SELECT FLIES

Order Diptera – (2-winged) flies

Family Muscidae (Filth Flies)

Musca domestica - house fly

Morphology

- Fleshy, **sponging mouth parts** for feeding on liquids and organic matter.

Life cycle

- **Eggs deposited on decaying organic matter.**
- Larvae (called maggots) are found in decaying matter.
- Pupa develop in a puparium, and emerge as an adult fly.
- In N.C., will breed year round.

Pathology

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

Musca autumnalis - face fly

Morphology

- Little larger than the house fly.
- **Sponging mouth parts**

Life cycle

- **Eggs laid in fresh cow feces.**
- Larvae, pupae, adults.
- Adults overwinter inside barns, but in summer will not follow animals into buildings.

Pathology

- Annoy animals by feeding on secretion around eyes, head and wounds.
  - Can transmit the bacteria (*Moraxella bovis)* that causes pinkeye in cattle (infectious bovine keratoconjunctivitis).
  - Vector for the nematodes *Thelazia* and *Parafilaria bovicola*.

Control

- Area insecticide sprays, fly baits
- **In-feed insect growth regulators are passed through the cattle and in the feces, and affects the larvae within the fecal pile.**

Stomoxys calcitrans - stable fly

Morphology:

- Resembles house fly but has **sucking mouth parts** (long bayonet-like proboscis).

Life cycle

- **Breed in decaying hay, straw, rotting vegetable matter**.
- Eggs, larvae, pupae, adult flies
- **Adult males and females feed on blood.**
- Leave host after feeding.
- Prefer light and are 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:: weight loss and low feed conversion.

Control

- Eliminate breeding sites (damp bedding, old hay, old straw, etc.)
- Apply insecticide to walls and animals.
- Difficult to control flies coming from another farm up to 2 miles away.

Haematobia irritans - horn fly

Morphology

- Smaller than a stable fly, has shorter **sucking mouth parts** (short bayonet-like proboscis).

Life cycle

- **Eggs laid in fresh cow feces.**
- Larvae, pupae, adults.
- **Adult fly will always be on host**.
    - Mostly on the back;
    - or when raining or very hot, will be on the abdomen.
    - Leave host only to lay eggs or when host goes inside.

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

- Topical sprays, dust bags, back rubs, ear tags, fly vacuums
- Area insecticide sprays, fly baits
- **Use in-feed insect growth regulators are passed through the cattle with the feces, and affects the larvae within the fecal pile**

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

Myiasis - Invasion of tissue by dipterous larvae

"Maggot" Flies

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, decaying vegetable matter, diseased tissue or in wounds.
- Larvae (maggots) feed on material for about a week.
- Pupate and adults emerge in about a week.

Pathology
- Maggots may infest wet, soiled wool or hair coat that supports bacterial growth, generating a foul odor. This is called **"fly 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.

Treatment
- Physical removal
- CapStar® (nitenpyram) to kill prior to physical removal
- Treat wound accordingly

Cochliomyia (Callitroga) hominivoraux - primary screwworm

Morphology
- More aggressive maggots.

Life cycle
- Females deposit batches of eggs in shingled masses on edge of wound.
- Larvae (maggots) hatch and **feed on living tissue**.
- Pupae develop on the ground.
- Female fly mates only once.
    - (The 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.)

Pathology
- The **primary screwworm is a true obligate parasite** and feeds only on the living flesh of warm-blooded animals.
- A small break in integument will permit infestation. (barb-wire scratch, tick bite, etc.)

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.

Bot Flies

Morphology

- All of the bot flies (*Gasterophilus, Hypoderma*, *Oestrus*, *Cuterebra*, *Dermatobia*) have similar morphology.
  - Adult Bot Flies are large, heavy bodied (resembling large honey bees or bumble bees), but they lack mouth parts.
  - Bot larvae are large, thick with spines or bumps on their surface.

Family Gasterophilidae

Gasterophilus intestinalis - horse bot fly
G. nasalis - throat bot fly
G. haemorrhoidalis - nose bot fly

Life cycle

- The non-feeding adult flies emerge in late 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.
  - *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.
  - *G. haemorrhoidalis* and *G. nasalis* hatch spontaneously
  - *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.
  - *G. intestinalis* attach near cardiac region
  - *G. nasalis* near the pylorus.
  - *G. haemorrhoidalis* attach to the rectum
- Larvae remain in the horse for 8 to 10 months and then pass out in the feces.
- Pupation takes place in loose dirt and after 3 to 5 weeks the non-feeding adults emerge to breed and lay eggs.

Pathology

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

Control

- Treat after "fly free date", which is usually the first hard frost.

Family Hypodermatidae - cattle grubs, ox warbles and heel flies
Hypoderma bovis - northern cattle grub.
H. lineatum - cattle grub
Life cycle

- Females lay as many as 800 eggs on hairs of cattle's legs.
- Hatch in about 4 days and crawl down hair shaft and penetrate skin.
- *H. lineatum* migrates through the **esophageal submucosa** and eventually up through the loin muscles, and forms a subcutaneous cyst along the back.
- *H. 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 falls to the ground.
- Pupation occurs in loose dirt for 4 to 5 weeks.

Pathology

- Cattle have instinctive fear of the adult flies and are stampeded by them.
- Post-treatment pathology
  - Treatment that kills the older bots within the spinal canal or esophagus leads to paralysis or bloat.
- Economic Pathology
  - 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"
  - To avoid Post-treatment pathology
    - Treat immediately after fly season ends; do not wait until late fall or winter.
- Trichlorfon or eprinomectin or other avermectin.

Family Oestridae - head bots
Oestrus ovis - sheep bot, nasal bot
Life cycle

- Females larvaposite 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 in the environment near rabbit, squirrel, or rodent nest or burrow.
- Mechanical stimulation of nearby 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, cats, rabbits, squirrels. Usually see fully developed swelling containing bots in early Fall.
- In rodents, bots often develop in the scrotum. (aka emasculator bot)
- 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.

==========