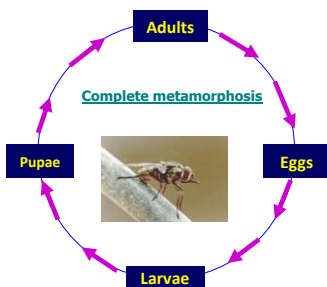


# Introduction to Fly Management

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## Introduction

- Flies are the most important insect pest of livestock animals and carry many disease agents
- This insect pest group includes: blood-sucking flies, nuisance flies, mosquitoes, and bot flies
- All flies exhibit the same life stages which include egg, larva, pupa, and adult fly



- Moist organic matter is ideal for fly development



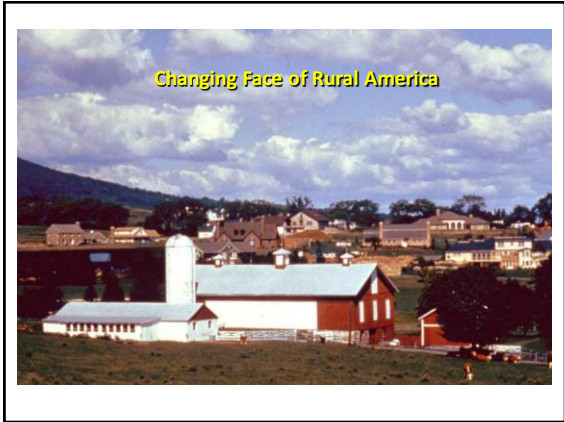
## Factors to Consider before Controlling Pests:

- Economic Threshold
  - Animals in good body condition can tolerate higher populations of pests before economic injury occurs.
- Pesticide Resistance
  - Many products are no longer as effective as they once were.
- Pest Biology
  - Reproductive potential of pest.
- Knowledge of Pesticide Classes
  - Rotate products.

## Flies on the Farm....

- Animal Health
  - Transmission of Disease causing Agents
  - Decrease Milk Production, Weight Gain
- Annoy / Irritate Animals & Farm Workers
- Off-Site Movement
  - Neighborhood Conflicts, Public Health
- Control Challenges
  - Pesticide Resistance and the FQPA





**Off Farm Impacts**

- **Publicity**
- **Public Health**
- **Neighborhood Relations**
- **Litigation?**

June 25, 2000

**Town Watches the Skies After an Invasion of Flies**

By THE NEW YORK TIMES

**N**APLES, N.Y., June 23 — Will they return, or is the worst over? Will the buzzing black masses swarm around homes, settling on screens and siding? Will they once again slip through the cracks around windows or fly in doors, landing on food and brushing across the faces of the sleeping? Will more barbecues be canceled, more garden parties postponed?

The Associated Press

Denise Wheaton scooped up dead flies from her porch last week after a black swarm descended on about half a dozen homes in Naples, N.Y.

If only the people of Naples knew. Last week, millions of flies hatched and descended on about half a dozen houses in town, three weeks after a local farmer spread 200 tons of chicken manure on a 20-acre field nearby. Some residents scattered to the homes of friends and relatives. The town's health officer, noting that dead flies were several inches deep around the houses, declared a public health risk. Neighbors banded together to pester county and state health and environmental officials for help. Town leaders fielded inquiries from news media as far away as Japan.

**Insecticide Resistance**

- House flies resistant to most insecticides
- Fewer insecticides registered for livestock use
- Few new chemistries on the horizon
- Food Quality Protection Act

**Food Quality Protection Act 1996**

- **FQPA - Mandates a single, health-based standard for all pesticides in all foods; provide special protections for infants and children; expedites approval of safer pesticides, and creates incentives for the development and maintenance of effective crop protection tools for American farmers.**

**Protect all food sources from pesticide residue!**

**FQPA and Insecticide Resistance**

- Few pesticides available for use
- FQPA = Even fewer pesticides
- House fly insecticide resistance is exceptionally high

**These two imminent problems demand a cost-effective INTEGRATED approach**

**IPM**

- **Integrated Pest Management (IPM)**
  - “Integrated” is the key word in IPM
  - Combines several different control strategies to prevent, lessen, or reduce the economic impact of pests
  - Strategies include:
    - Sanitation
    - Animal Husbandry
    - Physical
    - Biological
    - Chemical

<http://www.ento.okstate.edu/ipm/>

## Monitoring

### Spot Cards

- Count or estimate the # of spots
- Min. 5 cards, fly resting areas, distribute throughout facility
- 7 days/sample
- *Action Guideline:*
  - About 100 spots per week



## Monitoring - 3X5 Index "Spot" Card



## Sanitation

- One of the most basic components of IPM but yet the most under-utilized
- Flies will readily develop in areas where manure, a source of moisture, and spilled feed or hay are mixed together



## Sanitation (cont.)

- Areas to focus on are:
  - Around water troughs
  - Near feeding areas
  - Depending on the number of animals, a rotational program of cleaning animal areas or fly breeding habitats should be implemented
  - Either compost or dispose of waste away from animal dwellings



## Management Alternatives Cultural Control

### Disrupt Fly Life Cycle:

- Sanitation
  - Moist organic matter is...
    - *Paradise to a Fly!*
  - Clean manure, "soiled" bedding, moist hay / grain, spilled feed frequently at least weekly
  - Dry is good!
- Spread manure thinly
- *Disk in where possible*



## Management Alternatives Physical & Mechanical Control

- Sticky tapes, ribbons
- Fly swatter
- Fly-free zone in milk room
  - Screen doors & windows
  - Traps
  - Limited insecticides



## Animal Husbandry

- Healthy animals can tolerate fly infestations better than sick or convalescent animals
- Maintaining a healthy environment for animals especially pets is a critical step in control



## Physical control

- Physical barriers to prevent fly infestations or alter flies behavior can include tree lines, screening, and traps



## Physical control (cont.)

- Tree lines can act as vertical barriers from your horse operation to neighboring residential dwellings (more of a long term approach)
- Traps can be effective monitoring tools
- Traps are usually specific to certain fly species so finding one that catches all fly species will be difficult



## Traps (cont.)



## Treated Targets

- Treated targets that specifically have a blue/black contrast collected 6x more biting flies than the industry standard



## Biological Control



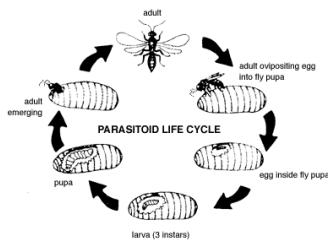
## Releasing Natural Enemies

- **Sanitation is the Foundation**
- **Insecticide Baits, Sticky Traps**
- **Parasitoids**
  - Start middle to late April
  - Weekly releases
  - Colony sold in a bag
    - Staple to post/rafter or scattered near targeted fly breeding area
    - Cost ~ \$14 / 10,000 / week



## Biological Control

- The use of one type of living agent to suppress another
- While beneficial insects most often come to mind, beneficial organisms also include mites, bacteria, fungi, and nematodes
- Parasitoid wasps are common and successful organisms that can be used for fly control



## Biological Control (cont.)

- Things to consider:



- Are house flies and stable flies your major problems? If the answer is no, then the parasite release program is not a good alternative because the wasps are best against those two pests.
- What type of waste management program do you have? Is most all manure, spilled feed, and hay around bunks removed regularly? If the answer is no, then there may be too much breeding area for house flies and stable flies for wasp releases to be effective.
- What types of wasps is the company offering and what will be the total cost of the program? How does that compare to your current expenditures for fly control?

## Biological Control (cont.)

- **Nematodes:**
  - Considerations:
    - Check the type of species to be sure it is compatible with soil type on your property (clay vs. sand)
    - These work similar to the wasps and are seeking the larval (maggot) stage
    - Rate: 10 million nematodes will treat 3,200 ft<sup>2</sup>



## Repellents



**Active Ingredients:** Lemongrass Oil (2.5%), Geranium Oil (1.05%), Geraniol (3%), Citronella Oil (1.5%), Sodium Lauryl Sulfate (0.6%), Potassium Sorbate (0.25%)



**Ingredients:** Diatomaceous Earth, Brewers Yeast, Thiamine Monohydrate, Garlic Niacin, Grape Seed Extract



**Active Ingredient(s):** Cypermethrin, 0.15%  
Piperonyl Butoxide 1.60%  
Butylacrylate 5.00%  
Other Ingredients 93.25%  
Total: 100.00%

## Semiochemicals

- Rosalva ( $LC_{50} = 26 \text{ ug/cm}^2$ )
- Citronellol ( $LC_{50} = 50 \text{ ug/cm}^2$ )
- Geranyl acetone ( $LC_{50} = 50 \text{ ug/cm}^2$ )



## Chemical control

- IPM programs are not designed to eliminate pesticides
- The result of this program will often lessen the amount of pesticides sprayed and reduce the number of applications
- However, pesticides are still an essential component of a successful pest management program



## Chemical control (cont.)

- Quickly suppresses the fly population
- Pesticides should be used when pest populations get out of hand
- Know the difference between products that can be applied to the animal and premise insecticides
- Formulation of the product is very important
  - Some products require mixing and others are "ready-to-use" products

## Chemical Control

- Adulticides
  - Fogs, space sprays
  - Residual premise sprays
  - Baits
  - Animal applications
- Larvicides
  - Manure applications
  - Feed additives

## Dimilin 2L



Percent emergence of house flies developing in manure treated with Dimilin 2L® at a dairy in Stillwater, OK 2007.

	% Emergence (SD)				
	3 DAT	7 DAT*	14 DAT*	21 DAT*	28 DAT*
Untreated Control	81.19 (6.70)	83.15a (3.59)	74.15a (6.31)	76.28a (9.52)	75.28a (8.76)
0.5 g a.i. applied @ 1 L/m <sup>2</sup>	77.00 (3.55)	57.33b (4.70)	59.34b (4.10)	67.04a (5.21)	61.62b (5.65)
1 g a.i. applied @ 1 L/m <sup>2</sup>	72.49 (5.53)	14.75c (3.05)	12.41c (3.91)	25.72b (5.13)	48.16c (3.99)
1 g a.i. applied @ 3.8 L/m <sup>2</sup>	74.74 (7.18)	14.39c (3.75)	11.05c (1.73)	21.07b (5.31)	42.70c (3.77)

\* Means followed by the same letter in a column are not significantly different  $P < 0.05$

## Rotations - What is it???

- Rotating between chemicals from different insecticide classes
  - Carbamates
  - Organophosphates
  - Pyrethroids
  - Pyrethrins

## Rotations - *Why?*

- Insecticides within a family act in similar ways
- Insecticides inhibit or over activate physiological functions
  - When insects overcome insecticide mechanisms = resistance
- Using permethrin and cyfluthrin results in resistance as quickly as if either were used alone

## Insecticide Resistance

- **House flies resistant to most insecticides**
- **Fewer insecticides being registered for livestock use**
- **Very few new chemistries on the horizon**
- **Food Quality Protection Act**

## Managing Insecticide-Resistant Flies

- **Sanitation - the first line of defense**
- **Sticky tapes, ribbons**
- **Use baits & space sprays for early season control**
  - use fly baits or pyrethrin
  - less harmful to natural enemies

## Managing Insecticide-Resistant Flies

- **Use residual premise sprays only as a last resort**
    - permethrin (Ectiban, Atroban) and cyfluthrin (Tempo) - harmful to natural enemies
  - **Alternate insecticides (different modes of action) to slow development of resistance**
- Example:**
- bait > pyrethrin space spray > bait > permethrin residual spray > organophosphate residual spray

## Does IPM work? Will it pay?



Relative efficacy and costs of conventional and bio-based management programs for flies in and around dairy barns.

	Conventional management	Bio-based management
Seasonal fly activity index (threshold=100 spots/card/wk)	149.1	71.8
No. insecticide treatments	14.7	2.7
Cost of insecticides	\$7.66/cow/year	\$1.53/cow/year
Cost of parasitoids	\$0.00/cow/year	\$4.64/cow/year
<b>Total costs</b>	<b>\$7.66/cow/year</b>	<b>\$6.17/cow/year</b>

Bio-based management is twice as effective, requires 80% fewer insecticide treatments, and costs \$1.49 less per cow per year than conventional management.



## Questions

