Little House Fly
(*Fannia canicularis* L.)

General Information

The little (or sometimes lesser) house fly is a common pest of poultry, particularly at caged layer facilities where immature flies develop in the manure accumulating beneath confined birds. In the arid southwestern United States, this fly species is most abundant during the cooler spring and fall months. Male little house flies aggregate into mating swarms within poultry houses as well as beneath shade trees, in building doorways, and in other areas protected from wind and direct sunlight that are near to development sites. This male swarming behavior combined with their dispersal into neighboring residential areas can result in nuisance to nearby homeowners.

Identification and Life History

Little house flies are small bodied, 5-6mm in body length, with three indistinct longitudinal stripes on an otherwise gray thorax (Fig. 1). Relative to similar looking flies, the little house fly is narrow-bodied and tends to hold the wings in an overlapping position over the rear of the body. Although they look superficially like small-sized true house flies (*Musca domestica*), they can be easily separated from true house flies by examination of their wing vein pattern; the wing veins on little house flies do not bend near the tip of the wing as they due for true house flies (Fig. 2). Additionally, true house flies have four dark longitudinal stripes on the thorax allowing for easy separation of these species at a glance. Like many flies, the eyes of the males are much larger and closer together at the top of the head than are those of females. Also, the abdomen of male little house flies is more elongate and yellowed than for females (Fig. 3).

Figure 1: *F. canicularis* female. Image by Stephanie Leon, UC Riverside.

Female little house flies lay their eggs on a wide range of decaying organic matter (e.g., feces, greenwaste, carrion), but immature flies are often produced in largest numbers in accumulations of bird feces (particularly feces of confined poultry). Little house flies undergo complete metamorphosis, with egg, larva, pupa, and adult stages in their development. Larvae of the little house fly have a flattened body with numerous filamentous protrusions (Fig. 4), making the immature forms of this fly quite different from the rounded maggots that are the immature forms of most other filth flies. Young larvae respond negatively to light,

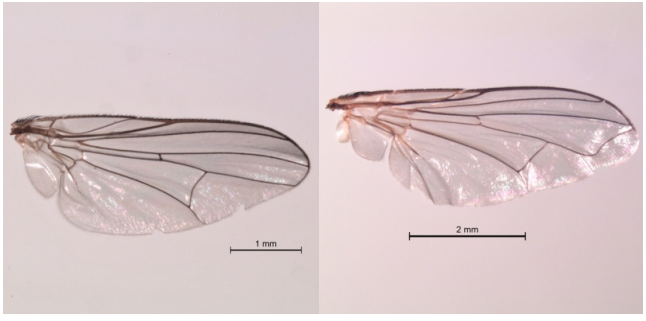

Figure 2: *F. canicularis* wing (left) vs. *M. domestica* wing (right). Image by Stephanie Leon, UC Riverside.

Figure 3: *F. canicularis* male. Image by Stephanie Leon, UC Riverside.

and if exposed will burrow into their developmental habitat. Older larvae emerge from their developmental habitat to seek drier and cooler areas in which to transform into a pupa. The pupa develops within a puparium, which is the hardened outer 'skin' of the last larval instar. The total time required to complete development from egg to adult can be completed in as little as 15 days under optimal temperatures.

Damage

Where numerous, the little house fly can cause considerable nuisance due to the aggregation of males into mating swarms within building entryways, patios, and other locations near developmental sites that are protected from wind and direct sunlight. Male swarms typically form about 5-6 feet off the ground, putting them at a height where they are most visible to adult humans. While these swarming male flies will not land on people that move into the swarm area, the presence of numerous flies circling about is often enough to keep people from using the area. The dispersal of little house flies from developmental sites to residential homes has resulted in nuisance citations and lawsuits.

In addition to causing nuisance, little house fly has been implicated in the transmission of exotic Newcastle disease (END) virus to poultry. Older literature also records this species as a cause of human myiasis (invasion of human body tissues by flies), however this species is not generally associated with myiasis today. It is possible that early reports of myiasis were incorrectly attributed to this species or that sanitation changes in the urban environment have reduced human exposure to these flies.

Integrated Pest Management in Poultry Facilities

Monitoring: In any pest management approach, pest population information guides management decisions such as when and how to control the pest. Pest population abundance must be regularly assessed or monitored so that changes in abundance over time can be readily determined. Pest monitoring methods typically provide a relative assessment of the pest population rather than an actual count of the number of pests in a given area. For this reason, it is important to use the same monitoring method consistently so that direct measurements can be made between different assessment periods. Casual observations are subjective, may be misleading, and are rarely helpful to demonstrate effectiveness of control measures. Monitoring results should be recorded and kept for several years in order to evaluate seasonal and long-term trends in pest population abundance. Understanding these trends will help to develop a proactive program for pest control. Consistent monitoring also provides quantitative data to better address nuisance complaints commonly associated with little house fly activity at poultry production facilities.

Little house fly activity can be monitored using sticky fly tapes. Sticky tapes should be placed in areas where little house fly activity is high, with flies captured on the sticky tapes over one week identified and counted. Little house fly activity in a poultry facility can be most efficiently monitored using a weekly "walking sticky tape count" performed by holding the sticky tape at chest height while walking through the chicken house along a consistent route. Flies resting, feeding, or laying eggs on the manure beneath poultry will take flight when disturbed when walking past them and some will be captured on the sticky tape. Fly activity should be monitored using the same methods and at the same locations each week in order to record adult activity for comparison over time.

Management: Exclusive use of chemical insecticides for management of little house fly can lead to insecticide resistance in fly populations. Furthermore, the application of insecticides to larval development sites (e.g., poultry manure) may also reduce the abundance of fly predators and other natural enemies that are also common in this habitat and help to manage fly production. Therefore, it is best to use a multifaceted approach that takes advantage of cultural, biological, and chemical control options in order to maximize effectiveness of your management program.

Cultural Control: The most important cultural control efforts are those measures that lead to very rapid drying of poultry feces (manure). Little house flies will lay eggs and develop in manure with a moisture level above 40%, with drier manure producing few or no flies. At moisture levels less than 40%, the manure will appear fairly dry and will crumble when crushed by hand. The regional climate where the poultry facility is located, the facility design, and the needs of the producer are all factors to take into account when deciding on methods to rapidly dry poultry manure. Common manure drying methods include: (1) allowing manure to pile or cone underneath confined poultry so that fresh manure is deposited on top of the cone where it is dried by air movement and evaporation, (2) weekly removal of manure from poultry houses followed by spreading manure on soil in a thin layer (< 1-2 in depth) to encourage rapid drying, (3) weekly removal of manure from poultry houses followed by manure piling (or placing into windrows) to encourage composting of the manure within the pile and rapid drying of the manure in the outer portion of the pile, and (4) continuous removal of manure using conveyor belts that catch manure beneath confined birds allowing for manure to dry during transport of manure out of the poultry house.

In California, where humidity is typically low and summer temperature is high, the coning and drying method is commonly used in open sided egg-layer poultry houses where air flow through the house is unimpeded; some facilities utilize fans to encourage additional air movement, and the sides of poultry houses should be cleared of all vegetation that might reduce natural air flow. During manure cleanout, it is common practice to leave a drying pad of old (dry) manure, 10-20 cm deep, beneath confined poultry to elevate newly deposited wet bird feces off the ground where air flow can more quickly dry the feces. The drying pad also provides a refuge for many of the natural enemies of little house flies. In coastal areas of California or in other states where humidity levels are commonly higher, weekly removal of manure from poultry houses followed by composting of manure (with or without greenwaste) is will provide better management of little house fly. Whatever

method is used to dry poultry manure, once dried the manure should be removed from the poultry facility or harrowed into fields for nutrient application as appropriate. Dry manure should be protected from rewetting by rain or irrigation, as rewetted manure will again be suitable for fly production.

In confined poultry facilities, it is important to frequently inspect watering systems for any leaks that could lead to an increase in manure moisture and therefore increased fly production. Condensation caused by improper insulation of overhead pipes can also lead to wetting of manure and should be remedied. Routine inspection and repair of leaks can reduce fly production considerably. Sick and diuretic birds can also produce manure that is much wetter than normal. Limited areas of very wet manure should be immediately removed from the poultry house and dried using one of the methods indicated above.

Biological Control: Many natural enemies, most notably predatory beetles and parasitoid wasps, attack and kill immature little house flies. These natural enemies are common in poultry manure and are responsible for very significant reductions in fly numbers. Insecticides applied to the manure will kill these natural enemies, sometimes resulting in an increase in fly numbers in the weeks after an insecticide application as the flies rapidly repopulate the manure while the natural enemies repopulate the manure far more slowly. Insecticides applied to poultry facility walls or other structures on which flies are noted to rest will have less impact on natural enemy populations.

Figure 4: *F. canicularis* larvae and eggs. Image by Alec Gerry, UC Riverside.

Chemical Control: Most chemical control methods target adult flies and may be required when non-chemical methods targeting immature development have failed or as part of an integrated pest management (IPM) program where chemical applications support other management efforts. As part of an IPM program, insecticides can be applied throughout the poultry facility as non-persistent space sprays or fogs, to facility walls and structures as persistent surface sprays, or as a component of baited traps. The application of insecticides as space sprays or fogs is effective to reduce the number of swarming male little house flies, those most likely to cause nuisance. Surface sprays should be applied to structures where flies are noted to rest, such as: facility walls, doorways, and covered patios.

Baited traps are a common control method, though overall effectiveness is not likely to be sufficient when used as the primary method of fly control. A common baited trap is the molasses trap, using a bucket or jug containing molasses and water as the attractant and covered by a cone-shaped wire screen coated with an insecticide (often a wetted granular fly bait). Flies attracted to the bait will land on the screen and receive a toxic dose of insecticide. Baited traps should be examined regularly for continued effectiveness, with bait material and toxicant replaced as needed.

References for more information

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AUTHOR: D. Theuret and A. C. Gerry (UC Riverside)
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