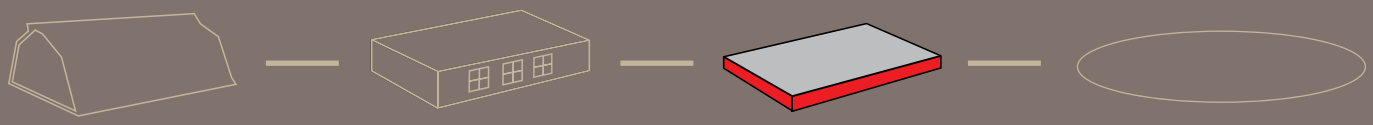
Rotation and Resistance Management

A guide to setting the bar for fly control on your operation



HIGH — MEDIUM — **LOW** — IN, ON AND AROUND

starbar®

A HIGHER LEVEL OF CONTROL

Flies Hinder Production

Fly control is an important part of production in agriculture. Flies impact producers in many ways: by being a nuisance, by biting, and in some cases by transmitting disease—all contributing to significant decreases in meat and milk production. Many nuisance fly larvae develop in manure, and as such are called "filth flies." This group includes house flies, stable flies, horn flies, and others that are often linked to production agriculture.

Non-biting

House Flies

(Musca domestica)

Nuisance flies that can transmit pathogens but do not bite. Larvae develop in rotting vegetation, manure, and numerous other sources. The adult flies feed on various sugar and protein sources; such as nectar, manure, milk, etc.

Biting

Stable Flies

(Stomoxys calcitrans)

Biting flies that feed on blood of numerous mammals including cattle, horses, and people. Larval stable flies develop in rotting hay and manure as well as numerous other rotting vegetation sites.

Biting

Horn Flies

(Haematobia irritans)

Biting flies that feed on blood of cattle and other large animals. Their larvae are unique in that they only feed on fresh cattle manure. The adults are unique in that they seldom leave their cattle host and are often spotted on the back or bellies of cattle in pastures.

Fighting Insecticide Resistance

Insecticide resistance is defined as a heritable change in the sensitivity of a pest population to a given product, a specific insecticide, or class of insecticides that share a common mode of action.

Scientists group insecticide resistance into categories such as metabolic (up-regulation of enzymes), genetic (mutations in the DNA), decreased permeability of the insect to active ingredients, and behavioral. Often, it is a combination of these factors that are responsible for introducing resistance in insect populations.

Control Flies with an Integrated Pest Management Plan

Integrated pest management (IPM) utilizes a multi-pronged approach for managing pest populations. The IPM process usually includes monitoring, cultural controls, mechanical controls, biological controls, and the responsible use of chemical controls. All of these components are important in developing an IPM plan for a particular farm or ranch.

IPM plans to control flies often involve using chemical controls known as insecticides. These insecticides are grouped by mode of action (MOA), which describes how the chemical functions at a cellular level to kill the insect. Often, when insecticides with a common MOA are overused, fly resistance can develop.

The Most Important Element for Relieving Resistance? Rotation. Rotation. Rotation.

One of the most valuable methods to resistance mitigation is rotation of active ingredient classes. Using a single active ingredient, as well as only rotating through a single active ingredient class (such as pyrethroids or organophosphates), will likely encourage resistance in a given fly population. Frequently, insects resistant to one insecticide are resistant to other insecticides in the same class. Unfortunately, it is not possible to predict in many cases, how long resistance development will take. In some areas, the onset of resistance may take a single season, while in other areas it may take several years.

If baits with different attractants, different active ingredients, and different modes of action are rotated and introduced consistently, their efficacy is increased and fly populations can be decreased. A rotational team, such as QuikStrike® Fly Bait, Golden Malrin® Fly Bait, and Cyanarox™ Insecticidal Bait from Starbar, helps ensure flies do not develop a resistance to any singular bait or insecticide.

QuikStrike® Fly Bait
Active ingredient: dinotefuran

Golden Malrin® Fly Bait
Active ingredient: methomyl

Cyanarox™ Insecticidal Bait
Active ingredient: cyantraniliprole

Resistance Management Strategies - House Fly

Use the Same Product Until It Is No Longer Effective

Apply the bait (always following label directions) continuously every other week until it no longer works, as indicated by fly population counts. This could take several months or several years depending upon numerous variables. When the bait fails to control the population, use a new bait with a different active ingredient. Use the second bait until the population monitoring indicates that pest flies are no longer being controlled. As with the first bait, this could take some time, so continue to monitor and apply new baits in the same manner.

A drawback to this method is that under continuous pressure, it is possible that the resistance mechanism for a given bait could be genetically fixed in the population, and there are a limited number of active ingredients and fly baits on the market. However, evidence suggests that rotation with different insecticide classes could help delay resistance to both classes simultaneously. Another potential issue is high fly populations may occur immediately before rotation to a different product.

Rotation by Date

Apply the selected bait for a set time period. In areas of the country with seasonal fly populations, this time period might be an entire year, while in continuous fly pressure areas (Florida, Texas, California), rotation might occur every six months or more frequently. Rotation would occur after each time interval through various active insecticide classes. The benefit of rotation by date is that the rotation schedule is well defined and should not allow the fly populations to reach undesirable levels between rotations. The risks in conducting rotation by date involve failure of a product occurring during the middle of a treatment period, if the rotation period is too long in duration for the area.

The Hybrid Strategy

A third example would be to combine the first two options. A bait is initially applied until product failure. In areas of the country with seasonal fly populations, this time period might be several years, while in continuous fly pressure areas (Florida, Texas, California), failure might occur faster. Rotation would occur to a different fly bait product when the first failed to control the fly population as defined by the population monitoring tool used. The second rotation would occur for a predetermined time period; for example, 3 months. After this interval, rotation to a third option would occur for a predetermined time period. Then, rotation would occur back to the first fly bait product used.

Fly Bait Rotation Trifecta

QuikStrike® Fly Bait, Golden Malrin® Fly Bait, and Cyanarox™ Insecticidal Bait can be used in rotation together to form a formidable rotational army to combat resistance. Each product uses a different active ingredient from a different class of insecticide. Rotating among these three diverse products can help you set the bar for fly control at the low levels of your operation.

QuikStrike® Fly Bait

- Active ingredient: dinotefuran
- A homogenous formulation
- Contains a Z-9 tricosene attractant that lures both male and female flies to the bait
- Equally effective scattered or in a bait station
- Large particle size
- Available in 1 lb., 5 lb., and 40 lb. sizes

Golden Malrin® Fly Bait

- Active ingredient: methomyl
- Consistent formula for killing power right down to the last grain of product
- Can be used daily, scattered, or in a bait station
- Available in 10 lb. and 40 lb. sizes

Cyanarox™ Insecticidal Bait

- Active ingredient: cyantraniliprole
- Low bulk density
- Suitable for use indoors (in a bait station) and outdoors
- No odor
- No dusting during application
- Available in 4 lb. and 28 lb. sizes

Always read and follow label directions. To learn more about Starbar® products and fighting fly bait resistance, visit StarbarProducts.com or call 1.800.347.8272

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CENTRAL Life Sciences®