

Northern Fowl Mite Management



The northern fowl mite, *Ornithonyssus sylviarum*, is regarded as the primary and **most serious ectoparasite of poultry** in North America (Axtell and Arends, 1990), as well as in Mississippi. Mites and lice are the most destructive external parasites of the state's poultry flocks (Goddard and Edwards, 2010). The northern fowl mite is common on wild birds and rodents, which readily introduce it into commercial poultry production facilities unless sound biosecurity practices are in place. Its entire life cycle is spent on the host, where it feeds on blood and is a source of irritation to the bird. Eggs are laid in masses at the base of the feathers, usually in the vent area. It is **one of three species of fowl mite** that are ongoing pests of commercial breeder and layer flocks.

The other two are 1) the chicken mite or red poultry mite (*Dermanyssus gallinae*), which stays hidden in cracks and crevices in the poultry house during the day and comes out to feed on the birds at night, and 2) the tropical fowl mite (*Ornithonyssus bursa*), which has similarities to the northern fowl mite. Because the red poultry mite remains hidden much of the time and can go for long periods without feeding, it is very difficult to detect (unless birds are inspected at night when mites are feeding) and even more difficult to control. The tropical fowl mite is often confused with, and has similar behavior patterns to, the northern fowl mite. It spends its entire life on the host and does not survive for long if dislodged or separated from its food source.

Life Cycle and Transmission

The eight-legged adult northern fowl mite is about 1/26 inch long and dark red to black. There are **four stages in the mite life cycle**: egg, larva, nymph, and adult. The complete life cycle from egg to egg-laying female can be as little as five to seven days. This can result in rapid increases in mite populations, especially on layers and breeders kept for extended periods. Female adult mites lay eggs directly on their host. The eggs hatch in one to two days, depending on the temperature and humidity. The larvae that hatch do not feed on the bird; however, larvae rapidly molt to the nymphal stage in about eight hours (Kaufman et al., 1998). The nymphs do feed on blood from the birds and mature in four to seven days. Adult female mites complete the egg-laying process in two days after taking a blood meal from their host. The number of eggs laid per

female is relatively small, usually two to five. However, as mentioned earlier, the short life cycle means that **mite populations can rise rapidly**, with newly infested birds capable of supporting a mite population in excess of 20,000 per bird in nine to ten weeks under favorable conditions (Williams, 2010). Mites tend to congregate near the vent area, but the back is also a popular site as the mite population increases.

Birds infested with large northern fowl mite populations may suffer severe anemia and even death. DeLoach and DeVaney (1981) reported that heavy infestations can **remove as much as 6 percent of the blood volume of a commercial laying hen per day**. Heavy infestations on commercial pullets as they begin laying can cause a 10 to 30 percent mortality rate (Strother, 2008). Mite-stressed birds usually reduce feed intake, lose weight rapidly, may exhibit a pale pink comb (a symptom of anemia), and may have lowered egg production of 10 percent or more (Williams, 2010). Heavy infestations may make birds more susceptible to other parasites and diseases that can result in death (Strother, 2008). In broiler breeder flocks, mites are also thought to **impact semen production in males**. However, the literature is not in total agreement on all impacts or at what level these impacts exist (Hogsette et al., 1991).

Northern fowl mites prefer temperatures around 65 to 68 °F and are often more of a problem during cool weather, but they may be found on birds at any time of year. Even though they spend the majority of their time on the host, a well-fed northern fowl mite may survive for two to three weeks off the host, at room temperature. Therefore, depopulating an infested flock and moving birds back into the house sooner than three weeks may not totally resolve a mite problem. However, northern fowl mites are not as hardy as red poultry mites (which can survive without feeding for several months) and generally die within three to four days without a host.

Mites are **easily transmitted from bird to bird** by direct contact or by crawling from one bird to another. A mite-free house can become infested by several different methods including people, a contaminated pullet hauling trailer, the introduction of an infested pullet flock, wild birds, rodents, or contaminated egg flats and racks that are hauled from farm to farm by the egg truck. Birds older than 40 weeks usually do not support large mite

populations, but populations can build rapidly on birds 20 to 30 weeks of age (Williams, 2010). A severe northern fowl mite infestation can develop and spread through a flock in three to six weeks.

Light infestations of mites often go unnoticed and are difficult to identify. You may **notice mites on eggs or egg handlers** before they are found on the birds. However, by the time mites start showing up on eggs or workers begin to complain of mites, the infestation is usually well past the light stage and into the moderate or heavy stage. Individual mites on birds are nearly microscopic and may easily be missed as they crawl quickly across the skin near the vent area. Heavier infestations are easier to find because they produce a dark gray discoloration and matting of feathers around the vent. The discoloration is the result of large populations of mites, mite eggs, their feces, and shed skins.

Best Control is Prevention

Prevention is by far the best and most effective method of fowl mite control. Take steps to exclude mite vectors such as wild birds and rodents from the poultry house, and prevent the movement of mites from one farm to another on egg flats, racks, other equipment, or people. Promptly clean up spilled feed around feed bins or elsewhere before it attracts wild birds and rodents. **Maintain bait stations** along exterior and interior poultry house walls year-round, when birds are present and in between flocks. Also monitor rodent activity around generator sheds, well houses, stacking sheds, and other nearby buildings, and take appropriate measures to control the rodent population.

Keeping wild birds and rodents out of production houses means sealing up the holes and any possible entry points, including (Stringham and Watson, 2003)—

- end doors
- electrical conduits and feed and water lines where they enter the building
- fan housings
- along eaves and at building corners
- ridge vents and other air inlets
- sidewall curtains
- evaporative cooling systems (dog houses)
- damaged siding or foundations

Monitoring birds on a weekly or bimonthly basis is critical to detecting a mite problem early. Mite indexing systems that assign a one-digit number to various infestation levels have been in place for a number of years. However, they are often time-consuming and require the examination of a fairly large number of birds to get an accurate estimation for the flock. A typical mite index may be similar to the following:

0 = no mites

1 = 1 to 50 mites (light infestation)

2 = 50 to 1,000 mites (moderate infestation)—small clumps of mites on skin and beginnings of discoloration and matting around feathers

3 = 1,000 to 25,000 mites (moderate to heavy infestation)—more discoloration and accumulation on feathers and around vent

4 = >25,000 mites (heavy infestation)—numerous large clumps of mites on skin and feathers, and skin pocketed with scabs

Even though a one-digit rating system based on the number of mites per bird has been the standard for years, a more practical system may be simply a “present” or “absent” designation on 7 to 30 birds per house in a weekly inspection group, with a percentage of birds with mites present used as a threshold (Stringham and Watson, 2003). The more birds examined each week, the more accurate your monitoring program will be.

In a flock of breeder birds, the **roosters often have higher populations** of northern fowl mites than do the hens (Axtell and Arends, 1990). Mites readily spread from the roosters to the hens. Therefore, roosters should be examined at a higher ratio to the hens. To date, a vaccine to provide the birds with immunity to mites has not been developed. Although the production of antibodies as a result of mite infestations have been detected, a way to use this information to quantify the level of infestation or predict its impact does not currently exist (Axtell and Arends, 1990).

Prevention is made more difficult simply because any person, wild bird, rodent, animal, vehicle, or equipment moving between farms is a potential fowl mite vector. However, Stringham and Watson (2003) recommend these minimal precautions to greatly reduce the likelihood of spreading a fowl mite infestation:

- Isolate infected farms. Readjust traffic flows from infested to clean farms and take precautions with all protective clothing worn.
- At the hatchery, pay close attention to egg deliveries from infested farms. This includes strictly managing personnel, vehicles, racks, egg flats, and other equipment that have contact with infested farms.
- Pullet-moving and cleanout crews should take precautions to limit the risk of spreading a mite infestation (washing, sanitation, traffic flow, etc.).

Treatment Options Limited

Treatment for mites is difficult, expensive, and may be only partially successful. Unfortunately, **mites have developed at least partial resistance to many of the chemicals** used to treat an infestation. Furthermore, new promising substitute products for mite control will probably not become available anytime soon. **Sulfur was used as a miticide** in the past and is being used again in certain parts of the country with some degree of success

(Clark, 2013). Compared to many other products, sulfur is inexpensive and relatively easy to apply, but it has to be done correctly and even then may provide only partial suppression of mite infestations.

Unfortunately, however, **many growers are allergic to sulfur** or they use it wrong. They may “dust” it in with a backpack blower and their fans, but this gives poor coverage on the birds (Hubbard, 2013). Some growers simply open several bags of sulfur in the house and expect the chickens to “dust themselves,” but this is not effective. In addition, the dust formulation method of treatment may not place the active ingredient directly on the birds’ skin where it will do the most good. **Products used to kill mites do not kill the eggs**, so you have to come back in a few days and treat again (Hubbard, 2013). The seven-day life cycle means that if you wait more than about seven days before treating a second time, a whole new generation of mites have developed from hatched eggs that were unaffected by the initial treatment. Growers often only treat once when it may take at least three treatments strategically spaced close together to get all the mites from recent hatchings.

Another product that has yielded varying degrees of success is diatomaceous earth (DE). **Diatomaceous earth is believed to be a natural insect control powder**. It is obtained from deposits of diatomite, which are the fossilized sedimentary layers of tiny phytoplankton called diatoms. DE is a form of amorphous silica that can kill insects by absorbing their oily or waxy cuticle layer (Jacob et al., 2011). When this thin, waterproof layer is lost, the insect loses water and dies. In addition to its desiccant action, DE works abrasively to rupture insect cuticles. However, like sulfur, when used as a dust, it may not reach the birds’ skin where the mites live. Also, a single treatment will likely not get all the mites that hatch after the initial treatment, so the infestation may quickly re-establish itself unless multiple treatments are used at strategic intervals.

In some breeder flocks where nothing else seems to work, **extra-label use of ivermectin** has proven an effective method of control for the northern fowl mite. Like other products, it appears to work best when at least two treatments are made a few days apart. It is expensive but may be cost-effective depending on the severity of the problem, especially if other options have been exhausted with little or no results. It can sometimes be difficult to keep in solution and has to be used with propylene glycol, but even more important, **ivermectin is not labeled for use on poultry** (Hubbard, 2013). This means you must get **a prescription from a licensed veterinarian** before using it on breeder flocks.

Summary

Northern fowl mites are a serious threat to breeder and layer flocks not only in Mississippi but throughout North America. Control depends first and foremost on prevention. Take every precaution to reduce the risk of establishing a fowl mite infestation on your farm:

- Establish a thorough disinfection and treatment program for houses before a new flock is placed.
- Prevent rodent and wild bird access to your houses.
- Bring in only uninfested pullets.
- Monitor birds on a regular basis.
- Control the movement of traffic, equipment, and personnel between clean and infested farms and the hatchery.

Treatment options are limited and may be only partially effective, which makes prevention even more important.

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