on feed quality, proper hygiene and health condition.

Table 2: showing the data of milk production by different cattle's breed

Buffalo Breed	Daily Milk Production (Liters) in Urban Area	Daily Milk Production (Liters) in Rural Area
Murrah	16–18 L	18–20 L
Rajasthani	15–16 L	17–18 L
Desi	10–12 L	12–14 L
HF Cross	22 L	24 L
Sahiwal (cow)	15–16 L	17–18 L
Jersey	12 L	14 L

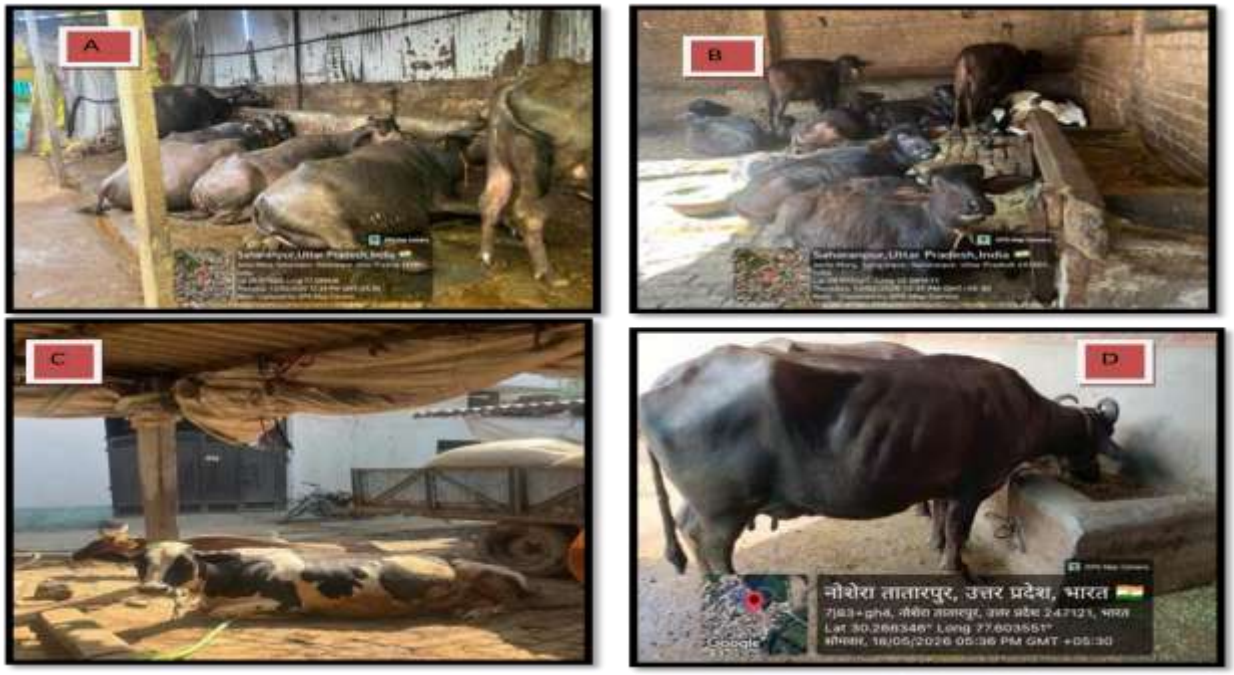

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Fig.3: (A and B) cattle farm of Urban Saharanpur, **(B and C)** cattle farm of rural area

3.3 Most common ticks found on buffalo in Saharanpur

In Saharanpur, the weather is mostly hot and humid, and during the rainy season the environment becomes very wet. In such conditions, ticks grow very rapidly on buffaloes and cows. After physically examining the buffaloes, we found that ticks usually attach near the ears and around the neck region and continue sucking blood from the body If a buffalo or cow gets bitten near the neck area, the animal may develop high fever and become weak (Vouraki.et.al.,S.2022). Based on the examination of our results, In the dairy farms and villages of Saharanpur district, the most common ticks found are *Rhipicephalus microplus* and Hyalomma type ticks..

Fig.4 : Image A, B and **C** showing ticks infection on cattles, image **D** showing *Rhipicephalus microplus* parasite seprated from cattle.

3.4 Commonly used antibiotics and Medicines to kill ticks

As we have previously discussed the results that *Rhipicephalus microplus*, an external parasite, is highly prevalent. Antibiotics are not given directly to kill this tick because it is a parasite, not a bacterial infection. However, this tick spreads many diseases. When infection occurs, veterinary doctors provide antibiotics and anti-tick medicines.

Table 3: list of antibiotics commonly used by veterinary doctors in rural and urban area.

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Common Disease	Treatment /Antibiotic Used
Mastitis	Amoxicillin
Fever	Oxytetracycline
Digestive Disorder	Sulphadimidine
Udder Infection	Ceftriaxone
Tick Fever	Ivermectin
Respiratory Infection	Enrofloxacin

As we found the data from vatenary docters and some local practitioner in village area, some medicines like Ivermectin, Deltamethrin spray and Cypermethrin are also used to kill ticks. Some medicines are given in tablet form for three months, and their effect works very quickly. One such medicine is Meloxicam, which is mostly given in November and December. It is mainly used for pain and swelling. In some cases, a 2500 mg tablet is also given as part of the treatment (Table-3).

4. Discussion

The present study revealed significant differences in cattle breeds, milk production, tick infestation, and treatment practices between urban and rural areas of Saharanpur district, Uttar Pradesh, India. Murrah buffalo was found to be the most dominant breed due to its high milk-producing capacity, adaptability, and economic importance, which is consistent with the findings of Pundir et al. (2022) (Table 1; Fig. 2). Milk production was comparatively higher in rural areas because animals were provided with better space, ventilation, fresh green fodder, and hygienic conditions, whereas urban dairy farms were often overcrowded and poorly managed (Radostits et al., 2007; FAO, 2020; Sharma et al., 2019) (Table 2; Fig. 3).

Tick infestation was highly prevalent in both urban and rural dairy animals, particularly during hot and humid climatic conditions. The most common tick species identified were *Rhipicephalus microplus* and *Hyalomma* species, which are recognized as major vectors of livestock diseases in India (Ghosh et al., 2007; Chhillar et al., 2014) (Fig. 4). Infested animals commonly showed symptoms such as anemia, weakness, fever, irritation, and reduced milk production. Anti-tick medicines such as Ivermectin, Deltamethrin, and Cypermethrin were widely used for tick control, while antibiotics were mainly administered for secondary bacterial infections (Table 3). The findings emphasize that proper hygiene, balanced nutrition, and regular veterinary care are essential for improving cattle health and reducing economic losses caused by tick infestation and tick-borne diseases.

5. Conclusions

The present study showed that Murrah buffalo is the most dominant and economically important dairy breed in both rural and urban areas of Saharanpur district due to its high milk production, adaptability, and better economic value. Rural dairy farms showed comparatively higher milk yield because of better hygiene, availability of fresh green fodder, and improved management practices. The study also revealed that tick infestation, mainly caused by *Rhipicephalus microplus* and *Hyalomma* species, is highly prevalent in cattle and buffaloes of the region and significantly affects animal health and productivity. Murrah buffaloes were found to be the most commonly affected breed in Saharanpur district. Heavy tick infestation caused weakness, anemia, fever, irritation, and reduced milk production in animals. Poor sanitation, dirty water, overcrowding, and lack of proper animal care, especially in roadside dairy shelters and village farms, were identified as major factors promoting rapid spread of ticks. Therefore, proper farm sanitation, balanced nutrition, regular veterinary care, and timely use of anti-tick medicines are essential for controlling tick infestation and improving dairy animal health and milk production.

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6. Ethical Approval Not applicable.

7. Consent for Publication Not applicable.

8. Competing Interests The authors declare that there are no competing interests regarding the publication of this research paper.

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10. Authors' Contributions

NT and PK conceptualized, designed, and supervised the study and contributed to data interpretation, manuscript review and manuscript editing. A contributed to field surveys, data collection, sample collection, data compilation, and manuscript preparation. MC and SK assisted in methodology development, data organization, statistical analysis and literature review. All authors read, reviewed, and approved the final manuscript.

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