BUG BIZ
Pest Management and Insect Identification Series
LSU AgCenter Research · Extension · Teaching

Musca domestica, House Fly

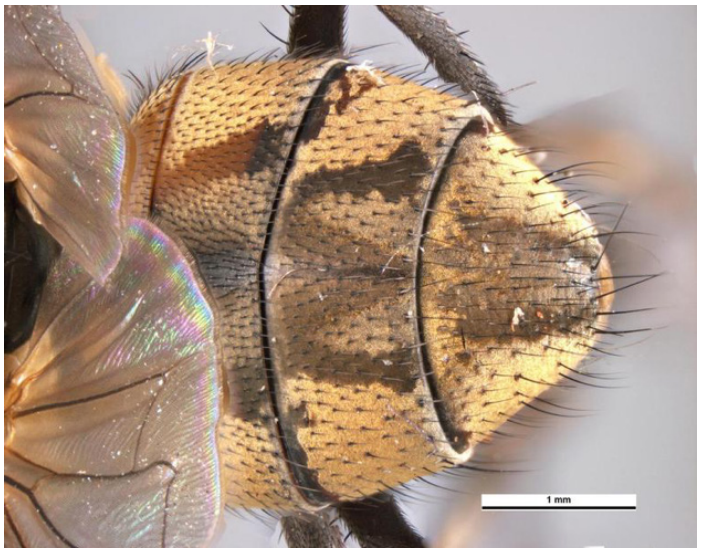
(Diptera: Muscidae)

Sarah E. McComic, Forest Huval, T. E. Reagan, Chris Carlton

Description

Musca domestica, the common house fly, originated in central Asia but has since spread to all inhabited land masses in the world. It is an important pest and nuisance in rural and urban areas, where it can transmit disease-causing organisms.

Adult house flies possess one pair of wings and are ⅕ to ⅓ of an inch long (6 to 7 mm). The adult has two large, red, compound eyes. The space between the eyes is wider in females than in males, whose eyes almost touch each other. The thorax has four dark stripes extending front to rear. The abdomen is yellowish gray with various dark markings on the sides. Antennae are short, three segmented, and terminate with a slender bristle-like arista. The mouthparts are adapted for sponging fluid food on surfaces. Adult females deposit clumps of white eggs, each of which is approximately 1⁄20 of an inch (1.2 mm) long and resembles a small grain of rice. The white larvae are about 1⁄10 to ⅓ of an inch in length (2.5 to 8.0 mm). Larvae are referred to as "maggots," a term used for a variety of fly larvae in diverse families. Larvae possess cylindrical, legless bodies that taper towards the front. The head possesses two dark hooks that are used in feeding. House fly pupae are about ⅓ of an inch long (8 mm) and vary in color depending on age. Color ranges from cream to dark red and brown at the end of pupation. Pupae are oval, robust, with rounded ends.



Identifying markings on the abdomen of M. domestica. (Pest and Diseases Image Library, bugwood.org, Creative Commons 3.0).

House flies can be confused with stable flies (*Stomoxys calcitrans*) and false stable flies (*Muscina stabulans*) because of their similar appearances and habits. All three are in the same family and occur in similar habitats but can be distinguished by external features with detailed examination. A number of other flies in the same family are superficially similar.

Life Cycle

Adult female house flies can lay approximately 500 eggs in their lifetimes and 75 to 150 eggs in one batch. House flies, as with all Diptera, go through four distinct stages during development: egg, larva, pupa and adult. Eggs are normally laid in clusters in moist habitats, which is required for successful embryo development. After eight to 20 hours of incubation in ideal conditions, larvae hatch from the eggs and begin feeding. The larval mouth hooks aid in movement and feeding on the substrate where the eggs were laid. Each larva goes through three instars (growth stages) to maturity. Maggots continue to feed until pupation. The cuticle of last stage larvae hardens to form a dark brown case called a puparium, and the pupa is enclosed within it. Pupae typically complete development within two to six days, depending on temperature. Once pupation is complete, adult flies emerge from the puparia. Adult *M. domestica* can live 25 days to two months depending on nutrition, and two to three days without food. Reproduction only occurs after adult house flies have fed. Adult females lay eggs four to 20 days after copulation, and the life cycle continues. Adult and immature house flies feed on a wide variety of

decaying organic matter as a nutrition source, including rotting animal and vegetable products, and human and animal excrement.

Ecological Significance and Pest Status

House flies are nuisance pests to farmers, homeowners, and store and restaurant owners because they are attracted to decaying or spoiled materials. Adults can reach large populations in poultry, swine, horse and cattle operations due to abundant decaying manure. They can often be seen landing on livestock because of odor and availability of sweat. House flies do not bite humans or animals, but they are medically important pests due to their ability to mechanically vector various enteropathogens. This is a more serious problem in areas with poor infrastructure for sanitation. House flies can mechanically vector almost 100 different animal and human infectious diseases. These include, but are not limited to, *Escherichia coli,* typhoid and cholera infections. House flies are also annoying when present in large numbers and can accelerate food spoilage. Spread of some viral infections have been demonstrated in house flies, including coxsackievirus, polio and enterovirus. House flies are important in forensic investigations, because the adults often lay eggs in decaying human corpses. The age and presence of various life stages of house flies and various other insects contribute to medical examiners' abilities to determine approximate time of death. House flies are common urban and rural pests in Louisiana, and throughout inhabited regions of the world, where they are important in the scavenging insect complex.

Control

Monitoring and surveillance. Locating house fly infestations is usually an easy task as they can be found anywhere decaying organic matter accumulates. They commonly occur in livestock barns and improperly managed garbage. Identifying frequently used perches can assist with determining if material needs to be disposed of and/or moved to locations where it is inaccessible to flying insects. This can reduce pathogen transmission and contamination of food in fly infested areas. Correct diagnosis of the fly species present is important in making management decisions. Specimens can be submitted to the LSU AgCenter for identification by a qualified specialist.

Cultural control. The presence of large numbers of adult house flies can be mitigated by using sticky fly traps, ultraviolet electric traps, scented traps and others. These traps can be placed in livestock barns or any location where house flies proliferate. Additionally, a small number of flies indoors can be controlled by using fly swatters. Exclusion is the most effective means of keeping fly numbers down in residences. Open windows and small tears in screens can provide entry for flies.

All life stages of M. domestica; eggs, larvae, pupae and adults. (Clemson University – U.S. Department of Agriculture Cooperative Extension Slide Series, bugwood.org. Creative Commons 3.0).

Lateral view of adult M. domestica. (Pest and Diseases Image Library, bugwood.org.Creative Commons 3.0.)

Chemical control. Synthetic insecticides are commonly used to control large populations of house flies, but these can have disadvantages. Overuse of insecticides ultimately leads to insect resistance and control failures. Consult the current Louisiana Pest Management Guide for the most commonly used insecticides for the control of house flies.

References

Cortinhas, L. B., P. Martins Mendonça, M.V. Braga, M. M. C. Queiroz. 2020. Ultrastructure of the Immature Stages of *Musca domestica* (Diptera: Muscidae: Muscinae). Journal of Medical Entomology 576:1712-1721.

Gerry A.C. 2020. Review of Methods to Monitor House Fly (*Musca domestica*) Abundance and Activity. Journal of Economic Entomology113: 2571–2580.

LSU AgCenter. (2022). "2022 Insect Pest Management Guide – complete book." from https://www.lsuagcenter.com/portals/communications/publications/management_guides/insect_guide

Mohammad Z., R. Alajmi, M. Alkuriji, D. Metwally, W. Kaakeh, N. Almeaiweed. 2021. Role of *Chrysomya albiceps* (Diptera: Calliphoridae) and *Musca domestica* (Diptera: Muscidae) Maggot Crop Contents in Identifying Unknown Cadavers. Journal of Medical Entomology 58: 93-98.

Morey, R. A., A. J. Khandagle. 2012. Bioefficacy of essential oils of medicinal plants against housefly, *Musca domestica* L. Parasitology Research 111: 1799–1805.

Sanchez-Arroyo H., and J. L. Capinera. 2017. *Musca domestica.* University of Florida, Featured Creatures. University of Florida Department of Entomology and Nematology. https://entnemdept.ufl.edu/creatures/urban/flies/house_fly.htm (Accessed 9 March 2022).

Contact Us: For advice about arthropod identification or diagnosis, contact the LSU AgCenter Department of Entomology. Reach the department through the Contact Us webpage: https://bit.ly/36c4awm.

Matt Lee, Interim LSU Vice President for Agriculture
Louisiana State University Agricultural Center
Louisiana Agricultural Experiment Station
Louisiana Cooperative Extension Service
LSU College of Agriculture

PUB3849 (online) 11/22