Biospectrum Horizons:
A Journal of Life Science Research (JASLSRI)
(An international peer-reviewed journal)
Email: editorinchief@jaslsri.org
Website: www.jaslsri.org
ISSN Online: 3139-1524

# A Comprehensive Note on Ectoparasites Affecting Domestic Fowl: a Global Perspective with Special Emphasis on India

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***Received: 20 September 2025, Revised: 25 October 2025, Accepted: 04 December 2025, Available Online: 15 December, 2025***

*https://doi.org/10.5281/zenodo.19683255*

## Abstract

Ectoparasites infesting domestic fowl (*Gallus gallus domesticus*) represent a significant and pervasive threat to the health, welfare and productivity worldwide. These ectoparasites inhabit the skin, feathers, and external surfaces of the birds. They feed on blood causes direct damage, skin irritation, and feather destruction. they also serve as vectors for viral, bacterial, and protozoan pathogens. Poultry sector in India is vast and rapidly expanding industry, encompassing both intensive commercial units and extensive backyard systems. Infestation of ectoparasite poses a substantial economic burden and a constraint to sustainable production. This review synthesizes current knowledge on the major ectoparasitic groups (lice, mites, fleas, ticks, and bugs) infesting domestic fowl globally. It covers the present status of research in taxonomy, morphology, life cycles, clinical and economic impacts, diagnostic methods, and integrated control strategies. This review paper emphasised on the need for region-specific epidemiological studies, the monitoring of acaricide resistance, and the development of sustainable, holistic management approaches tailored to diverse production systems.

## Keywords

*Poultry, Ectoparasites, Lice, Mites, Menopon gallinae, Dermanyssus gallinae, India, Poultry Health, Integrated Pest Management.*

## 1.Introduction

The domestic fowl serves as a main pillar of global animal protein production, with more than 33 billion birds reared annually worldwide. Poultry accounts for over 50% of all meat produced in India, which is seen as one of the fastest-growing agricultural sectors, with millions of farmers (mostly in rural backyard systems) involved. A variety of infectious and parasitic diseases is

continually pressing against optimal productivity. Of these, ectoparasitic infestations, whilst commonly referred to as a "hidden" or overlooked issue, are ubiquitous and insidious. Ectoparasites will cause production losses by means of reduced weight gain, decreased egg production and quality, increased feed conversion ratios, skin damage, anemia and, in extreme cases, mortality. They serve as vectors or intermediate hosts for important microorganisms including avian pox virus, fowl cholera (Pasteurella multocida) and Salmonella spp., and they can induce stress, immunosuppression and behavioural changes in infested flocks. The economic repercussions are multiple, from loss of production, to cost of prevention and the introduction of trade restrictions. The epidemiology and importance of particular ectoparasites differ substantially when placed in the highly controlled settings of intensive, high-biosecurity commercial farms, or open, scavenging backyard poultry systems common in developing countries such as India. This review offers a comprehensive systematic overview of poultry ectoparasites from an international level, together with detailing of the special research issues, challenges and management concerns in this Indian subcontinent.

## 2. Major Groups of Poultry Ectoparasites: Biology and Global Significance

### 2.1. Mallophaga (Chewing Lice)

Poultry lice are wingless, dorsoventrally flattened insects of Phthiraptera, suborder Mallophaga. They remain on the surface of the host their entire life cycle, eating feathers, skin debris, and blood from superficial capillaries. Their quick proliferation rate and perennial irritation are main causes for economic losses.

***Major Species***

1. ***Menopon gallinae*** **(The Shaft Louse):** This is the most common and smallest (1.5-2.5 mm) poultry louse globally. It feeds primarily on the feather barbules and is frequently found in dense clusters on the breast, thighs, and vent regions. It causes intense irritation.
2. ***Menacanthus stramineus*** **(The Chicken Body Louse):** A large (3-3.5 mm), yellowish louse that is particularly pathogenic. It feeds at the base of feathers, often on the skin of the breast, vent, and thigh, and can consume blood and tissue fluid, causing severe irritation, scabbing, and anemia in heavy infestations.
3. ***Liperurus caponis*** **(The Wing Louse):** Found primarily on the wing feathers, attaching its eggs in clusters to the feather barbules.
4. ***Goniocotes gallinae*** **(The Fluff Louse):** Inhabits the fluff feathers near the vent and is very small, causing less direct damage but indicating poor flock health.
5. ***Cuclotogaster heterographus*** **(The Head Louse):** Primarily infests the head and neck region, especially around the eyes and comb of young birds.

*Life Cycle:* The life cycle is simple and host-bound. The female cements her eggs (nits) in clusters to the feather shafts. Nymphs hatch in 4-7 days and undergo three nymphal stages, maturing to adults in about 2-3 weeks. The entire cycle takes about 3-4 weeks, facilitating rapid population buildup.

### 2.2. Acari (Mites)

Mites are arachnids and the most economically damaging group of poultry ectoparasites in the world. They are grouped according to their feeding site and behaviour.

**A**. **Blood-Feeding Mites (*A. Dermanyssidae*).**

1. ***Dermanyssus gallinae (*The Red Poultry Mite or Poultry Red Mite):** This is easily the most significant ectoparasite of laying hens in Europe, the Americas, and parts of Asia. It is a nocturnal, hide-and-seek parasite. During the daytime, it hides in cracks, crevices, perches and nest boxes. At night, it springs up to eat roosting birds, causing anaemia, stress, and a massive drop in egg production. That reddish colour, which converts after a blood meal, becomes grey after digesting. It can live off the host for up to 8 months, making its eradication extremely difficult. It is a known vector of *Salmonella* enteritidis and avian spirochetes.
2. ***Ornithonyssus sylviarum* (The Northern Fowl Mite):** More common in cooler climates (North America, Europe). Unlike *D. gallinae*, it spends its entire life cycle on the host, commonly clustering around the vent region. It causes blackened feathers, severe irritation, anaemia, and reduced egg production.

***B. Burrowing Mites***

1. ***Knemidocoptes mutans* (The Scaly Leg Mite):** Burrows under the scales on the legs and feet of birds, causing hyperkeratosis, lifting of scales, deformity, and lameness. It is highly contagious through direct contact.
2. ***Knemidocoptes gallinae* (The Depluming Mite):** Burrows into the feather shafts and skin at the base of feathers, typically on the back, neck, and wings, causing intense itching and feather-pulling.

***C. Non-Burrowing Mites***

1. ***Megninia spp.*** (Feather Mites): Found clasping the feather rachis, causing wear and tear.
2. ***Laminosioptes cysticola* (The Fowl Cyst Mite):** Invades subcutaneous tissues, forming small, yellowish nodules in the breast and thigh muscles that may calcify.

**2.3. Siphonaptera (Fleas)**

- *Echidnophaga gallinacea* (The Sticktight Flea): A key flea species in tropical and subtropical regions, including India. The female attaches permanently to the host's skin, especially on the comb, wattles, and around the eyes, causing ulceration, anaemia, and potential blindness. Males are free-moving. Heavy infestations can be fatal to chicks.
- *Ceratophyllus spp.* (The European Chicken Flea): More common in temperate regions, nesting in poultry litter and only visiting the host to feed.

**2.4. Hemiptera (Bugs)**

- *Cimex lectularius* (The Bed Bug) and *Cimex hemipterus* can infest poultry houses, feeding on birds at night. They cause irritation, anaemia, and can be vectors for pathogens. They hide in deep crevices during the day.

**2.5. Ixodida (Ticks)**

In warmer climates, the soft ticks of the genus Argas are of particular importance.

- *Argas persicus* (The Fowl Tick or Blue Bug) found in Asia, Africa, and the Americas. These ectoparasites lives in cracks of poultry houses, they emerge at night and feed on poultry birds. Their bite is very painful and toxic, it may cause tick paralysis and anaemia. These are primary vectors for *Borrelia anserina* (avian *spirochetosis*) and *Aegyptianella pullorum*. Heavy infestations of these parasites may cause high mortality.
- Other species include *Argas walkerae* and *Argas radiatus*.

## 3. The Indian Context: Epidemiology and Research

Poultry sector in India has dual structure: a highly integrated, technology-driven commercial and industrial sector. These two sectors are coupled with a large, resource-poor backyard poultry system that accounts for over 30% of the total poultry population. The backyard sector is primarily dominated by indigenous breeds: Aseel, Kadaknath and improved varieties such as Vanaraja. Coexistence of these two contrasting production systems strongly influences the epidemiology, spread, and persistence of ectoparasites across the country.

### 3.1. Prevalence and Diversity

Similar pattern of ectoparasitic infestation in several Indian states is reported, especially in backyard and small-scale systems where birds scavenge freely, come into contact with wild birds, and live in structures susceptible to parasitic use.

- **Lice**: There is no denying that *Menopon gallinae* is the most prevalent and abundant species in India with rates of prevalence generally reaching more than 60-70% in backyard flocks. *Menacanthus stramineus* and *Liperurus caponis* are also commonly cited. A study conducted in Uttar Pradesh revealed 86.6% of backyard chickens infected with M. gallinae (Singh et al., 2017). Studies of the field in Tamil Nadu showed that *M. gallinae*, *Goniocotes gallinae* and *Menacanthus stramineus* were the most prolific species found (Latha et al., 2014).
- **Mites**: *Dermanyssus gallinae* is a significant problem in backyard and increasingly caged layer operations across India due to its enormous impact in areas like India's backyard and caged layer operations. Research from Haryana and Maharashtra has also reported its great impact on layer productivity. *Ornithonyssus sylviarum* is also reported, but less commonly occurring. Knemidocoptes mutans (Scaly Leg Mite) is often found in backyard flocks causing the most common leg deformities.
- **Fleas**: *Echidnophaga gallinacea* (sticktight flea) is common in the warm and humid areas of southern and eastern India. Significant infestation on combs, wattles and eyelids is often seen in village chickens.
- **Ticks**: The infestations of *Argas persicus* are endemic especially in the night shelters which consist of mud walls with thatched roofs that serve as a perfect place to hide. A tick-borne avian *spirochetosis* outbreak is also frequent and associated with acute, high-mortality disease.

### 3.2. Risk Factors in India

- **Management System:** Backyard scavenging systems have a significantly higher risk than confined commercial broiler or layer farms.

- **Housing:** Poorly constructed shelters with cracks, crevices, earthen floors, and thatched roofs promote the survival and proliferation of mites, bugs, and ticks.
- **Lack of Acaricidal Treatments:** Most backyard poultry are not routinely treated for ectoparasites due to lack of awareness, cost, or access to veterinary services.
- **Seasonality:** Infestations, especially of lice and fleas, often peak during warm, humid months, though *D. gallinae* can proliferate year-round in enclosed poultry houses.
- **Multi-Species Rearing:** Co-rearing of chickens with ducks, pigeons, or other birds can facilitate cross-species parasite transmission.
- **Wild Bird Contact:** Sparrows, starlings, and other wild birds can introduce parasites like *D. gallinae* into poultry sheds.

### 3.3. Economic and Health Impact in India

The actual economic loss is difficult to quantify but is substantial. It has been estimated that ectoparasites can reduce egg production by 10-20% and cause similar losses in body weight gain. For somebody with 10-20 birds, the result is a direct reduction in household nutrition and income. The burden is further exacerbated by the cost of morbidity, mortality (particularly from tick-borne diseases), and control measures. The impact isn't just an economic one, also infested birds experience diminished welfare from constant irritation, pruritus, and stress.

## 4. Clinical Signs and Diagnosis

Indicative clinical signs:

- **General:** Restlessness, reduced preening, poor plumage condition, feather loss, skin lesions, pallor (anaemia), reduced egg production, weight loss or poor growth, increased feed intake.
- **Lice:** Visible nits on feather shafts, scurrying lice on skin, especially around vent; scabs and raw skin from scratching.
- **Red Mite (*D. gallinae*):** Anaemia and dark specks (mite faeces) on eggs, shells, and perches are the main symptoms of their infection. Mites are observed in crevices during daytime. birds reluctant to use infested nest boxes.
- **Northern Fowl Mite (*O. sylviarum*):** The main indicative feature includes Blackened, "greasy" feathers around the vent.
- **Scaly Leg Mite (*K. mutans*):** Raised, crusty, deformed scales on legs and feet; lameness.
- **Sticktight Flea (*E. gallinacea*):** Small, dark, firmly attached fleas around eyes, comb, and wattles; ulcerations are the main symptoms of their infestation.
- **Fowl Tick (*A. persicus*):** These ticks cause paralysis (flaccid paralysis), anaemia and sudden death. These are generally found in housing cracks.

The main methods of diagnosis are:

1. **Clinical examination:** General inspection of the skin, feathers, legs, vent, and head of the bird for signs of visible parasites or characteristic lesions.

2. **Parasite collection:** Use a fine comb to obtain ectoparasite load, forceps, or cellophane tape to collect suspected parasites for closer examination.
3. **Environmental inspection:** The common hiding places for mites and ticks are Cracks, crevices, perches, and nest boxes. Scraping of debris with a spatula may be done.
4. **Microscopic identification:** The louse load so obtained treated with 10% KOH and study under a microscope to identify morphological traits (head shape, setae, and tarsal claws).

## 5. Integrated Control and Management Strategies

Control must be sustainable, practical, and tailored to the production system.

### 5.1. Chemical Control

**On-Bird Treatments (for lice, mites, fleas):**

- **Dusting/Powders:** Treatment of bird with Malathion, carbaryl, Sevin dust, diatomaceous earth (mechanical action) is good for backyard birds. Dust needs to be properly applied beneath the wings and vent.
- **Sprays:** Pyrethroids (cypermethrin, deltamethrin), organophosphates (malathion), ivermectin (pour-on). Must wet the skin thoroughly. Repeat after every 10-14 days to end the life cycle.
- **Systemic treatments:** injection of ivermectin or fipronil may be used in food-producing birds.
- **Environmental/ Premises Treatments (Critical for *D. gallinae* and ticks):**
- Proper cleaning and spraying of the house with acaricides prior to restocking. In some nations even chemicals such as phoxim, fluralaner, and Spinosad are employed. Complete coverage over all cracks and crevices is vital. Empty homes may also be fumigated with formaldehyde.
- **Acaricide Resistance:** A serious and escalating problem that is becoming more and more obvious (especially for *D. gallinae*) against pyrethroids and organophosphates. Rotation of classes of chemical and integrated approach are necessary.

### 5.2. Physical and Mechanical Control

- **Extensive Cleaning:** Regular cleaning and removal of litter, debris and old feathers is one of the effective methods.
- **House Design:** Sealing cracks with sealable material, proper ventilation and installation of mite-proof nest boxes.
- **Heat Treatment:** Using flame guns or steam is more effective to treat empty poultry houses, it may kill all stages of parasites.
- **Traps:** Corrugated cardboard traps or traps with attractive volatiles can help monitor and reduce *D. gallinae* populations.

### 5.3. Biological Control

An ongoing, but less commercially adopted, aspect of ongoing research.

- Predatory Mites: ***Androlaelaps casalis*** and ***Stratiolaelaps scimitus*** prey on *D. gallinae* eggs and larvae.

- **Entomopathogenic Fungi:** *Beauveria bassiana* and *Metarhizium anisopliae* have shown efficacy against red mites in experimental settings.
- **Silicon-based Desiccants:** Diatomaceous earth and silica gels cause physical desiccation of arthropods.

### 5.4. Management and Biosecurity

- **All-in-all-out systems: In order to break the parasite life cycle b**irds are reared in batches and completely emptying the shed between flocks, followed by thorough cleaning and disinfection.
- **Quarantine and treatment:** Carefully examining and treating newly purchased or introduced birds before mixing them with the existing flock.
- **Wild bird control:** Using netting or wire mesh and discouraging roosting to prevent contact between poultry and wild birds that can carry parasites.
- **Regular monitoring:** Routinely checking birds and housing areas to detect early signs of ectoparasite infestation and take timely action.

## 6. Challenges and Future Directions, especially for India

- **Lack of Comprehensive Data:** Nationwide, systematic surveys on prevalence, species distribution, and economic impact are scarce. More epidemiological research is needed.
- **Resistance Monitoring:** There is an urgent need to establish surveillance for acaricide resistance in key parasites like *D. gallinae* across different poultry systems in India.
- **Tailored Solutions for Backyard Poultry:** Developing low-cost, safe, easy-to-apply control kits for rural farmers (e.g., herbal dusting powders, modified housing designs).
- **Herbal/Ayurvedic Alternatives:** Research on indigenous plant extracts (neem, *Pongamia*, turmeric) shows promise as eco-friendly acaricides and needs validation through large-scale field trials.
- **Farmer Education:** Extension programs to raise awareness about the impact of ectoparasites and promote integrated control practices are critical.
- **Regulatory Framework:** Clear guidelines on approved acaricides for poultry, with emphasis on withdrawal periods and food safety, need strengthening.

## 7. Conclusion

Ectoparasites of domestic fowl not only affect the vitality of host but also involve in the transmission of disease. In poultry production it is a critical global issue for bird health, animal welfare, and the economic viability. This researched area is widely and largely overlooked. It is essential to tackle it, add the ambitions that we have set for national poultry production expansion and rural livelihoods. Modern pest control practices need to move away from reactive, chemical-dependent ones towards proactive and integrated pest management (IPM) strategies. A transition like that demands the cooperation of researchers, veterinarians, extension personnel, and farmers. There is a need for improved biosecurity and housing systems, judicious and targeted application of chemical treatments, the development and application of novel biological control tools, and effective farmer education remain important. Collectively, these factors represent the means to

realize sustainable ectoparasite management and protect the health and productivity of commercial and backyard poultry systems in India and across the globe.

## 8. References


1. Chauve, C. (1998). The poultry red mite *Dermanyssus gallinae* (De Geer, 1778): current situation and future prospects for control. *Veterinary Parasitology*, 79(3), 239-245.
2. George, D. R., Finn, R. D., & Sparagano, O. A. E. (2015). Present and future potential of plant-derived products to control arthropods of veterinary and medical significance. *Experimental and Applied Acarology*, 67(4), 461-477.
3. Hoogstraal, H. (1985). Argasid and nuttalliellid ticks as parasites and vectors. *Advances in Parasitology*, 24, 135-238.
4. Jonsson, N. N., & Mayer, D. G. (1999). Estimation of the economic impact of *Dermanyssus gallinae* infestation in the laying hen industry. *International Journal of Parasitology*, 29(8), 1305-1307.
5. Kilpinen, O., et al. (2005). Influence of *Dermanyssus gallinae* infestation on the behavior of laying hens. *British Poultry Science*, 46(1), 26-34.
6. Latha, B. R., Aiyasamy, R., & Dhanalakshmi, H. (2014). Prevalence of ectoparasites of poultry in Tamil Nadu. *Indian Veterinary Journal*, 91(11), 68-70.
7. Mul, M. F., et al. (2015). Development and validation of an automated monitoring system for the poultry red mite *Dermanyssus gallinae*. *Poultry Science*, 94(1), 84-89.
8. Nayak, D. C., et al. (2018). Prevalence of ectoparasites in backyard poultry of Odisha, India. *Journal of Parasitic Diseases*, 42(2), 268-272.
9. Pritchard, J., et al. (2015). Understanding the biology and control of the poultry red mite *Dermanyssus gallinae*: a review. *Avian Pathology*, 44(3), 143-153.
10. Roy, L., et al. (2010). Diversity of ectoparasites in sylvan and domestic environments: the case of the poultry red mite. *Journal of Medical Entomology*, 47(1), 26-30.
11. Shyma, K. P., Gupta, J. P., & Singh, V. (2013). Acaricidal effect of herbal extracts against cattle tick *Rhipicephalus (Boophilus) microplus* and poultry red mite *Dermanyssus gallinae*: A review. *Journal of Parasitic Diseases*, 37(1), 1-6.
12. Singh, A. K., et al. (2017). Prevalence of ectoparasitic infestation in domestic fowl (*Gallus gallus domesticus*) in and around Meerut, Uttar Pradesh, India. *Journal of Entomology and Zoology Studies*, 5(5), 1926-1929.
13. Sparagano, O. A. E., et al. (2014). Prevalence and key figures for the poultry red mite *Dermanyssus gallinae* infections in poultry farm systems. *Experimental and Applied Acarology*, 63(1), 107-124.
14. Sychra, O., Harmat, P., & Literák, I. (2008). Chewing lice (Phthiraptera) on chickens (Gallus gallus) from small backyard flocks in the eastern part of the Czech Republic. *Veterinary Parasitology*, 152(3-4), 344-348.
15. Tomley, F. M., & Sparagano, O. A. E. (2018). Spotlight on avian pathology: red mite, a serious emergent problem in layer hens. *Avian Pathology*, 47(6), 533-535.