

## A Guide for Managing Poultry Insects

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Major insect pests of Nebraska's poultry population are identified and treatment recommendations are given.

For many years poultry production in Nebraska has consisted primarily of large operations of layer hens. In recent years, however, broiler production has increased in southeast Nebraska. There are also some large turkey production units. Extreme competitiveness in the poultry industry has resulted in narrow cost-profit margins. Poultry operations cannot allow ectoparasitic and nuisance insects to interfere with production, nor can they afford high pest control expenses. For production to be profitable, poultry production must be managed to reduce the incidence of insect pests.

Poultry are infested with a variety of insects and mites that live on the skin and feed on skin debris, feathers, and blood. This activity can lower growth rates, reduce egg production, and, if the infestation is heavy, cause debilitation and death of the birds. In addition, poultry houses can be a breeding source for a variety of flies that may be vectors of poultry diseases or, at the least, be a nuisance which may bring about litigation from neighbors.

### Litter Beetles (Darkling Beetles)

In the past few years, litter beetles (especially the lesser mealworm [*Alphitobius diaperinus*]), have become the most serious pest affecting several types of poultry production systems. Entomologists who work with arthropod pests of poultry give priority to litter beetles because they have a high reproductive rate, are difficult to control, are vectors of disease, cause considerable damage to insulation in poultry facilities, and may migrate from litter disposal sites to urban housing areas where they are a nuisance. They also may consume considerable amounts of poultry feed if they are very numerous.

Because the beetles feed on poultry carcasses and because poultry may feed on them, litter beetles are mechanical vectors of several diseases, including: Marck's disease, avian influenza, salmonella, fowl pox, coccidiosis, botulism and New Castle disease. They also are reservoirs of and vectors of cecal worms and tapeworms.

Adult litter beetles are black or dark reddish-brown and about 1/4 inch long. Larvae are yellowish-brown and

resemble wireworms. They may reach 3/4 inch in length before they pupate. Larvae cluster in dark corners under manure or litter, under feed sacks or under feed in feed storage areas. Aggregation also may occur in areas of higher temperature and moisture, such as near waterers or wet feed. The larval stage may last 40-60 days and, during that time, six to ten larval instars may occur. The pupal stage lasts a week or more and adults may live a year under ideal conditions. A female may deposit 500-800 eggs in her lifetime which accounts for the great number of beetles that may infest a poultry facility. Late instar larvae may migrate upward and pupate in the insulation of the building. The result is extensive damage to all types of insulation.

Control efforts for the litter beetles generally are only partially successful. The management program suggested by entomologists in North Carolina, Georgia and Florida, where poultry is a large enterprise, is to remove all birds from the building, thoroughly clean the building and leave it open or unheated for a prolonged period in winter.

Applying insecticides after the building is emptied and thoroughly cleaned will further reduce beetle numbers. Residual insecticides should be applied to the soil after the litter is removed and in areas where migration occurs. Disinfectants and insecticides should not be applied at the same time because each may destroy the toxic property of the other. Apply one, wait 10-14 days, then apply the other. Insecticides should be rotated periodically, i.e. a carbamate such as Sevin® could be rotated with a phosphate (Rabon®) and then with a pyrethroid (cyfluthrion-Tempo®) which will delay or inhibit the onset of resistance (both to the beetles and to filth flies).

### Ectoparasites

The most common parasitic arthropods of poultry in Nebraska are poultry lice and mites, bedbugs, chiggers, and flies. Specific insecticides to control these pests along with precautions, restrictions and application rates are presented in *EC1551, Nebraska Management Guide for Control of Arthropod Pests of Poultry and Pets*, which is available from University of Nebraska–Lincoln Extension offices.

### Poultry Lice

Poultry lice are small (less than 1/8 inch) wingless insects with chewing mouthparts. The most common in Nebraska are

brown chicken lice and chicken body lice. Less important are large chicken lice, shaft lice, chicken head lice, fluff lice, and several other species which are rarely present.

Poultry lice chew dry skin scales and feathers, but do not suck blood. Irritation from louse feeding and movement on birds causes appetite loss, weakened condition and susceptibility to diseases. Egg production is reduced, and heavily infested birds refuse to eat and gradually lose weight. Lice can be observed moving on the skin when feathers are parted, especially around the vent, head and under wings.

Control of poultry lice requires treating the birds since lice remain on the bird throughout its life. Treat by dipping, dusting, or spraying the birds, and be careful to avoid contaminating eggs, feed and water. Treatment is easiest at night when birds are quiet. For best results, split treatments with half of the recommended amount of insecticide applied initially, and the second half applied soon after the first, since the wet feathers retain more active ingredient. Applying liquid sprays to dry feathers often results in loss of some of the insecticide due to runoff.

### **Poultry Mites**

Several kinds of mites attack poultry. The most common are chicken mites and northern fowl mites. Occasionally scaly-leg mites are a problem. Mites vary in size (1/16 to 1/8 inch long) and structure, have eight legs, and have mouthparts on the anterior of the body. Usually there are no clearly defined body divisions.

Chicken mites feed at night. During the day they remain in cracks around roosts and interior portions of poultry houses. At night, they feed on the birds as they roost or nest. Chicken mites are small and grey or yellow in color, but darken after filling with blood. Direct control measures more to their hiding places in houses rather than to the birds.

Northern fowl mites remain on poultry. They are small and red or brown. Feathers of infested birds are discolored by mite excrement and eggs, and the skin is scabby. Control of the northern fowl mite must be directed to the birds.

Chicken mites and northern fowl mites suck blood, resulting in emaciation and lowered egg production. Continued heavy infestations can kill the birds.

Scaly-leg mites burrow under the skin, especially on the lower legs and feet. Legs become scaly, swollen, and exude lymph fluid. Severely infested birds may be crippled or unable to walk. In addition to treating with insecticides, legs may be dipped in a mixture of two parts raw linseed oil and kerosene.

Control mites by treating their hiding places. Treat roosts, walls, litter, and equipment by painting, spraying, or dusting. Treat all cracks, crevices, and rough spots. As a general practice, even in the absence of a known infestation of insects or mites, the poultry house should be treated at least twice a year. The treatment should include a thorough cleaning of the house and an insecticide application.

### **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.

### **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.

Biting midges and black flies develop as larvae in swiftly flowing water. When adults emerge, they quickly seek warm-blooded hosts on which to feed. These small (1/16-1/8 inch long), hump-backed flies hover around the heads of birds and feed by piercing the skin and feeding on blood. The feeding is painful and, in addition, leucocytozoan parasites that cause a malaria-like disease in birds may be transmitted during feeding. Control may not be possible on non-confined birds. Confined facilities should be screened with mesh small enough to prevent these flies from entering.

### **Flies**

House flies are the most persistent and common fly pest, although other species such as blow flies and little house flies also are present. House flies do not bite poultry, but are severe nuisances, and can spread some poultry diseases. House flies are present because of poultry manure and exposed wet feed, which are ideal feeding and breeding materials. Manure management is most important for house fly reduction. Dry manure management consists of keeping the manure moisture at less than 35 percent. This is accomplished by keeping only one or two birds per cage, mechanically stirring the manure and using ventilation fans in the drop area. The dry manure will stack in cone-shaped mounds. If manure cannot be dried, spread it in fields every five days. In liquid manure pits, the manure should be liquified rapidly to reduce fly breeding. Manure that remains partially solid in pits creates an ideal fly breeding site. In some management systems, agitating the liquid in pits has greatly reduced fly breeding.

Chemical controls are valuable, but should be considered secondary to sanitation and manure management practices. Many poultry operations combine good manure management

and one or more methods of chemical control. These include space or residual sprays, baits, larvicides, or feed additives. Recognize that it is practically impossible to eliminate flies.

Space treatment involves using a fine mist or fog (hot or cold) to kill flies on direct contact. The mist or fog is applied so that it drifts down upon fly-resting areas. There is no residual effect from space treatments. They can be applied over birds, but be careful not to wet the birds. Avoid direct contact with eggs, water and feed.

Residual fly control involves applying longer lasting insecticides to fly-resting areas. Flies are killed when resting on treated surfaces. Residual sprays may last two to six weeks under ideal conditions (in shade protected from rain and dirt). These are applied as a coarse spray to the point of run-off, or until surfaces glisten. Do not apply excessive amounts so that the spray puddles on the floors. Take special care not to contaminate feed.

Insecticide baits can help control house flies. Distribute dry baits along walls, window sills or other areas away from feed and water. Make light applications and periodically

sweep up dead flies and old bait. Apply liquid baits to burlap bags or paper. Organic phosphate insecticides used in liquid baits will decompose, leaving the sugar or syrup to attract flies, so remove and replace liquid bait residues regularly.

Routine use of larvicides is not recommended because of application costs, limited effectiveness and the chance of increasing fly resistance to insecticides. Larvicides are not efficient substitutes for good manure management systems, and should only be used as spot treatments to control maggots that develop in wet areas.

Feed additives can be effective as larvicides, but extended use has resulted in the development of resistance in fly populations.

Ideally, fly control should be approached through an overall management plan. This plan would include strict sanitation, screening of any openings that would allow entry of flies, and the use of a combination or rotation of insecticides and application methodology.

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