The Impact of Fly Pressure and the Importance of Fly Control

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When winter is over and warm weather arrives, it is goodbye to plowing snow and dealing with frozen water and hello to green pasture and sunshine. The warmth of spring and summer can present new challenges with the hatching fly population. Livestock owners know flies cause pain and discomfort to animals but they can also have a negative economic impact. It is important to enter the summer season with an effective fly control plan in place to maintain animal health and minimize fly pressure effects on producer profitability.

When fly pressure is high, livestock will be stressed, spending much of their time moving to avoid areas of high fly pressure and engaging in behaviors such as tail swishing, stomping and licking to remove flies from their bodies. These behaviors have a negative influence on animal health and performance by decreasing both feeding and resting time of the animal. **Figure 1** shows some of the most common fly species and their correlating significance in the livestock industry.

Studies evaluating the economic burden of flies on the United States' cattle industry show an estimated total loss of over $4 billion annually. The top two contributors to this economic loss were Stable flies and Horn flies. Stable flies had the largest negative impact, estimated at over $2.2 billion in annual loss. Horn flies were ranked as the second most detrimental fly species with over $1 billion in estimated economic annual loss. These evaluations were based on decreased animal production and performance, as well as consequences on animal health and cost of disease treatment. Other fly species that were determined to cause stress and decrease performance in livestock were the House, Face, Horse, Deer, and Heel fly.

Figure 1 **FLIES THAT AFFECT LIVESTOCK**

			
Stable Fly	Horn Fly	House Fly	Face Fly
Stable flies prefer to land on the lower legs of livestock and need a combination of moisture, organic matter and animal waste to reproduce.	Horn flies feed mostly on an animal's back, shoulders and sides. An individual fly can bite their host up to 40 times/day.	While house flies do not have sucking mouth parts like the stable or horn fly, they are a nuisance to livestock and known for spreading disease.	Face flies congregate around the eyes and noses of livestock and spread disease causing pathogens.
Economic threshold of 5 flies/leg.	Economic threshold of 200 flies/animal.	Adult House flies can live for 3-4 weeks and produce up to 1,000 eggs each.	Known for negative economic impact in spreading *Moraxella bovis.* (pinkeye).

Source: Michigan State University & U.S. Meat Animal Research Center, John Keele, *"Host Susceptibility of Cattle to Horn Flies."*

There are several management tools and strategies producers can use to provide animals with relief from fly pressure such as removing waste (manure, urine and dirty bedding), providing shade for livestock and using fly traps and predatory fly parasites. One of the most important tools to have available is a safe, effective fly repellent. There are many fly repellent options on the market, making it difficult to decipher which repellent is the best choice. Crystal Creek® Fly Repellent is a proven, effective choice that can be used in multiple types of applications.

The efficacy of Crystal Creek® Fly Repellent was tested in a trial by an independent laboratory that specializes in performing insect repellent efficacy trials. Both the Crystal Creek® Water and Oil base Fly Repellent formulas were tested. Stable flies were used in this trial as they are one of the most aggressive fly species and, as previously discussed, cause the most economic damage. **Figure 2** is a summary of the study and its results.

Crystal Creek® is proud to offer customers a safe, effective fly repellent option that does not rely on chemicals. Crystal Creek® Fly Repellent Oil and Water base formulas are convenient to use, easy to mix and can be used as a spray-on, wipe-on or in oilers. Both formulas are clean, non-sticky and pleasant smelling. Crystal Creek® Fly Repellent is a proven, must-have tool for your fly control plan.

References available upon request.

Figure 2 CRYSTAL CREEK® FLY REPELLENT EFFICACY TRIAL

TEST INSECTS: Stable flies, Stomoxys calcitrans, < 3-day old adults.

EXPERIMENTAL DESIGN: Approximately twenty to twenty-five (20-25) non-blood-fed adult Stable flies were used in each experiment iteration. An artificial blood agar host consisting of a 10 cm Petri dish bottom containing approximately five warm blood-soaked cotton balls, covered with fine nylon mesh stretched to cover the Petri dish were used. This is similar to the procedure used to rear Stable flies in the laboratory, so the use of blood-soaked cotton balls as a nutritional source is well documented. The nylon mesh of the artificial host was treated with the test substance and each host was treated with approximately 1-2 g of each of the test substances and dilution rates. The treated nylon mesh was allowed to dry for approximately 15 minutes before being placed on the host and introduced into the test cages. Untreated "hosts" or mineral oil treated hosts were used as control replicates. This laboratory testing method is considered industry standard and in accordance with best practice testing methods.

The blood agar hosts were immediately placed in individual test cages after being treated and filled with warmed blood as either a treated replicate or an untreated replicate, with a total of 5 replicates in each test group. The number of Stable fly landings with intent to bite (LIB's) and blood feeding (BF) for each host were recorded.

RESULTS AND DISCUSSION: The adult Stable flies in the untreated control group fed well on this artificial host bioassay system with an average of 24.2 flies feeding or attempting to feed. Both control groups demonstrated feeding rates well above what was observed in the Crystal Creek® Fly Repellent treated groups. Data for the 5 replicates were pooled for each test group and the percent repellency determined. A modification of Abbotts formula was used to determine percent repellency:

$A - B \div A \times 100 = \%$ Repellency

A = Average Control Value
B = Average Treatment Value

Results of the repellency efficacy from 5 separate testing iterations:

Crystal Creek® Oil Base Fly Repellent 3:1	= 96.7% Repellency
Crystal Creek® Water Base Fly Repellent 3:1	= 77.7 % Repellency

CONCLUSION: Both the water-based and the oil-based formulations of Crystal Creek® Fly Repellent provided a high degree of repellency against adult Stable flies.