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## Severe infestation of *Ornithonyssus bursa* in a commercial poultry layer farm and its successful management

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**Abstract**

Mites are obligatory haematophagous ectoparasites that infesting commercial poultry farms in tropical countries. This study reports a severe infestation of *Ornithonyssus bursa* in a commercial poultry farm and its successful treatment. A poultry farmer approached with the samples containing mites, which were creating annoyance to the birds as well as farm workers in the sheds. After repeated usage of chemical acaricides, the mite menace was not controlled. On visit, it was noticed clusters of mites near bird cages, water pipelines, feeders, egg trays, particularly in the cobwebs and also on the birds. All most 90 percent of the flock (about 4.0 lakh) which was spread over in eight sheds was showing severe mite infestation. Based on the morphological features, the mites were identified as *Ornithonyssus bursa*. Preventive measures, including clearing of cobwebs by home use vacuum cleaners were advised before the acaricidal spray. Sponging with malathion in lukewarm water was done for the cages, water pipelines, feeders and other farm equipment and sprayed on poultry manure. Deltamethrin spray was applied directly on birds and on farm equipments which were close to the birds. Besides these, blow lamping was done on the walls and crevices of poultry sheds. The above treatment was done for thrice with an interval of 2 weeks and the condition was improved satisfactorily and the mite infestation was controlled completely.

**Keywords:** *Ornithonyssus bursa*, poultry, acaricidal treatment, prevention

**Introduction**

Poultry industry is one of the rapidly growing sectors all over the world providing food and employment. Rearing large numbers of poultry in a confined areas results in overcrowding with poor management aggregate severe ectoparasitic infestation. Birds act as hosts for wide diversity of ectoparasites like flies, ticks and mites. Of these, mites secure a unique place as obligatory ectoparasites infesting birds as well as farm labourers. The majority of mites infesting birds belong to the order Sarcoptiformes. Mite infestations were noticed at different parts of body of the bird like skin, feathers, quills and respiratory tract <sup>[1, 3]</sup>.

Mite infestations cause health related problems for humans, animals and poultry. Further, they cause skin irritation due to constant bites or feeding on the host. Persistent dermatitis and mite induced allergies are also common in response to the invading mites through dermis. The skin lesions predispose the birds for secondary bacterial infection which leads to death of the bird in some cases. The major breeding sites of the mites are on farm equipment such as feeders, waterers and cracks and crevices of the poultry sheds. Severe infestations of mites directly impact on economic losses by minimizing feed conversion ratio, drop in egg production and reduced body weight etc. Overall 2500 mite species belonging to 40 families were infesting on animals, birds and humans but only less than 15% were identified in the existing census <sup>[4, 5]</sup>. Among the mites invading poultry, *Ornithonyssus bursa* is common in India. It is an economically damaging ectoparasite without bird's blood usually may not survive longer than ten days <sup>[6]</sup>. In this study, a high level of mite infestation was noticed in a commercial poultry farm and workers. Preventive measures applied were unable to suppress the infestation. Based on the comprehensive analysis of data on the condition, and its remedial measures against mite infestation restored the poultry farm output.

**History**

A poultry farmer approached the Department of Veterinary Parasitology, College of Veterinary Science, Sri Venkateswara Veterinary University, Tirupati with the samples containing miniature

ectoparasites, which were creating annoyance to the birds as well as farm workers. Even after repeated chemical acaricide treatments with deltamethrin and malathion under the supervision of a poultry veterinarian, the mite menace was uncontrolled. On visit to the farm, observed severe rashes on the skin of the farm workers and were reluctant to work in the poultry sheds.

Mites were noticed in clumps in the cobwebs near the bird cages, water pipelines, feeders, egg trays and also on the birds. All most all the birds (about 4.0 lakhs) with different age groups in 8 sheds were showing severe mite infestation.

All most 90% of the birds were showed the symptoms of severe mite infestations particularly around the vent region; ruffled feathers and dirty appearance of the birds were noticed with restlessness and frequent vent pecking.

On careful examination of birds and cobwebs, numerous clusters of mites were noticed and anamnesis revealed that there was a drop in egg production by 10 to 15 percent.

### Materials and Methods

The samples of cobwebs with mites in clusters which were noticed on various farm equipments and on birds were carefully collected into screw capped plastic sample containers.

Some of the samples were collected in 70 percent ethanol. The samples were collected carefully removing some of the feathers of infected birds, by disrupting cobwebs around the feeders, waterers and even from the litter material into a screw capped bottle.

These collected samples were brought to the laboratory and processed as per standard procedure [6, 7]. Briefly, the mites were gently dusted in the sample bottle by removing the feathers and other visible debris particles. The mites were carefully transferred into a boiling test tube and added sodium hydroxide (NaOH, 10% w/v) solution till the sample is completely merged.

The test tube was left undisturbed for overnight, and then the solution with partly cleared mites were transferred into a centrifuge tube and centrifuged at 1000 rpm for 5 minutes. After centrifugation, the mites in the bottom were placed on to a clean microscopic glass slide and added a drop of lactophenol and allowed for few minutes to visualize morphological features clearly.

Finally placed a cover slip and examination was carried out initially under a low magnification (100x) and then high magnification (450x). Based on the morphological features the mites were identified [6, 8].

### Results

The processed mites were identified as *Ornithonyssus bursa* (tropical fowl mite) belong to super order: Parasitiformes, order: Mesostigmata, family: Macronyssidae, sub family: Macronyssinae and genus: *Ornithonyssus* (Sambon, 1928) and the species, *O. bursa*.

The mite, *Ornithonyssus bursa* is also a Dermanyssoid mite but categorized under family Macronyssidae. The characteristic morphological finding observed were, the dorsal plate was wide up to one thirds of the body and suddenly tappers to form a tongue like blunt posterior end (Figure 1 and Figure 2).

Another significant characteristic feature noticed was the position of anus at the anterior half of the anal plate confirms the *Ornithonyssus bursa* (Figure 3).



Fig 1: Cluster of mites



Fig 2: *Ornithonyssus bursa*



Fig 3: Anus situated at anterior half of the anal plate (ventral aspect, posterior part)

Initially before the commencement of acaricidal treatment cleared cobwebs and other dust all along the length of the poultry sheds, feeders, waterers and bird cages etc., by home use vacuum cleaners. Sponging with malathion (@ 0.4% emulsion) with lukewarm water was done for the cages, water pipelines, feeders and other farm equipment viz., egg trays, cracks, crevices of the sheds and poultry manure. Deltamethrin was sprayed directly on birds at the concentration of 50 ppm. Upon treatment the heavily infested birds were separated from the rest of the flock and treated separately by dipping them in medicated water with deltamethrin at the rate of 50 ppm concentration.

The acaricidal treatment was done for thrice with an interval of two weeks. In addition to this, blow lamping was done weekly twice for a period of 8 weeks on the outside walls of the

poultry sheds. After adoption of these preventive measures, the farm condition was improved drastically and the mites were disappeared. Post treatment observations include, the health condition of the poultry farm was restored to normal. The egg production also restored back to close to 90% from the declined level of 80% during the severe mite infestation after 4-6 weeks of post treatment. No other signs were noticed in the farm workers except “delusory acariosis” in the children of the farm workers.

### Discussion

*Ornithonyssus bursa* is one of the commonest mite infestation noticed in the tropical poultry farms with neglected managerial practices. These mite populations can become very high on birds because of their life cycle and their presence is problematic for the producers. In the present paper, severe infestation with *O. bursa* was reported in a commercial poultry farm in Andhra Pradesh. Similar kind of study was reported earlier in six of commercial layer poultry farms in Namakkal region<sup>[9]</sup>. *Ornithonyssus bursa* infested birds exhibit clinical signs like pruritus, hyperkeratosis, and structural damage of feather integrity<sup>[10, 11]</sup>. Commercial poultry layer farms of tropical countries were constantly infested with mites such as *O. bursa*<sup>[12]</sup>. In a survey on the mites infesting in poultry farms in and around Hyderabad identified *Dermanyssus gallinae* and *O. bursa* as the predominant mite infestation<sup>[13]</sup>, while in another study observed the occurrence of *O. bursa* infestation in Japanese quails in Namakkal<sup>[14]</sup>.

Besides infesting to poultry, *O. bursa* also infest the people working in poultry farm and revealed its zoonotic potential. Severe itching, pruritus and prolonged painful dermatitis were noticed in farm workers which results in occupational zoonoses of these hematophagous mite infestation<sup>[15]</sup>. In a study reported, reduction in egg production and also observed irritation, prolonged itching, reddening of skin and painful dermatitis in farm workers due to *O. bursa* infestation in Namakkal<sup>[9]</sup>.

This is in accordance with the present observations particularly reduction of egg production in birds and severe pruritic rashes on the skin of the farm workers.

Along with the painful bite, these mites also act as vector in transmission of viral, rickettsial and protozoan infections among the birds. *Ornithonyssus bursa* infests vertically transmitted diseases viz., avian borreliosis as each female mite transmits the infection to its offspring<sup>[16]</sup>. Regarding preventive measures, in a study successfully controlled the *Ornithonyssus bursa* mite infestation and restored egg production in commercial poultry farms by six percent<sup>[9]</sup> by application of cypermethrin on birds on 0, 3 and 7 days interval. Similar observations were found in the present study, where three applications of malathion and deltamethrin along with cleaning of cobwebs led the control of *Ornithonyssus bursa* mite infestation and restoration of egg production. Control of *O. bursa* infestation in poultry farms is a challenging one to the field veterinarians by simple application of chemical acaricides alone. But involvement of prior cleaning of cobwebs is essential to expose the mites to the acaricides which facilitate the proper contact thereby better prevention. This strategy was followed in the current study and successfully managed the mite infestation.

### Conclusion

In conclusion, the present report indicated, *Ornithonyssus bursa* is an alarming hematophagous ectoparasitic infestation among commercial layers and broiler poultry farms of tropical countries particularly in India. Proper control measures to be

employed to avoid economic losses. The public health importance of these mite infestations should be advised to poultry farm workers. Before application of any chemical acaricidal treatment, cobwebs and other dust to be removed completely to enhance the drug effect on the mites.

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### Disclosure of statement

No potential conflict of interest was reported by the authors.

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