W1399

The Oriental Latrine Fly, *Chrysomya megacephala*

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Blow flies are a cosmopolitan group of flies that play a pivotal role in vertebrate decomposition but can also be considered pests or nuisances in certain situations. The oriental latrine fly, *Chrysomya megacephala* (Fabricius), is an invasive blow fly species recently documented in Tennessee. This fly is a concern as they are known to carry antibiotic-resistant strains of multiple pathogens and other harmful bacteria.

Blow Fly Biology

Blow fly larvae can survive on any resource containing vertebrate tissue, including dead animals and refuse. An important distinction between the oriental latrine fly and most other blow fly species is the ability to successfully breed in feces, with a specific affinity for human excrement. Due to this behavior, the oriental latrine fly is considered a public health hazard in some parts of the world.

The blow fly life cycle starts with a female fly laying a clutch of 100 to 300 eggs on an appropriate resource (e.g., carrion, garbage). As blow flies exhibit gregarious oviposition, it is not uncommon for multiple females to lay their eggs in the same place around the same time. After approximately one day, the eggs hatch into larvae that progress through three distinct developmental stages, or instars (Figure 1). After feeding, larvae disperse away from their food source and pupate in drier areas. One to two weeks later (depending on ambient temperatures), the adults emerge from the puparium. The puparium is a protective, sclerotized cuticle of the last larval instar in which the pupa develops into an adult.

Recognizing the Oriental Latrine Fly

Some adult blow flies are metallic, exhibiting a range of colors from green and blue to copper and purple. The oriental latrine fly typically exhibits a metallic green-blue color. One of the most obvious morphological characteristics that differentiates males in this species is the large eyes that meet in the middle of the head (Figure 2). These large eyes make the head of the males look extremely large, giving rise to their species name *megacephala* (literally meaning "large head"). The large eyes and lack of stripes on the top of the thorax set the oriental latrine fly apart from other problematic blow fly species, such as the primary screwworm (*Cochliomyia hominivorax*, Coquerel Figure 2), which is commonly associated with myiasis.

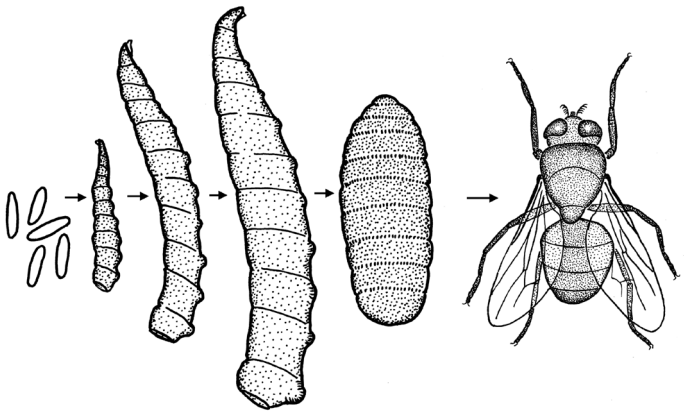
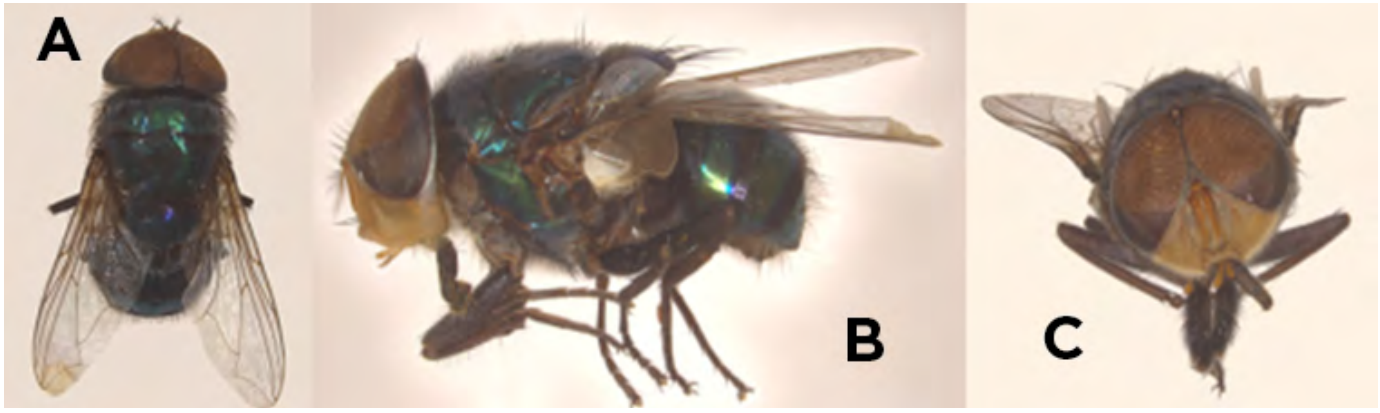


Figure 1: *General life cycle of blow flies. The stages are as follows: eggs, first instar larva, second instar larva, third instar larva, pupa and adult. Photo credit: "Life-cycle" by Acarologiste licensed under CC BY-SA 4.0.*



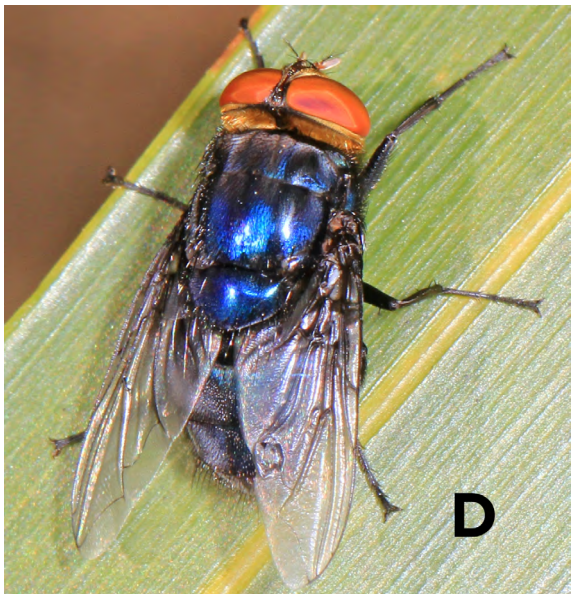


Figure 2: *Note the large eyes and broad head of the adult oriental latrine fly in dorsal (A), lateral (B) and frontal (C) views. The oriental latrine fly lacks the stripes found on the primary screwworm (D). Photo credits: A-C. Makhali Voss and Jackson Turner, UT EPP: D. "Screwworm - Cochliomyia hominivorax_Big_Pine_Key, Florida" by Judy Gallagher licensed under CC BY-SA 4.0.*

Health Hazard Potential

Oriental latrine flies are synanthropic, meaning they live in close association with humans. This species is known to be closely associated with pathogenic bacteria and, to a lesser extent, myiasis in humans and animals. Although uncommon, myiasis occurs when fly larvae infest and colonize necrotic or even healthy tissue. It often occurs in cases of neglect when people and animals are not able to physically take care of themselves, such as in cases of elderly and child abuse. In some areas of the world, this fly is known to carry 11 to 12 times more bacteria than a common house fly (*Musca domestica* L.), and some of those bacteria are resistant to antibiotics. Bacteria isolated from these flies include *Salmonella* spp. and *Escherichia coli*. The oriental latrine fly can mechanically transfer the bacteria it carries to humans by simply landing on a person or their food (Figure 3). Unlike other fly pests, blow flies cannot bite people, so they cannot pass bacteria or pathogens to us through a bite.

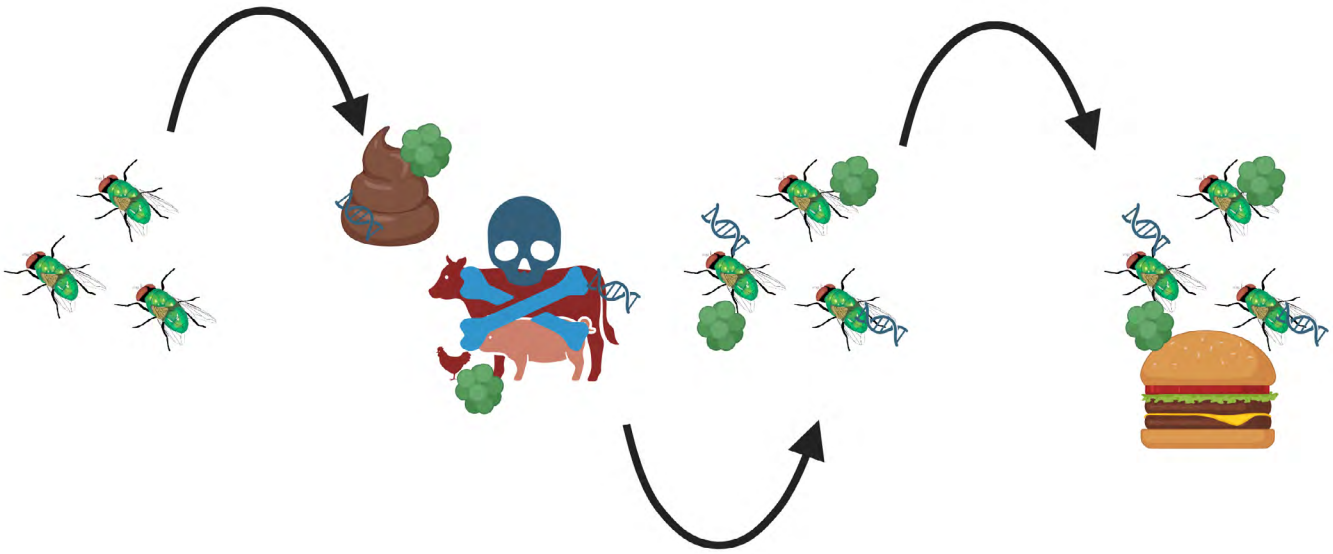


Figure 3: *Simplified version of mechanical transmission that occurs via blow flies. The DNA structure, or twisted ladders, and green circular structures represent potentially transferable microbes. Figure credit: Created in BioRender. Natalie Stovall from the University of Tennessee College of Veterinary Medicine. (2026)* https://BioRender.com/w3826qh.

How Are They Helpful?

The oriental latrine fly can be helpful in the field of forensic entomology. Forensic entomology is the application of arthropod biology to legal cases. As this species readily colonizes human remains in the US, it can be used to determine a minimum time elapsed since death (i.e., minimum postmortem interval, PMI_{MIN}). In the future, the oriental latrine fly could be one of the most important colonizers used in forensic cases in the United States.

Where in the World?

The oriental latrine fly is native to the Pacific and Australian regions and can be found primarily throughout the tropics and subtropics. This fly was first documented in the United States in the late 1980s on human remains in California (Figure 4). Since then, the oriental latrine fly has been reported in Alabama, California, Florida, Georgia, Indiana, Louisiana, North Carolina and Texas. While this fly has not yet established stable populations in Tennessee, higher average temperatures each year make this a possibility in the near future. As of 2020, we have documented it within Knoxville.

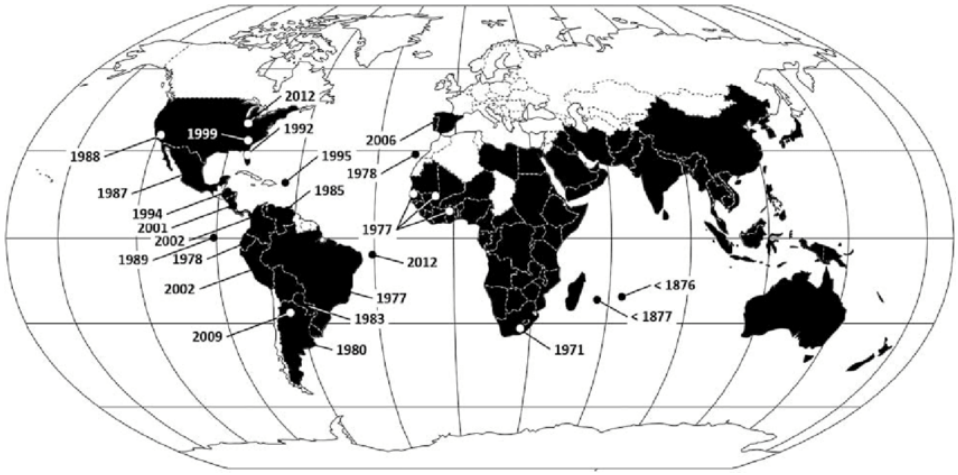


Figure 4: *Distribution map of the oriental latrine fly. Photo credit: "Geographical distribution of Chrysomya megacephala, by country, with year of discovery outside native range" by Rozane Badenhorst and Martin Villet under CC 4.0.*

What We Don't Know

Currently, we do not know when the oriental latrine fly will gain a stable, year-round population within Tennessee. As we have only recorded this species arriving in Knoxville from August to October in the last several years, we hypothesize that more southern populations must travel northward for most of the year before arriving in East Tennessee. As this is a tropical species, it is limited physiologically and cannot overwinter in colder climates. We are also unsure which disease-causing bacteria and pathogens the oriental latrine fly commonly carries in Tennessee, although ongoing research may reveal this soon.



Figure 5: *Sticky fly strip or ribbon used for monitoring flies. Photo credit: Picture licensed under CC2.0 by gothopotam*

Monitoring and Management

Monitoring flies can be an inexpensive, easy and effective way to identify species that are flying around your home. It also helps determine the relative population size, so you can take appropriate action before populations grow too large. Various sticky traps or ribbons (Figure 5) can be placed within and around your home to monitor for flies, but outdoor traps may catch non-target organisms. If you have a blow fly infestation problem or concerning population numbers, contact a pest management professional.

Blow flies are a common outdoor nuisance. They are attracted to the smell of our waste and trash. The best way to manage them would be to keep the area around your home clean. Do not leave food outside, keep tight lids on trash cans, and clean up after pets. Doing this will reduce potential egg-laying sites within and near your home. If you are hosting an outdoor event, keep food covered to prevent flies from landing on it and depositing bacteria. Dead animals near your home should be removed quickly to eliminate potential food sources for blow fly larvae.

What If I Find the Oriental Latrine Fly?

The oriental latrine fly has been detected in Tennessee in late summer/fall, but it does not appear to be established. While it is beneficial to help determine the time of human death using forensics, we are concerned about this fly's close association with people. Warmer temperatures may increase this fly's distribution and allow it to survive year-round. To help us track this fly's distribution in Tennessee, please submit specimens to your Extension agent, use iNaturalist.org to upload images with the location or contact the Owings lab.

iNaturalist is a great resource to become a citizen scientist and help track distribution changes of many different insect species. iNaturalist has a diverse group of people contributing, viewing the content and identifying uploaded images.

The Owings lab at the University of Tennessee is happy to identify potential oriental latrine fly finds! To send us specimens, please contact mvoss2@vols.utk.edu or cowings1@utk.edu.

Online Resources

County Extension office locations: utextension.tennessee.edu/office-locations-departments-centers/

Instructions for signing up and contributing to iNaturalist: inaturalist.org

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