important to put the parasitoids where they will have time to act, so it a good idea to sprinkle the parasitoids in corners and nooks where a normal cleaning doesn't remove everything. Protection from wind is also important since the tiny parasitoids cannot fly well and a strong breeze can blow them away.

What about calf hutches and confinement areas?

Calf hutches and similar places are ideal fly-breeding areas, so you'll need extra parasitoids. We recommend one thousand *M. raptor* per week per hutch in addition to the regular order. Sprinkle around the inside edges of each hutch. One colony should be split evenly among ten hutches.

Isn't this expensive?

Biological control combined with good sanitation costs no more than a conventional pesticide program, especially when you consider application costs. In 2004, *M. raptor* cost about $14 per colony plus shipping charges. Altogether, it costs about $130 to supply a hundred-cow dairy for 4 weeks. When purchasing, be sure to ask for disease-free stock.

Where can I get *M. raptor*?

The following website lists suppliers of beneficial organisms. Be sure to ask for northeast-adapted varieties.

www.cdpr.ca.gov/docs/ipminov/bensuppl.htm

Cultural Controls

Add cultural controls such as tapes, traps, and lights ("bug zappers") to your arsenal. These generally target adult flies and don't harm beneficials.

Pesticides

-Use pesticides as a last resort.

-To avoid pesticide resistance, spray only when necessary.

-Minimize harm to beneficial species by using non-persistent sprays such as natural pyrethrins. Avoid residual premise sprays and manure or bedding treatments.

-Change classes of insecticide between successive applications to minimize the potential for resistance.

-Always read and follow label directions.

What about baits?

Baits are attractive to adult flies only and won't harm beneficials. Follow label instructions regarding rate and placement.

More questions?

Contact the Maine Department of Agriculture at (207) 287-7616, or visit:
www.maine.gov/agriculture/oanrr/IPM.htm

Managing Barn Flies

Maine Department of Agriculture
(207) 287-7616
www.maine.gov/agriculture/oanrr/IPM.htm

Adapted from “Barn Flies Management Guide” courtesy of the NY State IPM Program. 2003.

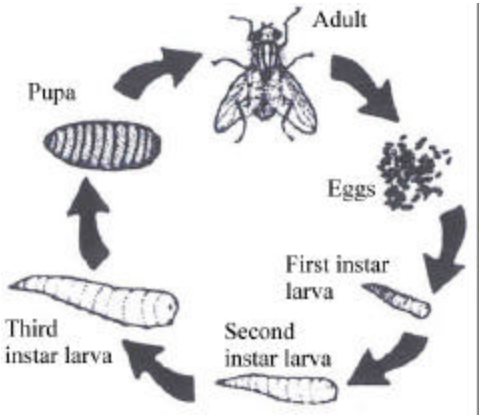
Sanitation

Good sanitation is the most effective and economical way to manage house and stable flies in dairy farms.

Where do flies breed?

In manure, bedding, spilled feed (hay, grain, and silage), or any other organic material.

How does sanitation help to control flies in the barn?



Females can lay up to 100 eggs at a time, every four days. Eggs can hatch within hours, and maggots (larva) may take only 7-10 days to become adult flies during summer months.

My barn is very clean, but I still have flies. Why?

Flies are probably breeding in other areas. Housing areas for calves, heifers, and dry cows are often neglected. Check watering (keep an eye out for leaky pipes and faucets) as well as feed mixing and distribution areas, along with any nooks and crannies that aren't cleaned regularly.

Biological Controls

All sorts of naturally occurring "beneficials"- spiders, beetles, mites, and diseases- attack flies in all life stages. Even the crushing weight of cows' hooves kill many. But barnyards are such fly-friendly environments that the beneficials need a boost.

You can supplement these beneficials with releases of the parasitoid *Muscidfurax raptor*. It attacks house and stable fly pupae (the life stage when larvae transform into adults).

Biological controls only work if you have a strong sanitation program in place.

Does *M. raptor* sting?

M. raptor parasitoids are hardly bigger than fruit flies. They never sting or bite humans, cows, dogs, or cats. They won't harm anything but the target species: house flies and stable flies.

When should parasitoids be released?

Release weekly for at least four weeks beginning in mid to late May. If flies continue to be problematic, continue weekly releases until late August. By September, most flies in the barn are migrants from elsewhere so later releases are unwarranted.

How often do I release them?

Research shows that weekly releases are effective.

How many *M. raptor* should I release at a time.

In general, use two hundred parasitoids per milking cow per week. For instance, if you have a milking herd of one hundred, order twenty thousand *M. raptor* (two colonies) per week.

IF YOU HAVE INDIVIDUAL CALF HUTCHES, ORDER MORE: You may vary this based on your sanitation efforts and your tolerance of fly populations.

How do I handle a shipment?

Colonies arrive in bags filled with wood shavings. The wasps are just about ready to emerge from host-fly pupa, so release them as soon as the package is received. Do not let the package sit in direct sunlight or in a very hot mailbox – too much heat will kill the parasitoids. If it is not possible to release them immediately, store them in a cool dark place.

How do I release the parasitoids?

Release the parasitoids by hand sprinkling the mixture in the bags throughout your barn. Try to put the parasitoids where they are going to be most effective: where flies are pupating. Pupation is the stage between larvae and adult, and often occurs where wet meets dry in manure, bedding, or feed. It is also