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# Ectoparasite Management in Goats

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Goat rearing needs little investment and land, which is exactly why it supports millions of small, marginal and landless farmers across India. Yet this low-input system carries one persistent, often underestimated cost: ectoparasites. Ticks, lice, mites, fleas and flies live on the skin and coat of goats, and despite decades of chemical control, none of them can be eliminated permanently. Ectoparasites reduce milk, meat and skin production, slow growth, and cause outright mortality in severe cases (Soulsby, 1982; Yadav and Upadhyay, 2023). For farmers already operating on thin margins, this is a real and recurring drain on income, not a minor nuisance. India's goat population, the second largest in the world after China, makes ectoparasitism a problem of considerable national scale rather than an isolated farm level issue.

## Common Ectoparasites of Goats

Ectoparasites of livestock fall into two broad groups: insects, which include lice, fleas and flies, and arachnids, which include ticks and mites. In India, a two region comparison found chewing lice most common in Uttarakhand and sucking lice most common in the other agro climatic region studied, alongside fleas and Haemaphysalis ticks (Ajith *et al.*, 2017). Table 1 summarizes the main ectoparasites found on goats, their typical effect and common treatment.

**Table 1. Common ectoparasites of goats, their effects and typical treatment.**

| Ectoparasite | Common Types in Goats | Main Effect on Animal | Common Treatment |
|---|---|---|---|
| Ticks | Haemaphysalis spp., Rhipicephalus microplus | Blood loss, anaemia, transmit theileriosis, babesiosis, anaplasmosis | Acaricide dips or sprays, rotation of chemical classes |
| Lice | Chewing lice (Bovicola caprae), sucking lice (Linognathus africanus) | Pediculosis, hair loss, anaemia, poor body condition | Pour-on or spray insecticide, repeat after 10 to 14 days |
| Mange mites | Sarcoptes scabiei, Chorioptes spp., Psoroptes spp. | Intense itching, crusting, hair loss, skin thickening | Injectable ivermectin or moxidectin, topical acaricide |
| Fleas | Ctenocephalides felis | Irritation, allergic skin reaction, secondary infection | Insecticide spray, shed hygiene, bedding removal |
| Flies and maggots | Screwworm and blowfly larvae (myiasis) | Wound infestation, tissue damage, secondary infection | Wound cleaning, larvicidal dressing, fly repellent |

## Ticks: The Costliest Ectoparasite

Ticks cause the greatest economic damage of any ectoparasite in small ruminants. Beyond direct blood loss, anaemia and toxicity, ticks transmit babesiosis, theileriosis and anaplasmosis, diseases that can be fatal if untreated. Tick borne illness, including hide and skin damage that affects leather quality, is estimated to cost small ruminant farmers over 70 million US dollars a year worldwide, at a minimum of 2 US dollars per infected animal (Yadav and Upadhyay, 2023). Two regional patterns are worth knowing. Ticks concentrate heavily on the ears, nearly 90 percent of tick burden in one Indian survey against just 12 percent on the tail, since ears are hard for a goat to reach through self grooming; kids also carry fewer ticks than adults, likely from frequent maternal grooming (Gopalakrishnan *et al.*, 2017). Species also vary by climate across India's fifteen agro-climatic zones, home to 106 recorded tick species in total: Rhipicephalus microplus dominates humid West Bengal, arid-adapted Hyalomma anatolicum suits Punjab and Haemaphysalis species dominate across South India (Kumar *et al.*, 2026), meaning a strategy that works in one region cannot be assumed to work elsewhere.

## Three Diseases Behind the Tick Threat

Theileriosis, babesiosis and anaplasmosis are the three major tick borne diseases affecting Indian livestock, each with a somewhat different clinical picture. Theileriosis typically causes fever, swollen lymph nodes and rapid loss of condition. Babesiosis produces high fever, dark urine from haemoglobin breakdown and severe anaemia, and can be fatal without prompt treatment. Anaplasmosis causes jaundice, weight loss and reduced milk yield, with infected animals often carrying the organism for life once recovered, silently able to re-infect ticks that feed on them (Richey, 2019; Jacob *et al.*, 2022). A meta-analysis of Indian studies put overall theileriosis prevalence at roughly 20 percent (Krishnamoorthy *et al.*, 2021), babesiosis at around 6 percent (Jacob *et al.*, 2022), and anaplasmosis at about 11 percent based on pooled dairy-animal data (Krishnamoorthy *et al.*, 2019). These infections often stay subclinical, meaning an animal can look outwardly healthy while still acting as a silent carrier within the herd.

## A Serious Human Health Risk: CCHF

Beyond animal health, ticks on goats also carry a direct risk to human life through Crimean-Congo Haemorrhagic Fever, with a human case fatality rate reported as high as 80 percent. Transmitted mainly by Hyalomma ticks, India has recorded sporadic outbreaks since 2011 concentrated in Gujarat and Rajasthan, including a confirmed case in Sirohi and a fatal, hospital-transmitted cluster in Jodhpur that also infected several nursing staff (Makwana *et al.*, 2015; Yadav *et al.*, 2016). A national serosurvey across 22 states found CCHF antibodies in about 11 percent of tested sheep and goats (Mourya *et al.*, 2015), and a separate four-state study of cattle and buffaloes in Gujarat, Rajasthan, Punjab and Haryana found seroprevalence highest in Rajasthan at over 13 percent (Sarangi *et al.*, 2023). Herders, farmers and veterinarians are those most at risk, making tick control a matter of human safety, not only productivity.

## Lice: A Winter Problem

Lice spend their entire life cycle on the host, feeding on blood, skin debris or hair depending on the species. Chewing lice such as Bovicola caprae are especially prevalent in winter, when an infested goat typically shows dull, matted hair, weight loss and reduced body condition. Sucking lice, such as Linognathus africanus, draw blood directly and can cause anaemia in heavy infestations. A lice life cycle completes in about a month, so a single missed treatment allows the population to rebound quickly.

## Mange: A Severe Skin Disease

Mange mites burrow into or live on the skin surface, causing intense itching, crusting, hair loss and, in advanced cases, thickened, cracked skin. Sarcoptic mange is the most severe form and, left untreated, can progress to anorexia and death (Borah *et al.*, 2015). Injectable ivermectin remains the standard treatment for sarcoptic mange, typically given as a single long-acting dose to improve efficacy and reduce the number of repeat treatments needed.

## Flies and Wound Myiasis

Open wounds on goats, from injury, castration or even tick bites left untreated, can attract flies that lay eggs directly in living tissue, a condition called myiasis. Across the Indian subcontinent, the Old World screwworm fly, Chrysomya bezziana, is the main culprit. A single female fly can lay close to 175 eggs at a wound edge, and the larvae burrow head first into living tissue within a day, feeding aggressively on healthy flesh rather than dead tissue (WOAH, 2023). Newborn kids are a particular concern, since flies are readily attracted to the freshly cut navel cord. Affected goats typically show a visible wound with larvae present, lameness if a limb is affected, and systemic signs such as anaemia in advanced cases. Treatment requires physically removing all larvae, cleaning and dressing the wound, and applying a larvicidal or antiseptic preparation, with antibiotics if secondary infection has set in. Because myiasis progresses quickly, checking wounds daily during warmer, fly heavy months is far more effective than treating an established infestation.

## Climate Change Is Widening the Problem

Rising temperatures and shifting rainfall are already reshaping ectoparasite management in India. Climate change has been linked to the geographic expansion of key tick species, including Hyalomma anatolicum, Rhipicephalus microplus and various Haemaphysalis species, raising the risk of both animal and human tick borne disease, including CCHF. Hyalomma anatolicum, historically an arid zone species, has now been recorded at higher altitudes in Uttarakhand, a likely sign of climate driven range expansion (Kumar *et al.*, 2026). More broadly, warmer and more humid conditions have also been linked to heavier tick infestation in Indian livestock, with the country's annual heat stress losses in cattle and buffalo alone estimated at over Rs 2,700 crore (BusinessToday, 2016). For a state like Rajasthan, already home to extensive goat rearing across a wide range of microclimates, this makes ectoparasite surveillance an increasingly forward looking concern rather than a purely seasonal one.

## Why Chemical Treatment Alone Is Failing

For decades, Indian farmers have relied almost entirely on chemical acaricides, applied without much variation in product or dose. This approach has backfired. Field tick populations across India have developed resistance to nearly every major acaricide class in routine use (Kumar *et al.*, 2020), and studies from Gujarat's dairy belt found frequent treatment failures with deltamethrin, flumethrin and fipronil, largely because farmers applied these products inconsistently and at suboptimal concentrations (Shyma *et al.*, 2015). This resistance problem is not unique to India, and it means simply spraying more chemical is no longer a reliable answer. What is needed instead is a shift toward integrated, rotational management.

## Working Toward an Anti-Tick Vaccine

Vaccination offers a genuinely different approach to tick control, one that does not rely on killing the tick with chemicals at all. The first commercial anti-tick vaccines, built around a tick gut protein called Bm86, were registered in Australia and Latin America in the early 1990s and worked by reducing the number, weight and reproductive success of ticks feeding on vaccinated animals, with early trials also showing the antigen carried some cross-protective effect against other tick species beyond the one it was originally developed for (De Vos *et al.*, 2001). Research at ICAR-IVRI has since found meaningful genetic differences between Indian strains of Rhipicephalus microplus and the strains those original vaccines were developed against, meaning a vaccine built for Latin American or Australian ticks is not well matched to Indian ones (Kumar *et al.*, 2021). In response, IVRI scientists have been developing an India-specific vaccine combining multiple tick antigens, including Bm86, subolesin and tropomyosin, targeted at both Rhipicephalus microplus and Hyalomma anatolicum together, since goats and cattle in India are rarely infested by just one tick species

(ICAR-IVRI, 2023). This remains research stage work, not yet a product farmers can buy, but it represents a genuinely India-specific alternative to endlessly rotating chemical acaricides.

## Integrated Ectoparasite Management

Integrated management combines several tools rather than relying on any single one, and it is now the direction recommended by most veterinary parasitology reviews. Its core elements include:

- Strategic acaricide use: treating only when infestation crosses an economic threshold, rather than on a fixed calendar, and rotating between different chemical classes to slow resistance.
- Host resistance: selectively breeding goats that show natural tolerance to tick and mite infestation within a herd.
- Pasture and shed management: rotational grazing, regular removal of bedding and manure, and reducing overcrowding, all of which disrupt ectoparasite life cycles.
- Botanical and herbal alternatives: plant-based treatments that are cheaper, more accessible to smallholders, and slower to trigger resistance.
- Vaccination: anti-tick vaccines based on tick gut antigens, which reduce but do not eliminate the need for chemical treatment.

## A Homegrown Option: Neem and Nirgundi

One of the more promising developments has come from ICAR-NDRI itself. A field trial across eight villages in three districts of Haryana tested a polyherbal preparation made from neem and nirgundi leaves on 203 dairy animals across 47 farms. The treatment controlled ticks effectively, and nirgundi seedlings were subsequently distributed to 600 farmers to scale up the approach (ICAR-NDRI, 2025). The economics are striking. Farmers using the polyherbal treatment spent only Rs 140 to 240 per animal per year, compared to roughly Rs 1,440 per animal per year for conventional allopathic treatment, a nearly ten-fold cost reduction. For India's smallholder goat and dairy farmers, this kind of low-cost, locally available option matters as much as its biological effectiveness. Laboratory research elsewhere supports the broader principle, neem leaf extract mediated silver nanoparticles have demonstrated strong antimicrobial activity in controlled studies, supporting the idea that plant-based compounds can offer meaningful biological activity beyond conventional chemical treatments (Avinash *et al*., 2017). Plant extracts generally carry an added advantage, since they contain a mixture of active compounds, resistance tends to build more slowly against them than against single-molecule synthetic acaricides.

## Practical Steps for Farmers

Alongside strategic acaricide use and herbal options, a few basic husbandry practices go a long way in keeping ectoparasite levels manageable:

- Inspect goats regularly, especially the neck, ears and underbelly, where ticks and lice concentrate and self-grooming cannot reach.
- Keep sheds clean, dry and well ventilated, and remove bedding and manure frequently to break fly and flea life cycles.
- Isolate and treat newly purchased or visibly infested animals before mixing them with the rest of the herd.
- Clean and dress wounds promptly during the fly season to prevent myiasis, or maggot infestation, from taking hold.
- Avoid using the same acaricide product repeatedly; rotate between chemical classes where possible to slow resistance.

## Conclusion

Ectoparasites remain one of the most persistent, if underappreciated, threats to profitable goat rearing in India. Ticks alone cause measurable losses through blood loss, disease transmission and skin damage, while lice and mange steadily erode body condition and productivity. Decades of routine chemical use have left many populations resistant to the very products meant to control them. The way forward lies in integration rather than any single fix strategic acaricide use, herd health monitoring, better shed and pasture management, and low-cost, locally accessible alternatives such as the neem and nirgundi preparation already validated by ICAR-NDRI. For India's smallholder goat keepers, effective ectoparasite control does not need to be expensive to be effective, but it does need to be consistent and combined.

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