Building a Successful Fly Control Program
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Cattle Pests - Flies

• “Pasture” breeding flies
  • Horn Fly – develop in fresh cattle manure
  • Face Fly – develop in fresh cattle manure
• “Premise” breeding flies
  • House Fly – develop in manure, spilled feed, garbage, etc.
  • Stable Fly – develop in manure/hay mixture

Horn Fly

Similar to house and face flies, except slightly smaller and with mouthparts adapted for blood feeding. Stable fly and horn fly share similar mouthparts. Face and house flies share similar mouthparts.
Family Muscidae
Horn Fly
Haematobia irritans

Horn Fly – Economic Importance

- Most economically important insect pest of pastured cattle in the U.S.
- Losses occur through blood loss and annoyance. Infestations of up to 10,000 flies per animal have been documented.
- Losses in cow-calf production is an indirect reduction in calf weaning weight. Reduction in calf weaning weights (vary from 18 pounds up).
- Stocker cattle gains may be reduced by 50 pounds.
- Linked to increased summer mastitis in cattle.
Horn Fly - Life Cycle & Biology

- Adult remains on host - except for egg laying.
- Eggs laid on fresh cattle manure, less than 10 minutes old, larva develop in manure.
- Both sexes feed on blood.
- Life cycle from egg to adult is from 9 - 12 days.
- Adults live from 6 - 8 weeks, mating occurs on the host about 3 days after emergence.
- Horn flies overwinter as pupae in the soil.
- Two seasonal peaks – Spring and Fall.

Management
Surveillance, Economic Thresholds and Counting Horn Flies

- Economic injury level is 150-200 flies per animal (75-100 dairy).
- Count flies on a minimum of 10 animals to obtain an average.
- Whole body, one side, two sides? Whole animal counts are more accurate but not always possible.
- In reality, counting the number of flies per side is the most feasible.
- When flies are less than 25 per animal count individually, when greater than 25 count in multiples of 5, 10, etc.

There are approximately 50 horn flies on this cow. Note that most of the flies are on the udder area but that a few flies are on the legs and head.

This cow has approximately 100 horn flies. Note that a majority of the flies are on the udder area. Horn flies on the eyes, head and neck of the animal. In Valerie mid-breast heat the flies may be observed on the belly of the cow.

Drawings of estimated population of horn flies on cattle; a = 50, b = 100 and c = 200.

Horn flies on bull and belly of Hereford.
Insecticide ear tags are important because they are long-lasting and slow release, resulting in exposure of multiple generations. When using insecticide impregnated ear tags, rotation of insecticide classes is critical to maintain insecticide susceptibility.

Managing insecticide resistance

- Target application to lactating cattle and growing calves (more potential for loss). Can create a refuge for susceptible flies.
- Rotate insecticide classes.
- Wait until horn fly population approaches 200 per animal (beef cattle).
- Use alternate insecticides and application methods, especially late in the season.
- Remove tags when the population declines in the fall (can increase the proportion of susceptible flies that overwinter).
- Change application methods – paired dust bags, back rubbers, pour-ons, sprays, mechanical traps or feed-through IGRs/larvicides.
Control Methods

Types of Insecticide Applications

• Insecticide Impregnated Ear Tags
• Trapping
• Self-treatment devices
• Feed-through larvicides and insect growth regulators
• Pour-ons
• Sprays

Insecticide Impregnated Ear Tags

• One treatment? Maybe, if horn flies are not insecticide tolerant and timed correctly
• Ear tag classes:
  • Organophosphate
  • Pyrethroid
  • Macrocyclic lactone
  • Pyrazole
  
Insecticide classes must be rotated

Some ear tags also control face flies; "Aids in control of face flies" or "reduces face flies" versus "controls face flies"
Examples of Ear Tag Rotation

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
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<tbody>
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<td>OP</td>
<td>ML</td>
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<td>ML</td>
<td>OP</td>
<td>Pyreth</td>
<td>Pyraz</td>
<td>ML</td>
</tr>
</tbody>
</table>

With multiple insecticide class, it is much easier to rotate now compared to a few years ago when we had only two insecticide classes.

Remember, non-ear tag control methods (dust bags, back rubbers, sprays, pour-ons and larvicides/IGRs) can be substituted for an ear tag. Be aware of the insecticide class.

Mechanical control: Passive trap

- Passive, no chemicals
- Restrict access to feed or water
- Animal must pass through trap
- Up to 70% control
- Cost (material): $500-600
## Horn Fly Demonstration – Dallas County

<table>
<thead>
<tr>
<th>Date</th>
<th>Average horn flies per animal</th>
<th>Trap</th>
<th>Control</th>
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</thead>
<tbody>
<tr>
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<td>5</td>
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<td>50</td>
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<tr>
<td>7/29/2004</td>
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<td>0</td>
<td>100</td>
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<td>150</td>
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<td>8/12/2004</td>
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<td>0</td>
<td>200</td>
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<td>250</td>
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<td>10</td>
<td>400</td>
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<td>15</td>
<td>450</td>
</tr>
<tr>
<td>9/23/2004</td>
<td>50</td>
<td>20</td>
<td>500</td>
</tr>
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### Treatment threshold
- 200 per animal

The charts show the increase in horn fly counts as the cattle were moved to another pasture, reaching the treatment threshold of 200 flies per animal on 9/16/2004.
**Pour-ons**

- A small amount of insecticide is poured down the backline.
- Rates vary ~ about ½ ounce.
- Higher insecticide concentration than sprays (>1%)
- Two types: traditional insecticide (pyrethroids) and endectocide (controls internal and external parasites).
- Endectocide pour-ons control cattle grubs, lice and horn flies, consider horn fly control as an added benefit.

**Conventional Pour-on Examples**

- Cylence (cyfluthrin)
- Brute, Boss, etc. (permethrin)
- Ultra Boss, Permethrin CDS, etc. (permethrin and PBO)
- Standguard (gamma-cyhalothrin)
- Ultra Saber & Cyonara Plus (lambda-cyhalothrin and PBO)
  - Aim-L Vet Caps contain the same A.I.

*Controls lice and face flies. Multiple applications are usually required. Depending on product, the minimum interval between applications is 2 or 3 weeks.*

**Endectocides for horn fly control?**

- Ivomec, Cydectin, etc. Pour-ons
- Probably best not to rely on endectocides alone to control horn flies (use when necessary for cattle grubs (Aug. 1 – Oct. 15) or lice).
- Ivomec pour-on will control horn flies from 14-28 days, meaning multiple applications may be required during a fly season.
Sprays

- Controls adult flies, ticks, lice
- High pressure sprays to apply a large volume of insecticide solution (1-2 quarts)
- Low-volume sprays apply about 2 ounces per animal, uses nozzles set up in gate or doorway where animal must pass

Spray concentrate examples

- Permethrin II, Atroban, GardStar, etc. (permethrin)
- Co-Ral Fly and Tick Spray (coumaphos)
- Rabon (tetrachlorvinphos)
- Ravap EC (tetrachlorvinphos and dichlorvinphos)
- Prolate/Lintox-HD (phosmet)

Permethrin and coumaphos will also control face flies. Most will control lice. Multiple applications are needed for season-long control.

Walk through sprayer

- Restrict access to minerals or water
- Animals are automatically treated as they pass through (electronic eye)
- Not to be continuously operated – operate only when fly numbers reach treatment threshold
- Commercial units are available
Solar-powered automatic sprayer

Horn fly demonstration – Washington County

Backrubbers and Dust Bags

- Self treatment device use pyrethroids or organophosphates
- Recharge when needed
- Backrubber is saturated with a light oil solution containing insecticide
- Dust bags are closed mesh burlap bags containing insecticide dust – no mixing necessary
- Best if forced use
Paired, forced-use dust bags

Forced-use backrubber

Insecticides used in self-treatment

- Backrubber
  - Organophosphates
    - Coumaphos (Co-Ral)
    - Phosmet (Prolate/Lintox)
    - Tetrachlorvinphos & dichlorvos (Ravap)
  - Pyrethroids
    - Permethrin
    - Permethrin and PBO

- Dust bags
  - Organophosphates
    - Coumaphos (Co-Ral)
    - Tetrachlorvinphos (Rabon)
  - Pyrethroids
    - Permethrin
    - Zeta-cypermethrin & PBO (Python)

Backrubbers equipped with face flips charged will control face flies.

Dust bags aid in control of face flies.

More effective if forced use. Animal must pass through on a daily basis.
Feed-throughs: IGR’s and Larvicides

- Consider proximity to untreated animals
- Kills face and horn fly larva developing in manure
- Insecticide mixed into trace minerals formulated as a block, as granular form mixed with mineral or feed, or as liquid feed
- Animals must eat a specified amount each day
- Examples: IGR’s - Altosid (methoprene), ClariFly (diflubenzuron). Larvicides – Rabon (tetrachlorvinphos)

Potential Issues with IGRs

- Proximity to untreated herd (immigration from nearby herds)
- Consumption (Are they consuming the IGR?)
- Start when flies appear in the spring or be patient (adult horn flies will live from 6-8 weeks).
- Worth considering for horn fly control, if fairly isolated from untreated herds, then the face fly control would be an added benefit.

http://www.uaex.edu/Other_Areas/publications/PDF/FSA-7031.pdf
Consult MP 144 "Insecticide Recommendations for Arkansas" which is updated yearly. http://www.uaex.edu/Other_Areas/publications/mp-144.asp. Read and follow the insecticide label.

**Family Muscidae**

**Face Fly**

*Musca autumnalis*

- Introduced into North America in 1952, native to Europe, China, North Africa, etc.
- Became common in Arkansas in the 1970s
- Biggest concern is in the north half of Arkansas
Face Fly – Economic Importance

- Economic losses from decreased weight gain, decreased milk production, and mechanical transmission of *Moraxella bovis*, a bacteria that causes pinkeye
- Does not reach pest status every year in Arkansas, usually only a major problem 1 or 2 years out of every 5 years.
- Population will spike as early as June and as late as August
- DO NOT PIERCE SKIN TO FEED ON BLOOD
- Feed on secretions around the eyes and nose, on wounds, etc.
- Feeding causes blinking and eyes to weep or "overflow"
- Readily feed on young and adult cattle and horses.

Face flies on cow (left) and calf infected with pinkeye (right).
**Face Fly Biology**

- Complete metamorphosis
- Eggs laid on fresh cattle manure, <10 min. old
- Life cycle from egg to adult is from 11 – 17 days
- Intermittent feeders, rest on fences, vegetation when not feeding
- Females feed on secretions around the eyes and on saliva
- Overwinter (hibernate) as adults in protected areas (barns, attics, uninsulated walls, etc.)

**Face fly hibernaculum**

Adults undergo a reproductive diapause

**Face Fly Management**

- Face fly are difficult to control because 1) they are found on the face (hard to treat area) and 2) are intermittent feeders spending little time on the host.
- Insecticide treatment may be necessary when an average of 10 flies per animal (face) are present.
- Self treatment devices (back and face rubbers, dust bags, face misters) provide control.
- Whole body spraying is effective but short-lived – 10-14 days
- Insecticide impregnated ear tags provide limited control (pyrethroid ear tags (2 per animal)) are generally more effective for face flies than the organophosphates.
- Some oral larvicides (Insect growth regulators such as Rabon – tetrachlorvinphos, and Clarifly – diflubenzuron) will kill larvae developing in the manure
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Cultural Control - Sanitation

• For many fly species, elimination of larval development sites is key to control
• Elimination of the sites for horn and face flies is not practical because they develop in undisturbed manure pats
• High stocking rates seen in some pasture rotations, manure pats may be destroyed thus reducing the number of newly developed horn and face flies