

Dairy Spring Fly Treatment Program

Pest control is a science. It starts by knowing the pest you are trying to control. This means understanding the life cycle and the stages of development of the pest. The treatment plan must be based upon the pest....not our schedules.

Fly Control Program

Treatment Summary

Begin your fly control program as soon as the warm weather arrives – temperatures above 65°F – and the first sign of a fly. Spray balEnce regularly. Strive to prevent the fly population from exploding.

If the fly population increases significantly, begin using parasitic wasps in combination with balEnce to boost the fly control program. When the flies are under control, move to a maintenance program using only balEnce once or twice a week.

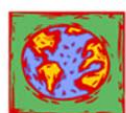
The more common flies found in dairies are the housefly, stable fly, face fly and horn fly. The issues are:

Housefly – The housefly is primarily, a nuisance but they do transmit diseases, and are present in very large numbers bothering the cows and workers. These flies have soft mouth tissue and do not bite.

Stable flies - The stable fly resembles the common housefly, but unlike the housefly, where the mouth part is adapted for sponging, the stable fly mouth parts have biting structures. The stable fly feeds on blood by biting its host causing the dairy cows to reduce milk production.

Face flies - The face fly is similar to the closely related housefly but is slightly larger. They feed on secretions around the eyes, mouth, and nostrils. The adult flies will also feed on the hosts' blood through wounds. The face fly transmits pinkeye to dairy cows causing lost revenue due to the downtime for treatment.

Horn flies – The horn fly is the smallest of the biting, blood-feeding fly and is gray in color. Horn flies are more prevalent in the spring and fall with a drop in population during the height of Texas summer heat and during the winter months. They are ferocious and painful biters and research has shown that more than 400 per animal will affect the health and productivity of cows.



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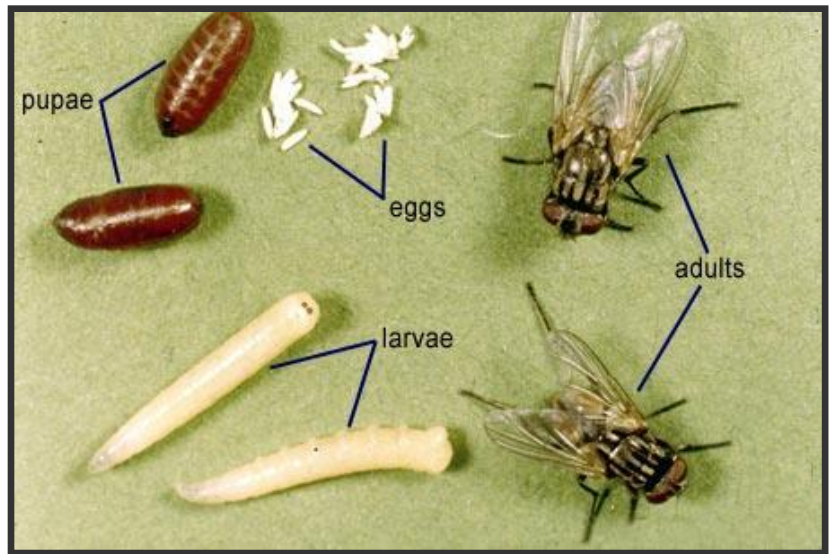
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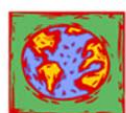
As all of these flies are in the same family, they have similar life cycles:

1. Egg
2. Larvae (maggots)
3. Pupa (hard shell cocoon in which the adult fly develops)
4. Adult fly



The length of time for each stage of development depends upon temperature; the higher the temperature, the higher the metabolic rate of the fly and the faster it develops; that is, the shorter the time from egg to adult. In very warm climates the time from egg to adult can be as short as 10 – 11 days. Although the adult only lives approximately 21 days, the females lay as many as 50 to 125 each time they lay eggs.

A single pair of flies could produce 10's of thousands of flies in a matter of weeks, which explains the fly population explosion in the spring. This is why it is so important to begin treating for flies with the first sign of a fly in the spring.



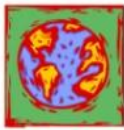
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Fly Control Program with balEnce BioPesticide



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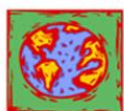
How to Use balEnce for Dairy Fly Control



Easy to Mix

- Determine the Area to be Treated
- Squeeze the balEnce bottle to fill the measuring section equal to the area to be treated. A 15 oz. bottle treats 40 - 50,000 sq. ft.
- Add balEnce to your sprayer
- Add water

balEnce Is
Chemical-Free
Natural & Organic



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How & Where to Apply balEnce

A Little balEnce Goes a Long Way.
Don't be Stingy with Your Spray

- Fog or Mist the Entire Area!
- Spray Everything in Sight- not just solid surfaces.
- Spray the walls, floors, ceilings, pens, and gates, etc.
- Spray Where Flies Breed, Roost and Hatch- around decaying organic matter - silage, hays, ponds, etc.
- Spray into and around calf hutches
- Spray over and under cows and calves



balEnce is Non-Toxic, Safe for Humans, Livestock, & Beneficial Insects

Watch the video at:

<https://terregena.com/dairy-farm-fly-control/>

balEnce™ for Control of Adult Flies and Fly Larvae in Dairy Facilities



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How to Spray balEnce Biopesticide for Dairy Fly Control



Watch later Share



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Frequency of Spraying balEnce

With the first warm spring weather and the first sign of flies, begin spraying balEnce twice a week – Monday and Thursday, for example. The flies did not die over the winter - - they were hibernating. As they warm, they become active. Kill the flies, especially the females, before they lay eggs, 50 to 125 at a time!

If the fly population increases, increase the spraying to three times per week – Monday, Wednesday, and Friday, for example. This will keep knocking down the fly population. As control of the typical spring explosion is achieved – this could take 4 or 5 weeks in some cases – the frequency of spraying may be reduced to twice a week and eventually to once per week as a maintenance program. balEnce has a residual – will stay active – for at least 30 days.

During this time, the naturally occurring beneficial insects, such as the hister beetle and earwig will begin to populate the area and help to control the fly population.

If the fly population continues to be high, it may be necessary to add help with more beneficial insects, specifically parasitic wasps.

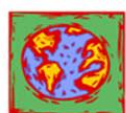
Parasitic Wasps in Addition to balEnce for Fly Control

It is recommended that 200 parasitic wasps per milking cow or 1,000 parasitic wasps per calf be released on a weekly basis. Each 50,000 unit package will release, approximately, 250,000 wasps; that means that each bag is sufficient for, approximately, 1,250 cows.

Beneficial Insects

Not all insects are bad. In fact, using “Beneficial Insects” to help control flies is a good idea. There are many insects including parasitic wasps, hister beetles and earwigs, that are discussed below, as well as mites and other beneficial insects. These beneficial insects feed on the eggs of flies to prevent them from hatching and fly larvae and keep them from pupating, thus killing the fly at two different stages of its life cycle before it can become an adult fly. These are naturally occurring predators of flies.

It is critically important to note that toxic chemical insecticides are broad spectrum - - that means that they kill everything! Including the beneficial insects. Once a farm begins using these chemicals, the beneficial insects are gone and the only recourse is the continued use of the chemicals, which may not be effective if the flies have already developed resistance to the chemicals.



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Technical Aspects Fly Control

balEnce - *Beauveria bassiana* Biopesticide – A Non-Toxic Insecticide

Beauveria bassiana is a naturally occurring fungus that is found worldwide. In fact, strains of *Beauveria bassiana* are typically found wherever there are insects – such as flies – in barns, stables, poultry houses, etc.

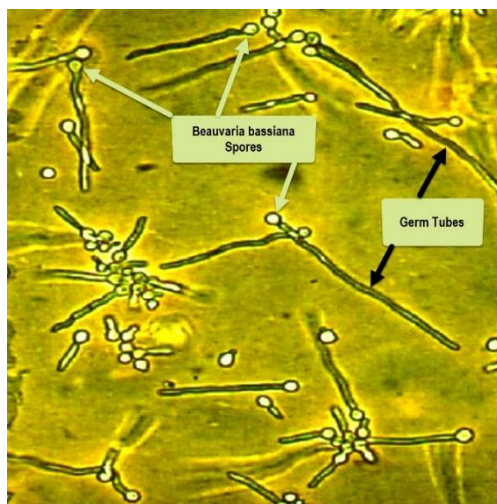
When animals congregate in large groups, such as dairies, they attract an overabundance of insects causing an "imbalance" in nature.

Beauveria bassiana exists as many different strains of the fungi. Each strain of the fungus is a host specific pathogen. That means that a particular strain of *Beauveria bassiana* can “recognize” a specific family of insects to the exclusion of all other biological entities, such as, other insects, animals, or humans. When the strain of *Beauveria bassiana* recognizes its host, the fungus infects the host by penetrating the host’s cells and growing inside the host insect. In the process of growing, the fungus kills the insect.

One particular strain of *Beauveria bassiana* is a host specific pathogen that uniquely targets and kills flies in the *Muscidae* family. The *Muscidae* family of flies includes the common housefly as well as horn flies, fruit flies, face flies, stable flies, black garbage flies and blowflies, among others. This particular strain of *Beauveria bassiana* will infect and kill all the flies in this specific family of flies but will not harm other insects such as beneficial insects (parasitic wasps, hister beetles, and earwigs), animals (dairy cows, poultry, horses, swine, cattle), humans or the environment.

balEnce Biopesticide Spray has been developed from the specific strain of *Beauveria bassiana* that is the host specific pathogen for the *Muscidae* family of flies, both adult flies and fly larvae.

balEnce is approved as a biopesticide by the US Environmental Protection Agency (EPA), the USDA National Organic Program for organic production and the PMRA, Health Canada.



The circles in the photomicrograph are the fungal spores. They begin to grow by producing germ tubes. As the fungus grows in the fly, the fly dies.

Beneficial Insects That Assist in Fly Control

Parasitic Wasps

Adult parasitic wasps are, approximately, half the size of a gnat.



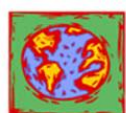
A tiny, female, parasitic wasp about to bore a hole in a fly pupa which is about the size of a grain of rice.

These tiny insects breed in fly pupae, feed upon and kill the developing adult fly. The adult female housefly lays her eggs in decomposing organic material. Within a short period of time, the eggs hatch into larvae (maggot stage)....that then move to dry manure and develop into pupae (cocoon stage). The female parasitic wasp seeks out and deposits her eggs inside the fly pupae. These eggs hatch and the parasitic wasp larvae begin to grow and feed on the developing adult fly, killing it. Parasitic wasps reproduce in two to three weeks, constantly reinforcing the beneficial insect population. There are many species of parasitic wasps. A mixture of species containing *Muscidifurax raptor* is the recommended for use on dairy farms. *Nasonia* parasitoids are inexpensive but are inappropriate for use in dairies.

For farms with an explosion of flies or large fly populations, parasitic wasps may be purchased to assist in reducing and controlling the flies. Terregena's parasitic wasps are customized so that the proportions of the three species of wasps match the dairy site conditions.

- ✿ *Muscidifurax raptorellus* — multiple wasps emerge from each pupa; this species is effective in moderate conditions and multiplies very rapidly.
- ✿ *Muscidifurax zaraptor* — a single wasp emerges from each pupa; this species is effective in cold, dry conditions.
- ✿ *Spalangia cameroni* — a single wasp emerges from each pupa; this species is effective in hot, dry conditions.

The combination of these three species provides cross-seasonal and cross-conditional fly control. Each 50,000 unit package will release, approximately, 250,000 wasps.



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Hister Beetles and Earwigs

This photograph below shows the size of the two beneficial insects, hister beetles and earwigs compared to darkling beetles.



Hister Beetles

These tiny, beneficial insects are excellent for controlling flies as each hister beetle eats, approximately, 40 fly eggs per day.

The hister beetle is very small and usually unnoticeable until someone points it out.

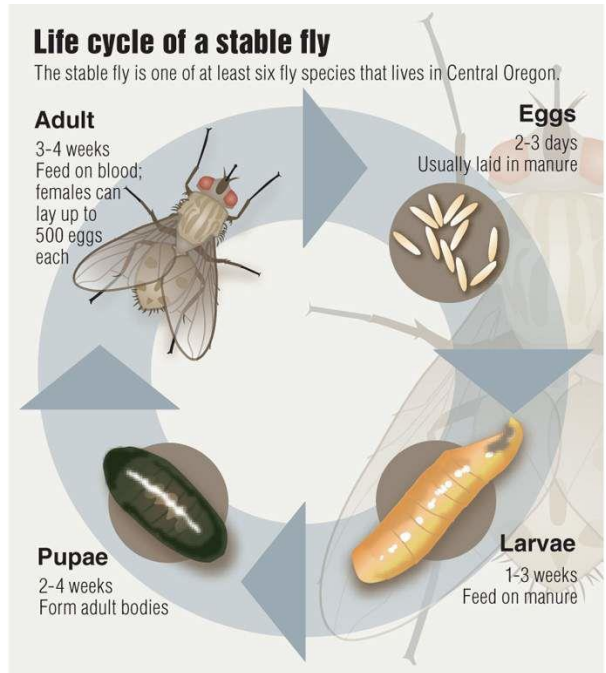
Earwigs

The earwig helps to control fly populations as they feed on both the fly eggs and fly larvae.

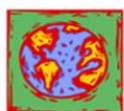
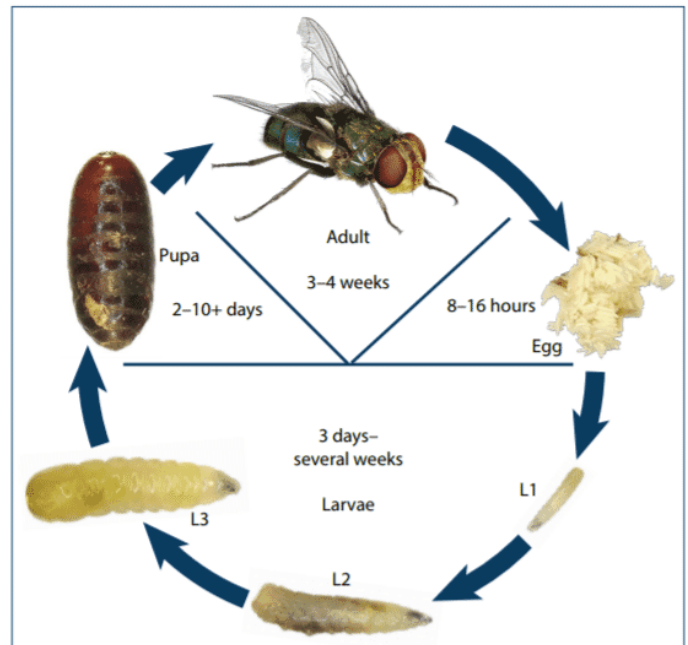


The Flies That We Need To Control

Stable Flies



House Flies



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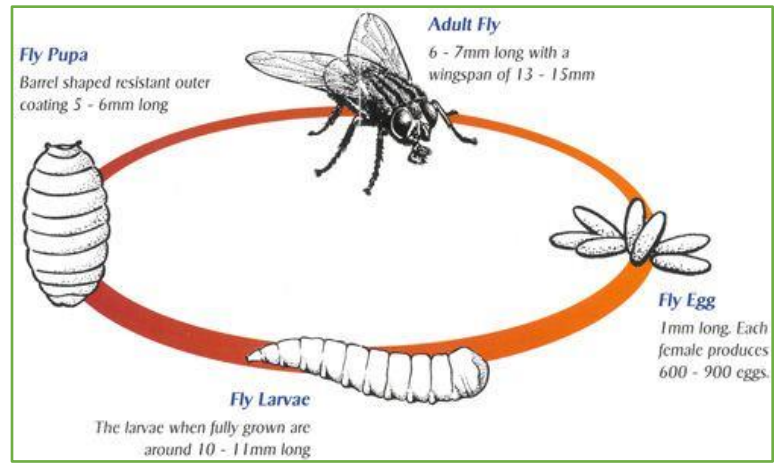
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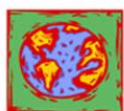
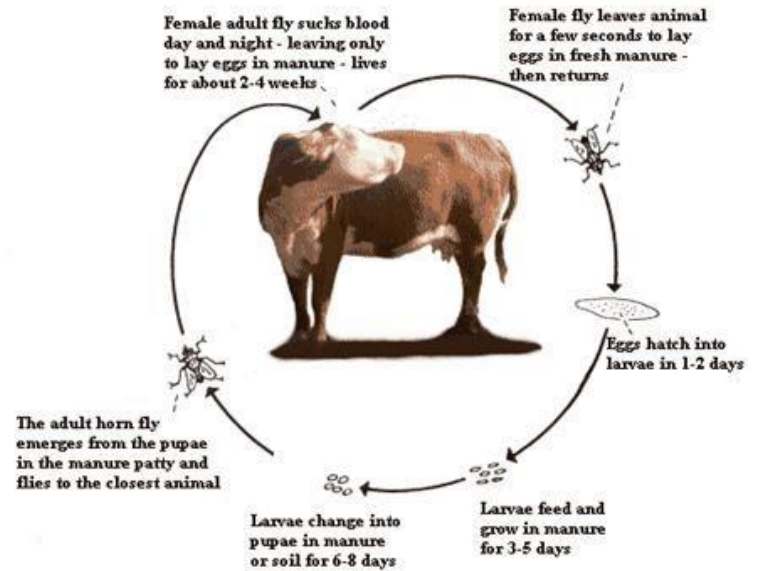
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Face Flies



Horn Flies



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