S-1030 (2007-2012)

Flies, Livestock & Food Safety

This project has developed tools and strategies to manage house and stable flies, reducing loss to producers as well as nuisance and health risks they pose to livestock and humans.

Who cares and why?

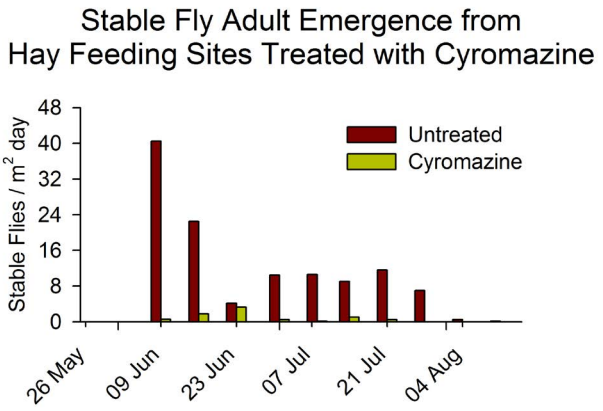
House flies, stable flies, horn flies, and face flies are serious pests of livestock, especially in confined animal operations. These fly species are responsible for damage and control costs that reach billions of dollars each year in the U.S. Stable flies and horn flies inflict painful bites to animals, resulting in direct losses to producers as a result of reduced weight gain and milk production. In addition, these flies can carry more than 65 disease organisms—such as *E. coli* and *Salmonella*—that can cause illnesses in livestock and humans. Flies can transmit pathogens to humans via direct contact and bites, as well as through water and food that they have contaminated. Concerns about flies have led to law suits, zoning limitations, and animosity between farmers and nearby residents and businesses. Available control technologies have been inadequate, largely because scientific knowledge of the biology of these flies has been seriously lacking and because control options have not been well suited for certain agricultural practices, facilities, processing plants, or climatic conditions.

House flies are the most serious nuisance pest associated with dairy and other confined animal operations. S-1030 researchers have determined that insecticide-treated fabric targets (see inset photo) can effectively trap and kill these pest flies when placed around animal facilities and feeding areas.

What has the project done so far?

Over the past five years, innovative studies coordinated by the S-1030 project have propelled the development of successful fly management technologies. Focusing on fly ecology, researchers have characterized the origins, dispersal, population dynamics, and behavior of stable flies and house flies. Studies have shown that local stable fly populations emerge from animal feeding sites from May to July, and migrating stable flies typically arrive after southerly wind events. Other studies have shown that stable fly densities rise quickly and remain high with favorable spring and summer weather. S-1030 researchers have also designed and used new methods for tracking fly abundance and movement. For example, researchers in Washington used digital photography to count face flies and horn flies in six cow-calf herds to determine if commercially available ear tags were effective at keeping flies away. Researchers noted that all tested ear tags achieved up to three months of control for horns flies; however, the same ear tags did not keep away face flies. In another study, researchers lured flies into traps using pheromones, marked the flies, and then tracked how they moved among dairy cattle, swine, and beef cattle facilities. S-1030 scientists at University of California at Riverside have also copyrighted the FlySpotter software, which counts, graphs, and reports fly abundance. Another focus of S-1030 has been determining flies' role in dispersing pathogens. Researchers have examined the digestive tracts of house flies under microscopes and confirmed that they can carry many pathogens, such as *E. coli* and *Salmonella*. Related studies have analyzed how flies spread these pathogens from livestock production areas into residential areas. Drinking water and feed were both found to be contaminated with bacteria spread by flies. Researchers have also assessed how the risk of fly-borne illnesses varies when different production techniques and types of facilities are used. Using this information, scientists have improved tactics for managing flies. For example, S-1030 researchers

have determined that insecticide treated fabrics can help manage stable flies and house flies, working best when two targets per acre are placed at ground level. Participating scientists at the University of Florida have developed a novel trapping technology, Florida-Fly Baiter, that attracts and kills house flies. S-1030 scientists have also started designing and evaluating a leg patch that controls stable flies on pastured cattle. Initial studies have focused on patch size, shape, and adherence properties. To ensure that these strategies control flies for years to come, researchers have conducted a nationwide survey of insecticide resistance in flies. S-1030 researchers have also discovered new alternatives to insecticides, such as exotic parasites and viruses that kill house flies. Researchers have provided an economic impact analysis tool to animal producers so that they can compare the costs and benefits of various control options. Throughout the last five years, research results and insights have been shared via Extension education programs and fact sheets, University and industry publications, and meetings with livestock producers.



Fly larvae often live in hay in livestock feeding areas (see inset photo below). S-1030 researches have applied the insecticide cyromazine to hay feeding sites to evaluate how well it controls fly populations. Study results indicated that cyromazine significantly reduced the number of stable flies per meter on the feeding sites for many months (see graph above).

Impact Statements

By improving our understanding of pest flies and developing economically and environmentally sustainable monitoring and control strategies, S-1030 has:

Helped livestock producers make informed, cost-saving choices about which fly control strategies to use.

Improved livestock welfare and quality, thus increasing productivity and profits.

Lowered the risk of pathogens in animal products and food crops, limiting the spread of diseases to animals and humans.

Reduced the use of expensive — and sometimes ineffective — chemicals, saving livestock producers money and reducing harm to the environment.

Improved quality of life in residential and recreational areas near animal facilities.

What research is needed?

Continued research is needed to evaluate the accuracy and efficiency of monitoring strategies and the effectiveness of newly available insecticides. Researchers also need to take advantage of new information about fly genomes to improve control strategies. In particular, further research is needed to develop technologies for reducing biting fly activity on cattle and to assess the impact of antimicrobials on pathogen survival in flies' digestive systems. Additional studies are needed to determine the role of microbes in pathogen transmission from flies to food plants.

Want to know more?

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Compiled and designed by Sara Delheimer