News In Fly Control: Management Concerns

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Fly management on the turkey farm can be a tricky thing, especially in growout. There are several reasons for this, most of which are related to the limitations of conventional production systems, larger birds and tight production schedules. Even so, consistent and timely interventions are a big help in reducing both the likelihood and severity of fly problems.

It's long been understood that house flies and their relatives are capable of transmitting a number of poultry diseases. However, assessment of the relative risk of transmission is less clear cut. The consensus within the industry then, is to err on the side of caution. This is a prudent approach, but may not always be practical in as much as expectations may be more than can be achieved if the goal is zero tolerance on a continuing basis. It might be better to concentrate on a managed approach that is prepared to react quickly and effectively when necessary, but otherwise tolerates low to moderate fly populations in most cases. Most importantly for an entomologist, this approach minimizes the possibility that the already limited inventory of insecticides is not lost to resistance. I would urge you to consider resistance management to be of equal or greater importance to bird health than the flies themselves in their presumptive role as a primary vector of disease. Imagine the difficulty of managing fly outbreaks in the absence of effective insecticides where a disease is present and know with a high degree of certainty to be fly-borne.

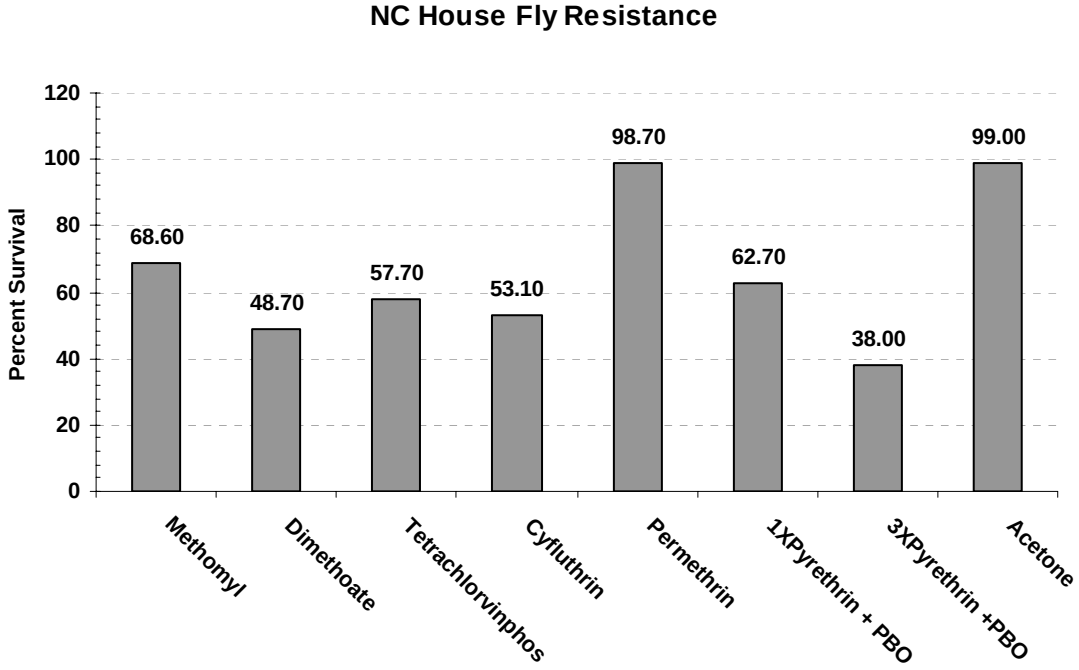
Assessing Risk: Vector Competency

Two important components of assessing the likelihood that flies transmit poultry disease are their ability to carry or harbor a disease organism for some length of time, and a realistic measure of their ability to actually transmit the disease. Most often the measure of a fly's ability to transmit the disease is limited to forced ingestion of infected flies or fly homogenates by test birds, or by inoculating turkey eggs with an extract. This is an effective plus or minus approach to establishing that flies can infect birds, but says little about real world transmission. We've been working with Dr. Jim Guy at the CVM to establish the length of time some viruses are harbored in the fly's crop and intestines and to establish the likelihood of transmission when differing densities of flies share space with turkey poults. In the case of turkey coronavirus we have demonstrated that the virus a reasonable basis for requiring a high level of fly control to prevent the spread of TCV.

The collaboration is looking at Newcastle disease virus at present. We found that the virus is harbored in the fly's crop for at least 96 hours, and at least 24 hours in the rest of it's intestinal tract. We've yet to complete exposure studies similar to those done with TCV, but once they are completed we'll have a more relevant predictor of risk than the simple presence or absence of the virus in or on the fly and infectivity.

Pesticide Resistance: Why Worry?

This chart of resistance information collected by the Southern Regional Pesticide Impact Assessment Program at the University of Florida, pretty much says it all about the problem facing the states poultry industry. North Carolina was one of four states included in the sampling. Florida, New York and Maine show higher resistant levels for particular insecticides on the list, but overall North Carolina shows the highest level of resistance across the board.



What's the state of insecticide resistance in U. S. animal production, and by extension, its poultry industry? How many compounds are presently available for house fly control in poultry production? The answers to these two questions are not promising. Recent investigations in house flies, have shown that there is resistance to permethrin, cyfluthrin (Tempo), and tetrachlorvinphos (Rabon). Dimethoate resistance is also present, but significantly lower than the others. Es-fenvalerate, reintroduced to the market after 25 or 30 years as a new material, has long-standing resistance issues as well. Lambda cyhalothrin and other pyrethroids are prone to the same resistance problems as the others in that class. Even the primary attractant used in fly baits, muscalure, has been shown to produce a behavioral resistance that reduces the effectiveness of some fly baits. Methomyl, the active ingredient in fly baits such as Apache and Golden Malrin, is losing its effectiveness as well.

Of the insecticides where resistance is not yet as serious an issue, pyrethrin is still effective, especially when synergized with piperonyl butoxide and used as a space spray. Dursban, although exhibiting no resistance problems, is represented by a single, restricted use label that is not well formulated for house fly control. Two insect growth regulators (IGR's), pyriproxyfen (PyriShield) and cyromazine (Larvadex), on the market are helpful in controlling house fly larvae, but have little effect on adult flies. In addition, only one (pyriproxyfen) is registered for use in turkeys. Three new chemistries have been introduced in recent years: nithiazine (QuickStrike), imidacloprid (QuikBayt) and spinosad. Nithiazine is used exclusively as a bait strip, while imidacloprid formulations are intended for use as a bait, paint on or spray. Spinosad is used exclusively as a spray. Although we cannot know the future of these materials, it is likely that one or more will develop the same resistance problems as permethrin, cyfluthrin and tetrachlorvinphos.

Lose of insecticides and new label restrictions on others complicate resistance management as well. Carbaryl (Sevin), although not very effective against flies, has been restricted to treatments on the outside of buildings. Tetrachlorvinphos is currently under review by the EPA and may be lost, taking with it the combination insecticide, Ravap (tetrachlorvinphos + dichlorvos). Malathion is no longer labeled, while dimethoate is all but gone through voluntary cancellations.

Long Term Fly Management Practices

Litter condition prior to flock placement is critical to good fly management, especially during the warm season. Wet litter will continue to breed flies long after the birds are removed. Even if the turn around time is relatively short, a tremendous number of fly larvae and pupae will be present, producing a major outbreak within a week of bird placement. Use hydrated lime or other litter treatments to condition the litter. The extreme pH shifts produced by these materials will destroy a good proportion of the fly larvae feeding there. Visually monitor houses or hang speck cards to estimate the density of the fly population in the empty houses. Do it several times during the down time. If it's clear that large numbers of adult flies are active, close and fog houses with synergized pyrethrin to clear the air of flies. This approach reduces the breeding population and the number of flies that migrate to a neighbor's home or other nearby poultry houses. Be prepared to fog 2 or more times to knock down newly emerged flies before they lay eggs. Remember there are likely to be many thousands of fly pupae in the litter that are largely impervious to litter treatments and just waiting to emerge. Don't be too concerned with what's outside the turkey houses at this time unless the outside fly populations are extreme and there are disease issues. If so, consider applying surface sprays (permethrin, cyfluthrin, lambda-cyhalothrin, es-fenvalerate or ravap) to curtains, eaves and other areas where they congregate. Keep in mind there's a chance that none of these insecticides will work particularly well on farms where fly populations are highly resistant.

Efforts to shut down a fly problem before it gets out of hand are the key to success. It's a lot easier to reduce fly populations at start of a flock cycle than two weeks after birds are houses. Monitoring is essential to have some idea of what your starting point is for any

placement. There's a big difference between, for example, a speck card average in the 20's at the start of a flock than a new flock with a mean speck card count in the 20's than if the card average is 80 or more.

There are two simple methods of monitoring that will provide good information about the poultry farms fly status. Consistent weekly monitoring for adult flies and daily inspections for maggot hotspots. Speck cards are an easy way to monitor the adults. Place a minimum of six, 3 X 5 inch, unlined index cards at random locations inside the house. The only instructions about placement are that the locations need to remain the same week to week, and the cards should be attached so they don't flap around in the wind or get rained on. Collect cards and count specks every week. Set an average count threshold depending on the number of flies you're willing to tolerate. A threshold of 20 or fewer specks per card is fairly low; 50 and rising is easily getting into the danger zone needing an effective response to keep the fly population from getting way out of hand.

Inspect the litter under and around drinkers at least once a week during the first 4 to 6 weeks of a growout cycle. Litter inspections in a brooder house should begin after about the 2nd week and continue through the end of the brooder cycle. Look for clusters of fly eggs and maggots. The fly eggs are often seen on the surface of litter and cake immediately below the drinkers. A small spade will be helpful in lifting or digging into caked material to make a good inspection for maggot activity. Check waste litter outside the poultry house doors. A 6-inch wide strip of wet litter can produce thousands of adult flies in 7 to 10 days. Use larvicides or litter treatments in areas where maggot activity is noted.

Be sure that traps or fly baits are in place before birds arrive to help keep the starting adult fly population as low as possible before placement. Baits and traps are very effective at low to moderate fly densities only if there are enough placements to **be** effective. Two, four or six placements inside a 20,000 square foot growout house are not enough. Plan on a minimum of 10 and don't hesitate to use more. The investment in fly baits or traps is worth it if they reduce the amount of other insecticides that may be needed to reduce fly populations to an acceptable threshold.

If necessary, and nighttime temperatures permit, fog with synergized pyrethrin before sunrise to eliminate adult flies. Raise the side curtains, close end doors and fill the house with fog. The whole procedure shouldn't take more than half an hour per house with the right equipment. A two or three well-timed foggings will help carry you past the crisis. In growout, much of the fly buildup occurs during the first 3 to 6 weeks. One or two foggings, and the use of larvicides to suppress maggots during that period may be the only fly control necessary for the remainder of the flock cycle. A few surface treatments with other insecticides may also be helpful, but remember that many of these chemistries are plagued with resistance problems and may have little impact. The other concern should be that over use of the newer chemistries will lead to resistance problems.