

LECTURE #18: **Select Flies**

Class Insect - the insects

Order Diptera - flies

Family Muscidae (Filth Flies)

Musca domestica - house fly

Morphology - have fleshy, sponging mouth parts that feed on liquid or small particles of organic matter produced by digestive juices regurgitated onto food source.

Life cycle

- Eggs deposited on decaying organic matter - hatch in 8 to 12 hr.
- Larvae are one of common maggots found in decaying matter - larval stage lasts about 5 days.
- Pupal stage in soil or drier areas for 4 to 5 days.
- Total life cycle about 10+ days and can have 10 to 12 generations in a summer.
- In N.C., will breed year round.

Pathology

- excellent vector because it vomits to digest food and it defecates at random.
- Suspected vectors of anthrax, salmonella, polio, cholera.
- Vector for *Habronema musca*, *H. megastoma*, fowl tapeworm, *Entamoeba*, *Giardia* and *Cryptosporidium*.

Stomoxys calcitrans - stable fly

Morphology: Resembles house fly but has sucking mouth parts visible as a narrow pointed, shiny black proboscis protruding bayonet-like in front of head.

Life cycle

- Breed in decaying straw, rotting vegetable matter and especially a mixture of straw and manure.
- Usually 25 to 50 eggs deposited.
- Larvae hatch in 1 to 5 days and bury themselves in their food.
- Larvae move to dry parts of the breeding medium and pupate. Pupal stage ranges from 5 to 26 days.
- Adult males and females feed on blood. Do NOT stay on host after feeding. Prefer light, found on outside walls of buildings.

Pathology

- Bites are extremely painful. Feed on cattle, horses and humans.
- Can transmit surra, anthrax, brucellosis, *Habronema microstoma*.
- Losses include weight loss and low feed efficiency.

Control: eliminate breeding sites (damp bedding, ect.), apply insecticide to walls and animals.

Difficult to control flies coming from another farm up to 2 miles away.

Haematobia irritans - horn fly

Morphology

- Resembles the stable fly but is much more slender, about half the size of the house fly.
- Mouth parts resemble the stable fly except labium is heavier and the palpi, almost as long as the proboscis, are flattened.

Life cycle

- Eggs deposited on **fresh** cow manure.
- Eggs hatch in 24 hours and the larvae burrow through the droppings and mature in 4 to 8 days to become pupae.
- Adults emerge from the puparium in 6 to 8 days and **will always be on host**. On the back; or, when raining or very hot, on the abdomen. Leave host only to lay eggs and when host goes inside. Adult females AND males are **blood feeders**, biting upto 40 times/day.

Pathology

- Main damage by irritation and annoyance. Prefer cattle.
- Heavily infested cattle may lose 15 pounds flesh per day and milk production reduced 10 to 20%.

Control: use in-feed tetrachlorvinphos or methoprene to be in feces. Topical eprinomectin or other avermectins.

Musca autumnalis - face fly

Morphology

- Little larger than the house fly.
- Abdomen of female is black on the sides in contrast to yellowish color of the house fly.

Life cycle

- Eggs have a respiratory stalk and are laid just beneath the surface of **fresh** cow feces.
- Hatch in about a day into a yellowish larva.
- Larvae develop in 2 to 4 days.
- Puparium is dirty white.
- Total time for life cycle about 14-21 days. Adults overwinter in barns, but in summer will not follow animals into buildings.

Pathology

- Annoy animals by feeding on secretion around head.
- Can transmit the bacteria causing pinkeye and the nematodes *Thelazia* and *Parafilaria bovicola*.

Control Area insecticide sprays, fly baits, tetrachlorvinphos in-feed.

WHAT ARE THE 4 “FILTH FLIES”? HOW IS EACH DISTINGUISHED BY FEEDING AND BREEDING HABITS?

Myiasis - Invasion of tissue by dipterous larvae

Family - Calliphoridae

Calliphora vomitoria - blue bottle fly

Phaenicia (Lucilia) sericata - yellowish green sheep strike

Phormia regina - black blow fly

Cochliomyia (Callitroga) macellaria - secondary screwworm

Morphology - slightly larger than *Musca*, bright metallic color.

Life cycle

- Eggs laid in carrion or decaying vegetable matter, diseased tissue or in wounds and hatch in 24 hours.
- Larvae feed on material for about a week.
- On reaching maturity, larvae drop to ground or crawl to a dry area and form puparium. Adults emerge in about a week. Life cycle complete in 10 – 25 days.

Pathology

- Maggots may infect wet, soiled wool or hair coat that previously supported bacterial growth generating odor. This is called “**strike**”. If the area is not treated, healthy tissue may be invaded.
- Usually a complex sequence of different species of Calliphoridae maggots inhabit a strike site.

Cochliomyia (Callitroga) hominivoraux - primary screwworm

Morphology – same as less aggressive secondary screwworm, but larva has pigmented tracheae visible the length of the body.

Life cycle

- Females deposit batches of 10 to 400 eggs in shingled masses on edge of wound.
- Larvae hatch in 11 to 22 hours and then feed on living tissue for 3 to 5 days.
- The pupal stage is spent in the ground for about 7 days.
- Female fly copulates only once. Release of **irradiated male pupae** permitted eradication from southeastern U.S. Male flies are sexually active but females that copulate with these males produce sterile offspring. Females mate only once.

Pathology

- The **primary screwworm is a true obligate parasite** and lives only in the living flesh of warm-blooded animals.
- Only a small break in integument will permit infestation.

Control: irradiated male fly pupae release on large scale. Otherwise, where endemic, use injection of ivermectin prophylactically for new borne calves (umbilical lesions) and calves at castration.

Family Gasterophilidae

Gasterophilus intestinalis - horse bot fly

G. nasalis - throat bot fly

G. haemorrhoidalis - nose bot fly

Morphology

- all of the bot flies (*Gasterophilus*, *Hypoderma*, *Oestrus*, *Cuterebra*, *Dermatobia*) are similar in that they are large, heavy bodied like either honey bees or bumble bees, but they lack mouth parts.
- Third stage (instar) larvae are mature bots, 1 -2 cm long, 0.5 - 1 cm in diameter.

Life cycle

- The adult flies emerge during the latter half of the summer and live for about 3 weeks. *G. intestinalis* deposit eggs mainly around the fetlock and forelegs. *G. nasalis* deposit eggs on the hair of the intermandibular area and *G. haemorrhoidalis* deposit eggs on the nose and cheek. *Gasterophilus sp.* are host specific to equids.
- The eggs are ready to hatch in about 10 days. Those of *G. haemorrhoidalis* and *G. nasalis* hatch spontaneously but those of *G. intestinalis* require licking or rubbing.
- Larvae penetrate the mucosa of the cheek, gums and tongue for about a month and then pass to the stomach.
- *intestinalis* attach near cardiac region and *G. nasalis* near the pylorus.
- Larvae remain in the horse for 8 to 10 months and then pass out in the feces. *G. haemorrhoidalis* attach to the anus for a short time before passing to the outside.
- Pupation takes place in loose dirt and after 3 to 5 weeks the adults emerge to breed and lay eggs (no feeding).

Pathology

- Adult flies annoy horses
- Heavy infestation causes damage to mucosa of mouth and stomach.
- Can block the pylorus.

Control: Treat after “fly free date”, that is usually the first hard frost.

Family Hypodermatidae - cattle grubs, ox warbles and heel flies

Hypoderma bovis - northern cattle grub.

H. lineatum - cattle grub

Morphology - see above, very similar to other bot flies.

Life cycle

- Females lay as many as 800 eggs on hairs of cattle's legs.
- Hatch in about 4 days and crawl down hair and penetrate skin.
- *lineatum* migrates in the subcutaneous tissue to the esophageal submucosa where it remains until midwinter and then migrates down the esophagus to the diaphragm up through loin muscle so it lives in a submucosal subcutaneous cyst.
- *bovis* migrates through the spinal canal and muscles of the back.
- Both species cut holes in the skin of the thoracolumbar region.
- At end of development period 5 to 10 weeks, larva enlarges hole and works its way out and falls to the ground.
- Pupation occurs in loose dirt for 4 to 5 weeks.

Pathology

- Treatment that kills bot while in the spinal canal or esophagus leads to paralysis or bloat. Treat immediately after fly season ends; do not wait until late fall or winter.
- Cattle have instinctive fear of adult flies and are stampeded by them.
- Migration of larvae through loin muscles causes a greenish tract resulting in condemnation.
- Hides penetrated by larvae are downgraded.

Control:

- Treat late summer to early fall, before the end of "safe period"
- Trichlorfon or eprinomectin or other avermectin.

Family Oestridae - head maggots

Oestrus ovis - sheep bot

Morphology - see above

Life cycle

- Females deposit active larvae in the nostrils of sheep and goats during summer or early autumn.
- Larvae crawl up nostrils into sinuses where they attach to mucosa and feed.
- By spring, the larvae are developed and crawl down nostrils to be sneezed out.
- Pupation in soil lasts 3 to 6 weeks.

Pathology

- Heavy infestation can be fatal if there is penetration into the cranium.
- Animals show great distress by sneezing and shaking of head, loss of appetite and a purulent discharge.
- Control: systemic ivermectin, other macrocyclic lactones.

Family Cuterebridae

Cuterebra sp.

Morphology - see above. Rarely see adult because fly does not contact the host.

Life cycle

- Fly lays eggs at rabbit, squirrel and rodent borrow entrance.
- Mechanical stimulation of entering animal, including snooping cat or dog, causes larva to come out of nit and move onto and into host.
- Enter through natural orifice (nose, mouth, orbit of eye).

Pathology –

- subcutaneous cyst containing bot at head or neck of dogs and cats and squirrels. Usually see fully developed swelling containing bots in early Fall.
- In rodents bots often develop in the scrotum.
- Cerebrospinal cuterebriasis in cats associated with seasonal Feline Ischemic Encephalopathy (summer). Clinical signs: depression and blindness.

Treatment

- Very careful surgical removal, do not rupture bot.
- Clean wound.

Dermatobia hominis - human skin bot.

Morphology - see above. Adult fly does not contact host.

Life cycle

- Eggs laid on a mosquito or stable fly (“slave fly”)
- Larvae hatch and enter the host upon which the slave fly is feeding.
- Bot develops under skin for 6 weeks before emerging.

Pathology

- Subcutaneous cyst containing pear shaped bot in man, cattle, sheep and other mammals in Central and South America.
- Feel painful swelling with movement of bot.

Treatment

- Covering opening in swelling (and bot spiracles) with ointment may cause the bot to emerge.
- Most commonly careful surgical removal is done.

=====