An overview on ectoparasites of poultry

Dr. T.J. Harikrishnan, M.V.Sc., Ph.D.,
Professor and Head,
Department of Veterinary Parasitology,
Veterinary College and Research Institute,
Namakkal-637 002
E.mail:tjhkrish2007@rediffmail.com

Undetected infestations by external parasites in poultry flocks can lead to serious loss in the form of decreased egg production, decreased growth, inefficient feed conversion and mortality in severe cases. Constant monitoring of the flock, through physical examination of the external surfaces of each bird's body, is the first step in detecting and preventing external parasites. Learning to identify and treat the most common ectoparasites in poultry flocks can prevent losses in poultry enterprise.

Chickens and other fowls harbor only chewing lice. Although many species of lice infest poultry (at least six on chickens and two on turkeys), the major species of concern is the **chicken body louse**. Some species can be localized on specific locations like the quill lice; or others can be found over most of the body surface like the chicken body lice. The lice found on poultry do not suck blood as the lice found in other species of animals; rather they feed on dry skin scales, feathers, and scabs. However, they will ingest blood extruding from irritated skin. The entire life cycle of the lice occurs on the host bird, primarily in the feathers. Poultry lice are host specific and cannot be transferred to humans.

Fall and winter are the most common times to observe lice infestations excepting the large turkey louse which is more common in summer. Body lice on

chickens are found close to where the feathers meet the skin. The nits (eggs) are white clusters on the feather shafts. The lice are yellowish-white and can be seen on feathers and skin. They feed on skin scales. Inspect the ventral region of the bird for live lice crawling on the bird and for nits (lice eggs) as most infestations start in this area of the bird's body. Eggs are white and commonly appear in bunches on the lower feather shaft. Feathers of infested birds may have a moth-eaten appearance. Due to the feather damage, the bird may have a dull or roughened appearance. Turkeys may also be infested with chicken body louse. Chicken body lice can heavily infest hens in caged layer houses. Some authorities estimate that louse infestations cause as much as 46% decrease in egg production. Lice can be found on poultry by direct examination of skin and feather shafts. Louse control on poultry requires pressurized spray applications of wettable powder or emulsifiable concentrate insecticides to the bodies of birds. Dusts or other appropriate insecticide formulations must be applied to the nest boxes and litter at the same time the birds are being treated. Treating one and not the other will not result in an effective louse control program.

There are two major types of mites found on the body of poultry. They are the Tropical Fowl Mite (or in temperate environments, the Northern Fowl Mite) and the Chicken Mite (or Red Roost Mite). The Tropical Fowl Mite sucks blood from all different types of fowl and can live in the tropical regions of the world. As compared to the Chicken Mite, the Tropical Fowl Mite primarily remains on the host for its entire life cycle. These mites can live off the host bird for 2 to 3 weeks. These mites are small and black or brown in color, have 8 legs, and are

commonly spread through bird-to-bird contact. The Northern Fowl Mite is comparable to the Tropical Fowl Mite but lives in the temperate regions.

The Chicken Mite is a nocturnal mite that is primarily a warm weather pest. These mites suck the blood from the birds at night and then hide in the cracks and crevices of the houses during the day. Chicken Mites are dark brown or black, much like the Tropical Fowl Mite. The life cycle of mites can be as little as 10 days, which allows for a quick turnover and heavy infestations. Mites can be transferred between flocks by crates, clothing, and wild birds. Mites are capable of living in the environment and off the host bird for a period of time. Diagnoses of mite infestations are similar to that of lice; however since mites can live off the bird and some are nocturnal, inspect birds and housing facilities at night especially if you suspect that the Chicken Mite is the cause of the infestation. Observable signs may include darkening of the feathers on white feathered birds due to mite feces; scabbing of the skin near the vent; mite eggs on the fluff feathers and along the feather shaft; or congregations of mites around the vent, ventral abdomen, tail, or throat. Since mites congregate around the ventral region, they can also reduce a rooster's ability of successful mating.

Feather Mites

These live between the barbs on the ventral surface of feathers. The entire life-cycle is spent on the bird. As with lice, species appear host-specific and also prefer certain niches on the bird, eg. on the budgerigar, *Protolichus lunula* is found on wing and tail feather while *Dubininia melopsittaci* is found on

smaller body feathers. Over 1400 species have been described and the common feather mite of chicken is the *Megninia* species. Most are not directly damaging to feathers (though *Falculifer rostratus* may damage feathers on the wings of pigeons) and light burdens generally cause no problems. It is proposed that mite burdens are kept low by the beating of the wings and that large numbers build-up when birds are too debilitated to flap wings (Atyeo and Gaud 1979). In these situations mites may move off the feathers and onto the skin causing considerable irritation. This can result in loss of productivity in poultry. Adult mites are easily seen as dark dots on feathers. They may be gathered on acetate strips. Discarded sheds of nymphs may be found in the plumulaceous barbs.

Flocks infested with lice or mites show similar general symptoms. Birds will have decreased egg production; decreased weight gain; decreased carcass-grading quality; increased disease susceptibility; and decreased food intake. If any of these generalized symptoms are observed, a visual evaluation is recommended. Inspect birds around the ventral region for signs of lice or mites since infestations usually start in this area of the bird. Detecting and monitoring the mite population level is an important factor for effective control. A minimum of 10 randomly selected birds should be examined for mites weekly. Infestation levels can be estimated by blowing on the bird's feathers and counting the mites that are immediately seen. The following index can be used to estimate mite infestation levels:

- 5 mites counted = Bird may be carrying from 100 to 300 mites

- 6 mites counted = Bird may be carrying from 300 to 1,000 mites (light infestation)
- 7 mites counted = Bird may be carrying from 1,000 to 3,000 mites - small clumps of mites seen on skin and feathers (moderate infestation)
- 8 mites counted = Bird may be carrying from 3,000 to 10,000 mites - accumulation of mites on skin and feathers (moderate to heavy infestation)
- 9 mites counted = Bird may be carrying 10,000 to 32,000 or more mites - numerous large clumps of mites seen on skin and feathers; skin pocketed with scabs (heavy infestation

Once the mite has been identified, an appropriate treatment can be determined. These treatments may involve spraying pesticides and chemicals on birds, nests, litter or in the building. Mites can be located along cracks and crevices of the roost areas and poultry house, and eliminated by spraying pesticides in these infested areas two or three times for several weeks. Spray roosts and other equipment in the house. Remove nesting material and spray nest boxes inside and out. Allow time for drying before adding new nesting material.

Sanitation and cleanliness are the keys to lice and mite control. Sanitation includes cleaning and disinfecting housing facilities and equipment between flocks. Moreover, reducing people traffic through housing facilities is recommended. Mites are most commonly transferred to chickens, turkeys and gamebirds through wild birds such as sparrows, starlings, swallows and pigeons roosting or nesting in the poultry house. Eliminating the contact between flocks and wild birds can reduce the potential transfer of external parasites. Rodents have also been known to transfer mites to poultry. Mites can live off the host for several weeks to months; thus, clothes, hands and egg flats are minor sources of

mite transfer. Early detection of mites by regular monitoring of the flock is the best control of mite infestation.

Treatment by Pest and Location of Infestation					
Pests	**Material and Formulation**	**Mixing Directions**	**Amount per bird or Area if Appropriate**	**Days to Slaughter**	**Application and Remarks**
	Mist Sprays				
	carbaryl (Sevin) 50% WP	10 fl. oz. per gal. water	1 1/2 gals. per 1,000 birds	7	Repeat treatment in four weeks if needed. Ventilate while spraying. Do not spray nests, eggs, feed or water. Do not treat within 10 days of vaccination or other stress influence.
	80% S	6 fl. oz. per gal. water		7	
	4F (43% suspension)	10 fl. oz per gal. water		7	
	tetrachlorvinphos & dichlorvos (Ravap) 28.7% EC	1 pint per 6 gals. water	1 gal. per 100 birds or 1 fl. oz. per bird	0	For cage birds, spray no less than 100 to 125 psi to the vent area from below (high pressure). For floor birds, spray lightly. Do not treat more often than every 14 days.
	tetrachlorvinphos (Rabon) 50% WP	2 lbs. per 25 gals. water	1 gal. per 100 birds or 1 fl. oz. per bird	0	For cage birds, spray no less than 100 to 125 psi to the vent area from below (high pressure). For floor birds, spray lightly. Do not treat more often than every 14 days.
	Coarse Sprays				
	carbaryl (Sevin) 50% WP	6 fl. oz. per 5 gals. water	1 gal. per 100 birds	7	Repeat treatment in four weeks if needed. Ventilate while spraying. Do not spray nests, eggs, feed or water. Do not treat within ten days of vaccination or other stress influence.
	80% S	4 fl. oz. per 5 gals. water		7	
	4F (43% suspension)	6 fl. oz. per 5 gals. water		7	
	Dusts				
	carbaryl (Sevin) 5% Dust	Ready to use	1 lb. per 100 birds	7	Use rotary or other duster. Do not treat birds more often than once every four weeks. Do not treat nests, eggs, feed or water.
	Dust Boxes				
	carbaryl (Sevin) 5% Dust	Ready to use	2.5 lbs. per box 1 box per 50 birds	7	Mix dust evenly throughout top layer of box contents.
	tetrachlorvinphos (Rabon) 50% WP	Ready to use	2.5 fl. oz. per 50 birds	0	Mix dust evenly throughout top layer of box contents.

Chemical control can include the use of carbaryl (Sevin®). Treat the walls, floors, roosts, nest boxes, and the birds simultaneously. When dusting an entire house, be careful to avoid feed contamination. One treatment method for small flocks or individual birds is the use of a dusting bath with Sevin®. Place the bird into a garbage bag containing the medicated powder with the birds' head out and rotate/shake the bag to completely cover the bird with powder. The use of a facial mask is recommended to prevent inhaling this medicated powder. Because the life cycle of lice and mites is approximately 2 weeks, treatments should be repeated every 2 weeks as needed.

Scaly Leg Mites

Scaly leg mites are tiny, round, flat-bodied mites that can be found under the scales of the infested bird's feet and lower legs. They burrow under the skin, causing the legs to look aged, swollen and deformed. If left untreated, the skin will crack and may cripple the bird. Treatment involves dipping the legs in linseed oil and wiping them clean, then coat with petroleum jelly. Pesticides can be mixed (at spray dilution rates) with medicinal oils and applied topically to infected areas. These techniques should be repeated once or twice a week for several weeks. Do not use fuel oil, kerosene, motor oil, or other petroleum products on the birds at any time. Most poultry judges consider a scaly leg mite infestation to indicate a lack of proper management by the exhibitor.

Depluming Mites

Depluming mites are closely related and similar in appearance to scaly leg mites. They infest the bird's skin at the base of the feathers and are most

common in small, noncommercial flocks. As with scaly leg mites, once on the host they seldom leave. Their feeding activity causes intense itching to which the infested bird responds by picking at the mites and plucking feathers from the infested sites. Self-depluming and apparent molting at the wrong time of year may indicate infestation by depluming mites. Secondary problems that may be associated with depluming mites are bacterial skin infections and cannibalism. No insecticide is labeled specifically for control of depluming mites, but the permethrin spray and dust (or bird dipping) treatments used to control northern fowl mites may also control depluming mites.

Quill Mites

Most species live and reproduce in quills where they feed on available secretions and detritus. The exception is Syringophilid mites which penetrate the quill and suck tissue fluid. In large numbers these may cause feathers to break easily and may predispose to follicle and pulp infections. The damaged quills appear opaque instead of being transparent. Opening the quill and examining contents microscopically will reveal mites and eggs.

Bedbugs

The common bedbug and several other closely related insects feed on poultry. They are flat, wingless, blood-sucking insects that are about 1/5 inch long when fully grown. They have a very distinctive pungent odor when crushed. Bedbugs feed at night, hiding and laying eggs behind insulation, in wall cracks, loose boards, nests and other dark areas during the day. At night they move to

sleeping birds and suck their blood. Small, dark fecal spots around cracks, roosts, and on chicken eggs frequently are observed. Bedbugs can be carried into poultry houses by other birds or into human dwellings where they become a pest of humans. Control must be directed inside the housing facilities.

Bedbugs	carbaryl (Sevin)				
	50% WP	2 lb/25 gal water	1 gal/700 sq ft	7	Do not apply directly to poultry, nests, or eggs. Repeat as needed.
	80% S	1 1/2 lb/25 gal water	1 gal/700 sq ft		
	43% F	1 qt/25 gal water	1 gal/700 sq ft		
	5% D	ready to use	1 lb/40 sq ft		

Other Insect and Mite Pests of Poultry

Other blood feeding insects or mites that may occasionally be pests of poultry include: chigger mites, biting midges, and black flies (turkey gnats). Chiggers may be a problem where turkeys are kept on open range. Chiggers often are covered with dense, feathered hairs that give them a velvety appearance. They are often bright red with a figure eight-shaped body about 1 mm long. The larvae are small (1/150 inch long) and reddish or straw in color. Chiggers feed in clusters on the thighs, breast, underside of the wings, and around the vent. Feeding by the chigger (larvae) creates scabby, reddish lesions that require two to three weeks to heal after the engorged mites leave the bird. Chiggers are most efficiently controlled by treating the range with insecticides before releasing the turkeys; however, repeated treatments may be necessary if the turkeys remain on the range more than a few weeks.

Many of the chemicals used for controlling ectoparasites of veterinary importance are neurotoxins that selectively target the arthropod nervous system.

Such neurotoxins have suffered from a number of drawbacks, including development of resistance in ectoparasites and concerns over human and environmental safety. Recent developments include the introduction of insect-growth regulators and improved methods of product application. Compounds active against ectoparasites can be broadly categorized into larvicides (for environmental control of ectoparasites) and adulticides (which act on the parasitic stage on the host). Some compounds can even have both larvicidal and adulticidal properties. The majority of veterinary products contain new actives, such as the insecticides fipronil, imidacloprid and selamectin, and the insect-growth regulators lufenuron and pyriproxifen. In addition to spot-on formulations, there are sprays, injectables, tablets and collars.

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