

Poultry External Parasite and Pest Control

External parasites such as fleas, ticks, lice, and mites are a concern for both commercial and small flock poultry producers. Other pests such as flies and beetles are a major concern for bird health and food safety. Integrated pest management programs involving identification of the parasite or pest, prevention, use of approved and alternative pesticides or insecticides, and routine monitoring are critical to successful parasite and pest control in poultry production.

Lice

There are several species of lice that attack chickens, ducks, turkeys, and other domestic fowl; but it is important to note only chewing lice (e.g. *Menacanthus* spp) infest birds. These lice do not suck blood, but rather chew dry skin scales, feathers, or scabs on the skin (Figure 1), although some lice species have been documented to blood feed from pin feathers. Although economic impact is not determined, louse infestation may be damaging to young birds in terms of growth and feed conversion. These parasites are relatively host-specific, feeding on poultry only, and often die soon after being removed. Louse eggs (Figure 2) are laid on host feathers, and lice complete their life cycle from egg to adult in 2-7 weeks. Over 40 species of lice are reported from birds, but most of these are rare on commercial flocks. The most common occurring lice include chicken body louse (*Menacanthus stramineus*), small body louse (*Uchida pallidula*), and chicken head louse (*Cuclotogaster heterographus*).



Figure 2. Louse egg packets (nits) at the base of the feathers. (Image by Yuko Sato)

Mites (northern fowl mites, scaly leg mites, chicken mites)

Poultry mites can cause economic issues beyond constant irritation, including stunted growth, reduced egg production, damaged feathers, anemia, and even death. There are a few mites of interest to poultry producers: northern fowl mite (*Ornithonyssus sylviarum*), poultry red mite (*Dermanyssus gallinae*), scaly leg mite (*Knemidokoptes mutans*), and depilating mite (*Knemidokoptes gallinae*). Many of these mites are blood-sucking and can hide in cracks and crevices of equipment and buildings when they are not on the host.

Northern fowl mites are by far the most common type of mite both commercially and in backyard flocks. These



Figure 1. A laying hen with heavy louse infestation. (Image by Yuko Sato)



Figure 3. Northern fowl mites on a laying hen. (Image by Yuko Sato)

Table 1. Available insecticides for louse infestation. Consult the label prior to use of any insecticide to insure the product is currently labeled by the Environmental Protection Agency (EPA) and cleared for use.

Insecticide	Brand name	Use	Amount per bird	Additional notes
Permethrin	Permethrin II	Spray, mist, fog	1 gallon/100; 1/2 oz/bird	Has 30-day residual effect
	GardStar	High pressure spray	1 gallon coarse spray/100 birds	
	Insectrin X, Prozap	Spray, fine mist	Dilution of 9-14 oz/gallon water for premises +/- birds	
Pyrethrins	PyGanic (OMRI listed – meets organic requirements)	Spray/fine mist	Dilution of 9-14 oz/gallon water for premises +/- birds	House treatment followed by spraying over birds with fine mist. Do not apply more than 1 time per day.
Tetrachlorvinphos + dichlorvos	Ravap EC	23% +5.3%, emulsifiable concentrate	1 gallon/100 birds in cages	Chickens on litter at 1-2 gallon dilution/1000 sq ft. Also for poultry houses for controlling house flies, ticks, gnats, mosquitoes, darkling beetles, ants/spiders, and others.
Tetrachlorvinphos	Rabon 50	Wettable powder or spray	1 gallon/100 birds; 1 gallon/500 sq ft premise	Also for litter beetles and fowl tick (blue bug)
	Beetle Shield 6	Dust or plunger	1 lb/600 birds for wire cages; 1 lb/100 birds in dust box	Also works for darkling beetles. For group and individual treatment.
Malathion	Malathion 50	Spray	For premise use only; 175 mL/10L water (also for chicken mite, NFM)	Do not apply directly to birds. Avoid contamination of food and water. Avoid exposing birds to drafts after spraying. Do not apply to poultry within 1 week of slaughter.

blood-sucking mites mature quickly, going from egg to adult in as few as 4-5 days, allowing explosive infestations. Their feeding causes inflammation and scabbing of skin, resulting in itching, irritation, and production loss. These mites are not host specific and can reproduce on any bird species. In addition, while they cannot survive on non-bird hosts, they can move to people or other animals and attempt to feed, causing irritation and itching. They can also “hitchhike” on equipment, personnel, and other pests such as house mice, making biosecurity critical in managing these mites.

Poultry red mites are also blood-sucking mites, but predominantly feed at night and otherwise hide themselves in cracks and crevices of equipment and buildings. These mites can live up to several months even without the host (chicken) present. Red mites are a persistent issue in many operations in Europe and could become an emerging issue in commercial production in the United States with the increase in cage-free housing systems. Red mites are endemic in wild birds and are already found in backyard flocks in the U.S. Egg production, fertility, and feed efficiency are among the most common problems with red mite infestation. They may also cause skin irritation to people.

Scaly leg mites are rare in commercial flocks but are common in backyard poultry. These small mites burrow into the skin of a bird’s shanks and feet to feed and reproduce. The host’s immune response likely causes the scales to stick out. If left untreated, scaly leg mite lesions can cause permanent leg and claw deformities as well as lead to secondary infections. Typical treatments include dipping limbs in mixtures of oils (e.g. Vaseline, linseed oil, kerosene) or dish soap weekly to suffocate the mites. This mite is fairly host specific but related species can infest wild birds as well as other domestic birds.



Figure 4. Normal foot (left); chicken with scaly leg mite (right). (Image by Yuko Sato)

Table 2. Available insecticides for mite infestation (varies by state). Consult the label prior to use of any insecticide to insure the product is currently labeled by the EPA and cleared for use.

Insecticide	Brand name	Use	Amount per bird	Additional notes
Permethrin	Atroban	Sprayer	1 gallon coarse spray/100 birds	For Northern fowl mites (NFM)
	GardStar	High pressure spray	1 gallon coarse spray/100 birds	For NFM and lice
	Permethrin fly and louse dust	Dust	No more than 1 lb/100 lbs, cover vent area	For NFM
	Insectrin X, Prozap	Spray, fine mist	1 gallon/100 birds	Poultry mites, NFM
Spinosad	Elector PSP	Spray (NFM) Bait (others)	1 gallon coarse spray/100 birds	Also controls house flies, stable flies, little house flies, darkling beetles, hide beetles
Tetrachlorvinphos	Rabon 50	Wettable powder or spray	1 gallon/100 birds; 1 gallon/500 sq ft premise	Also for litter beetles and fowl tick (blue bug)
	Beetle Shield 6	Dust or plunger	1 lb/600 birds for wire cages; 1 lb/100 birds in dust box	Works for both NFM and other chicken mites. As well as darkling beetles
Sulphur	Poultry Shield	Spray	For premise use only	20 gallons/20,000 sq ft (1-2 gallons/100 gallons water) to control depluming mites. Also works to control darkling beetles and as a pH amendment (ammonia).
Diatomaceous earth*	Perma-Guard Red Lake DE, etc.	Dust or Slurry	For premise use only	Also for bedbugs, mites, litter beetles (darkling beetles), and hide beetles at 4 lbs/1000 sq ft or 20% slurry solution.
Pyrethrins	PyGanic (OMRI listed – meets organic requirements)	Spray/fine mist	Dilution of 9-14 oz/gallon water for premises +/- birds	Spray premise, followed by spraying over birds with fine mist. Do not apply more than 1 time per day.
Malathion	Malathion 50	Spray	For premise use only; 525 mL/10 L water	Do not apply directly to birds. Avoid contamination of food and water. Avoid exposing birds to drafts after spraying. Do not apply to poultry within 1 week of slaughter.

*Anecdotal evidence, some literature indicate the potential for DE to help control northern fowl mites.

Depluming mites burrow into the skin at the base of the feathers and cause itching and irritation, resulting in birds pulling their feathers. These mites are very small and hard to see with the naked eye.

Other external parasites and pests

There are other external parasites of concern such as ticks, chiggers, bed bugs, and fleas, although these are less common than mites or lice.

Chiggers (e.g. *Trombiculid* mites) are a problem for birds that are kept outdoors, and are often found under the wings, around the vent, on the head around the eyes, and on combs and wattles. Irritation and dermatitis is visible in heavy infestations, sometimes leading to trims and salvages during processing.

Bed bugs (*Cimex lectularius*) can be a major problem in commercial poultry operations, especially in broiler breeder houses and in aviary and other free-range housing. These pests can spread from house-to-house since bed bugs can hide in boxes, bags, shoes, and clothing of the farm employees. These bugs will feed on poultry at night and hide in cracks and debris within the houses during the day, often hiding in corners of nest boxes and egg transport boxes. Heavy infestations may lead to excessive feather loss, irritation of the cloaca, lesions on the breast and legs, anemia, loss of production, and egg spots from bed bug feces. Treatment must target the corners of the buildings and be repeated approximately two weeks after initial treatment to kill the eggs. Alternatively, heat treatment (>130°F for a few hours) in combination with insecticides outside the building can be used when there are no birds in the facility.



Figure 5. Darkling beetle larvae (top), pupae (second), and adults (third). A broiler crop filled with darkling beetles from a heavily infested house (bottom). (Images by Jim Arends)

Sticktight fleas (*Echidnophaga gallinacea*) are a non-host specific flea that can cause irritation, restlessness, and blood loss in chickens, turkeys, pigeons, pheasants, quail, people, and many other mammals. Sticktight fleas can cause blindness in birds through bites around the eyes, and could be potentially lethal, especially in young birds. Since they develop in litter, removal of infested litter and treatment of litter are effective means of controlling the flea.

In poultry houses, environmental parasites such as mosquitoes, flies, gnats, and lesser meal worms (i.e. darkling beetles) are much more of a problem due to their ability to carry other diseases such as viruses and bacteria (e.g. *Salmonella* spp). Mosquitoes and flies are known to be vectors of viruses such as fowl pox virus as well as other internal parasites (e.g. tapeworms). Gnats and black flies (e.g. *Simulium* spp) are bloodsucking pests that



Figure 6. Black fly (turkey gnat, *Simulium meridionale*) on a turkey. This species is perhaps the most notorious and injurious black fly species in central North America and is a well-known poultry pest. (Image by Jim Arends)



Figure 7. Turkey gnats occluding trachea and esophagus in a laying hen. The insects can suffocate the bird or cause anaphylaxis from many blood-sucking bites on non-feathered area. (Images by Alyona Michael, USDA-APHIS)

Table 3. Available Insecticides for other external parasite. Consult the label prior to use of any insecticide to insure the product is currently labeled by the EPA and cleared for use.

Insecticide	Brand name	Use	Label	Target species
Cyfluthrin	Tempo SC, WP, etc.	Dust, Wettable Powder, Liquid	For premise use only	House flies, ticks, gnats, mosquitoes, darkling beetles, bed bugs, ants/spiders, etc.
Permethrin	Atroban, Ectiban, Permethrin II, etc.	Sprayer	For premise use. Remove birds before treatment.	Flies, ants, roaches, spiders, mosquitoes, crickets, face flies
Cyromazine	Larvadex	In-feed, Spot spray	For breeders and layers, 3-day withdrawal period for slaughter. Do not feed to broilers.	Flies
	Neporex	Dry scattering (wet manure) or spray	1 lb/200 sq ft 1 lb/1 gallon water/200 sq ft	House flies
Imidacloprid	QuickBayt	Bait	For premise use only	House flies
	Credo SC	Spray	For premise use only, between flocks, following sanitation	Darkling beetles and larvae, hide beetles
Dichlorvos	Vapona	Sprayer, mister, fogger	For premise use only	Flies, gnats, mosquitoes, roaches, sowbugs, ants
Tetrachlorvinphos + dichlorvos	Ravap EC	23% +5.3%, emulsifiable concentrate	1 gallon/100 birds in cages	For house flies, ticks, gnats, mosquitoes, darkling beetles, ants/spiders, bed bugs, etc. Can be used with chickens present in the house.
Deltamethrin	Annihilator, Annihilator Polyzone, etc.	Sprayer, mister, foamer	For premise use only	Ants, flies, gnats, beetles, mosquitoes, ticks, wasps, cockroaches, fleas, etc.
Pyrethrins	PyGanic	Spray	For premise +/- direct application	Bed bugs, adult darkling beetles
Dinotefuran, tetrahydro-3-furanyl methyguanidine	PT Alpine Pressurized Fly Bait	Pressurized Fly Bait (Aerosol)	For premise use only. Do not apply directly upon animals or areas where animals can ingest product.	House flies, filth flies, lesser house flies, flesh flies, small fruit/vinegar flies
Boric Acid	Perma-dust SafeCide	Dust	For premise use only. Remove birds prior to application. Do not contaminate water, food, or feed.	Darkling beetles, hide beetles, flies. Can be applied directly to manure for fly control.
Thiamethoxam	Agita 10 WG	Water-dispersible bait, Spot spray	For premise use only. Do not apply directly to poultry or feed as illegal residues may result.	Houseflies, litter beetles (darkling beetles)
Methomyl	Golden Marlin, Blue Streak	Fly bait	For premise use only. Do not allow food producing animals to have access to treated areas.	Flies
<i>Beauveria bassiana (fungus)</i>	balEnce (NOP approved)	Water-dispersible spray	Direction application to pest infected areas	Flies, darkling beetles

could attack in swarms, causing high mortality in outdoor poultry and are also known to transmit bloodborne pathogens (e.g. Leukocytozoonosis) in poultry. Mortality can occur due to asphyxiation, anemia, suffocation due to piling, and potentially anaphylactic reaction to the saliva. Control is mainly by management, such as using screens, air movement (using fans), and housing poultry indoors.

It is illegal to use any pesticide in any manner that is not consistent with the label. Dusts, sprays, and washes are available for poultry, but make sure to check the label to insure they can be used in poultry. Pay close attention as some products are for use on poultry premises and not directly on the bird. SEVIN dust (carbaryl) has been suspended by EPA for use in poultry and poultry premises,

as it has been considered as likely to be carcinogenic in humans. Small animal topical products such as Frontline (fipronil), Revolution (selamectin), Bistrax (amitraz), and Advantage (imidacloprid/pyriproxyfen) are forbidden for use in food animals, including pet poultry.

For all insecticides and products listed in this publication, please make sure to read carefully and follow all label directions for proper instructions, registration, application rates, and precautions. A good resource to use is [VetPestX](http://www.veterinaryentomology.org/vetpestx) (www.veterinaryentomology.org/vetpestx), a database of registered pesticides for animals. Product labeling and availability may change over time, so please check before purchasing or application any products.

Any brand names listed are examples only. No endorsement of products is intended, nor is criticism implied of similar products not mentioned.

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