

Flies in **X** MY Garden



All photos from my gardens in Harrisburg, PA

Objectives

1. Show flies in new and different contexts (other than pests)
2. Describe the roles that flies play in gardens in central Pennsylvania and elsewhere
3. Demonstrate that flies can be beneficial garden residents



Flies

- Order Diptera: means two wings
 - True flies = only one pair of wings
 - Diptera contains an estimated 1,000,000 species
 - Found in almost all terrestrial habitats in the world except Antarctica
 - Collectively referred to as business, cloud, swarm
 - Serve multiple functions in the garden
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Platycheirus scutatus

Pollinators



Mallota posticata

- May not be readily recognized as pollinators but second most important pollinators after bees and other hymenopterans
 - Most do not have specialized pollen-carrying hairs like bees = generally less efficient pollinators by comparison
 - Pollinate multiple garden plants, including a range of annual and bulbous ornamental flowers:
 - Pawpaw, skunk cabbage, goldenrod, and members of the carrot family
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Predators

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- Predators as larvae, adults, or both
 - Most common predatory fly: robber fly or assassin fly (family Asilidae)
 - Feeds mainly or exclusively on other insects
 - Long-legged fly captures smaller insects
 - Aphids, gnats, mites, and other tiny arthropods
 - Many members of the family Syrphidae are pollinators as adults but predators as larvae
 - Diet of the larvae of predatory flies varies by species
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Long-legged fly

Detritivores



Platycheirus scutatus

- Obtain nutrition by feeding on feces or detritus
 - Organic matter made up of dead plant and animal material
 - Detritivores and decomposers contribute to the breakdown of all dead and decaying material in any ecosystem.
 - Play a crucial role in the cycling of nutrients
 - Essential to most biogeochemical cycles:
 - Carbon, nitrogen, phosphorus
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Pollinators: Hover Flies, Family Syrphidae

- Adults of many species feed mainly on nectar and pollen
- Larvae (maggots) eat a wide range of foods depending on species:
 - Plants
 - Decaying plant and animal matter in the soil, ponds, and streams
 - Aphids, thrips, and other plant-sucking insects
- Larvae are important for biological control of garden pests



Hoverfly larva on eringyum stem.

Drone Flies, Genus *Eristalis*



- Large genus of hoverflies in the family Syrphidae
- Several species are known as drone flies because they resemble honeybee drones
- Many species in genus remain unknown, and basic information is yet to be discovered.

← species unknown, possibly *tenax*, the most widely distributed syrphid species in the world



Black-Shouldered Drone Fly, *Eristalis dimidiata*

- One of the earliest hoverflies to fly in the spring
 - Late March to mid-November further north
 - Likely overwinters as an adult
 - Adults live on pollen and nectar; larvae are rat-tailed maggots that live in water
 - Breathe through a long, snorkel-like appendage
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Transverse (Banded) Flower Fly, *Eristalis transversa*

- First officially described in 1830
 - Reported from North America east of the Mississippi River and into Southeastern Canada
 - Shown here on brown-eyed Susan
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Plain-faced Drone Fly, *Eristalis arbustorum*

- AKA: European drone fly
 - Identified near Toronto ~1885
 - Now occurs throughout much of the United States and Canada
 - Known as flower flies because they are commonly found on and around flowers:
 - Protein from pollen; carbohydrates from nectar
 - Larvae are aquatic filter-feeders of the long-tailed type
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Syrphus ribesii

- Very common Holarctic (most of northern hemisphere) species of hoverfly
 - Larvae feed on aphids
 - Like many other species of hoverfly, eyes of the males meet on the top of the head; eyes of the females more widely separated
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Platycheirus

- Large genus of hoverflies also called sedge sitters
 - Many stay active during cold and rainy weather
 - Adults of many species feed on pollen from a wide range of flowers
 - Larvae feed on aphids
 - Inconspicuous
 - Small, slender, often blackish appearance
 - Tend to remain hidden in vegetation
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Tufted Globetail, *Sphaerophoria contigua*

- In the larval stage, predator of aphids, mites, thrips, and Lepidoptera
 - Found in meadows, forests, bogs, marshes, beaches, and gardens
 - Males have an almost tubular abdomen with large genitalia at the end
 - Females have a wider, flatter, more oval-shaped abdomen
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Oblique Streaktail, *Allograpta obliqua*

- AKA: Common oblique hover fly
 - North American species
 - Larvae are important predators of aphids
 - Adults are pollinators
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Margined Calligrapher Fly, *Toxomerus marginatus*

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- Common species of hoverfly
 - Found in many parts of North America
 - Larvae are predators of thrips, aphids, and small caterpillars
 - Adults feed on a wide range of flowers
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Eastern Calligrapher Fly, *Toxomerus geminatus*

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- Observed in the eastern and central United States and Canada
 - Larvae are predators of a variety of aphids and mites
 - Compared to the female shown here, the male has a longer, thinner abdomen with less pronounced markings.
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Thick-legged Hover Fly, *Syrirta pipiens*

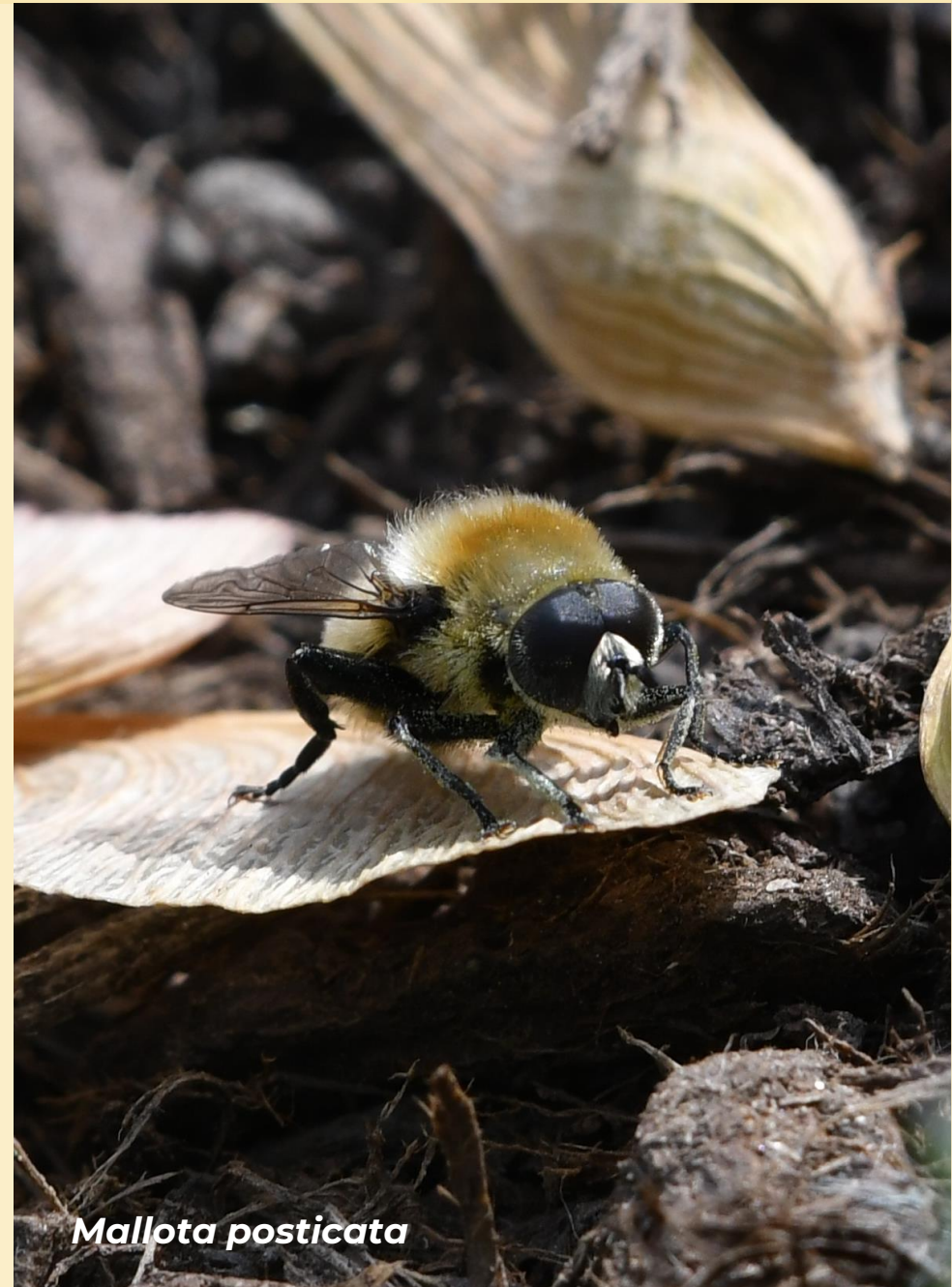


- One of the most common species in the Syrphidae family
 - Resembles many predatory species but is not predatory
 - Larvae found in and feed on rotting organic matter:
 - Manure, silage, garden compost
 - Adults critical pollinators for a variety of flowering plants
 - Hosts various parasitic wasp species
 - Important role in environmental functionality: can serve as bio-indicators
 - Abundance reflects health of environment
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Mimic Flies, Family Syrphidae

Some species in the Syrphidae family have appearances that mimic other insects, usually bees or wasps.



Mallota posticata



Williston's Wasp Fly, *Sphiximorpha willistoni*

- Rare species of syrphid fly found in eastern North America
- Strong wasp mimic with darkened forewing, elongate antennae, black and yellow markings on thorax, and banded yellow markings on a thin-wasted abdomen



- Larvae filter feed in sap in tree wounds
- Pupae have been found under black walnut bark
- Adults have been found associated with sap wounds on fallen Populus (poplar, aspen, and cottonwood)



Willison's wasp fly compared to *Polistes exclamans*, Guinea paper wasp.

Narcissus Bulb Fly, *Merodon equestris*

- Mimic fly in the Syrphidae family; aka greater bulb fly
 - Pollinator and horticultural pest
 - Adults are pollinators; larvae eat bulbs of plants in Amaryllidaceae family, especially narcissus
 - For this reason, considered synanthropic (lives near and benefits from humans); occurs in suburban parks, gardens, and horticultural land
 - Larvae take up to 300 days to grow; once hatched the adults only lives for 5 - 24 days.
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Mallota posticata

- Widely distributed genus well known for bee-like appearance
 - Larvae are detritivores:
 - Rat-tailed maggots that filter feed in water-filled tree holes
 - Adults are nectarivores
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Predatory Flies



Long-legged Flies

- Family Dolichopodidae; more than 7,000 species in about 230 genera worldwide
 - Adults are predators; capture gnats, aphids, mites, and other tiny arthropods
 - Mouthparts are knifelike and used to pierce prey
 - Diet of larvae varies by species: predators, herbivores, and scavengers (eat decomposing organic matter)
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Predatory Flies

Robber Flies or Assassin Flies



- Family Asilidae
 - ← *Laphria thoracica*, a bumble bee mimic robber fly
 - Powerful, bristly flies with short, stout proboscis enclosing the sharp, sucking hypopharynx
 - Feed mainly or exclusively on other insects
 - Wait in ambush and catch their prey in flight
 - Attack a very wide range of prey
 - May deliver intensely painful bites to humans
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Parasitic Flies

Myopa vesiculosa

- Genus of parasitic flies in family Conopidae, aka bee grabbers/wasp grabbers or thick-headed flies
 - Parasitize western honey, miner, and digger bees
 - Female pounces on a host bee in flight
 - Inserts ovipositor between two abdominal segments, inserts a single egg, flies away
 - Larva feeds in the abdominal cavity; eventually kills the host
 - Adult fly emerges from abdomen of the dead host
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Parasitic Flies

Tiger Bee Fly, *Xenox tigrinus*

- Family Bombyliidae (bee flies) found in the eastern United States and southern Ontario
 - Members of family parasitize the larvae of other insects
 - Distinctive wing pattern resembles tiger stripes
 - Female deposits fertilized eggs in carpenter bee nest
 - Larvae hatch and consume the carpenter bee larvae
 - Most common parasite of the eastern carpenter bee, *Xylocopa virginica*
 - Also considered a pollinator
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Other Garden Flies

Common Green Bottle Fly, *Lucilia sericata*



- *Lucilia*: genus of blow flies in the family Calliphoridae; various species commonly known as green bottle flies
- Found in most areas of the world – *sericata* most well-known green bottle fly species
- Larvae feed exclusively on dead organic tissue; adults eat carrion, feces, pollen, nectar
- Important pollinators in native ranges and important agents of decomposition
- Pollen may be used as an alternative protein source when carrion not reliably available
 - Frequently visit myophilous (pollinated by flies) flowers such as the oxeye daisy
 - Particularly attracted to sapromyophilous flowers (smell like carrion) -- trick the flies into pollinating them by mimicking the scent of a dead animal or dung





Blue-Bottle Fly, *Protophormia terraenovae*

- Family Calliphoridae; aka northern blowfly, blue-assed fly, or blue-arsed fly
 - Known for
 - Negative: economic effect as a myiasis (fly strike) pest of livestock; maggots burrow into live tissue
 - Positive: antibiotic benefits of maggot therapy
 - Positive: among most accurate forensic indicators of time elapsed since death
 - Larvae and adults scavenge in carrion and excrement; adults can also feed on nectar
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Black-Horned Gem, *Microchrysa polita*

- Family: Stratiomyidae
 - Species of soldier fly found in Europe, Asia, and North America
 - Breeds in dung, rotting vegetable matter, and compost heaps
 - Adults feed on flower nectar
 - Larvae feed on decaying organic matter
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Picture-Winged Fly, *Delphinia picta*

- Family Ulidiidae; most herbivores or detritivores
 - *Delphinia picta* is a detritivore
 - Found in many locations: temperate deciduous forests, landfills, shaded fields, swamps
 - Female lays eggs in decaying herbaceous material
 - Development of larvae and pupae affected by amount of daylight
 - One generation lives from May to July; second generation overwinters as mature larvae
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Narrow Banded Picture-Winged Fly, *Ceroxys latiusculus*

Larvae develop in the seed heads and eat plants in Asteraceae family, genus Senecio, including ragworts and groundsels



Sunflower maggot, *Strauzia longipennis*

- Large species of tephritid fruit fly
 - Minor pest -- larvae mine stems of sunflowers
 - Damage from larval feeding on spongy tissue is usually light
 - Larvae do not damage the flower head or seeds, but those of other fruit fly species do
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Mydas Flies

- Family Mydidae; generally large, including the largest known fly, *Gauromydas heros*
- Many mimic stinging hymenopterans, especially wasps
- When immature, prey on soil-dwelling insect larvae
 - Especially coleopteran (beetle) larvae, including white grubworms
- Infrequently encountered because the adult life span is very short



Mydas clavatus





Lance Flies

- Family Lonchaeidae; includes 610 species in 10 genera
 - Small flies with varied biology
 - Larvae of different species feed on plants, damaged plant tissues, or feces, or they can be predators
 - Larvae of some species cause formation of galls on plants; other species live in juicy fruits
 - Some species are agricultural pests of plants:
 - Cassava, passion fruit, fir and spruce trees, and figs
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A close-up photograph of a frog in a pond. The frog is the central focus, with its head and eyes clearly visible. The water is dark and reflects the surrounding greenery. The background is filled with bright green, out-of-focus foliage, creating a bokeh effect. A yellow, cloud-like thought bubble is positioned in the upper right quadrant of the image. The text inside the bubble is written in a simple, sans-serif font. The overall scene is bright and natural, capturing a moment in a pond's ecosystem.

...for all the lovely flies!

Thank you!