Kansas State University Extension Entomology Newsletter

For Agribusinesses, Applicators, Consultants, Extension Personnel & Homeowners

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NEWS CORNER

Look out for Soybean Gall Midge in 2024

In 2023, soybean gall midge was found infesting soybean and sweet clover in Marshall and Nemaha counties. Since this pest can overwinter in Kansas, producers should be on the lookout for additional infestations in 2024.

The Soybean Gall Midge (***Resseliella maxima***) was first observed in Nebraska in 2011 but was not officially described as a new species until 2018 when this tiny fly established itself as an emerging pest of soybeans in South Dakota, Nebraska, Minnesota, and Iowa. New infestations have been documented every year since and its range has expanded into Missouri. Soybean gall midge has been documented in Nebraska along the Kansas border as recently as 2021. This pest should be actively scouted for during the growing season, especially in counties along the Nebraska border.

Figure 1. Soybean field with damage by soybean gall midge (Justin McMechan, Univ. of Nebraska).

Losses from soybean gall midge infestation are due to plant death and lodging (Figure 1). Heavily infested fields have shown the potential for complete yield losses from the edge of the field up to 100 feet into the field and a 20% yield loss from 200 to 400 feet into the field.

Identification and Lifecycle

Adults: tiny (2-3mm), delicate flies with an orange abdomen, slender bodies and mottled wings. Long legs are banded with alternating ligzht and dark markings (Figure 2).

Figure 2. Adult soybean gall midge (Mitchell Helton, Iowa State Univ.).

Larvae: small, legless, maggots that are clear to white-colored when young but turn bright orange when mature (Figure 3).

Figure 3. Soybean gall midge larvae (Justin McMechan, Univ. of Nebraska).

Soybean gall midge overwinters as larvae in the first few inches of soil. After pupation in the early spring, adult midges emerge and lay their eggs on the lower portions of stems or at the base of soybean plants. The eggs hatch and the larvae feed within the stems. Infestation does not occur until the V2 stage when natural fissures and cracks appear in stems allowing entry by larvae. Infestation can continue into the reproductive growth stages. So far, there appear to be at least two generations per growing season. The adult soybean gall midges do not feed on soybeans.

Scouting

Begin scouting soybean plants at the V2 growth stage. Symptoms of infestation include:

1. wilting or dead soybeans along field edges with decreasing damage into the center of the field (Figure 4),
2. darkening and swelling at the base of stems (Figure 5),
3. brittle stems that break easily near their base, and
4. small orange larvae present in split open stems.

Figure 4. Wilting soybean plant from gall midge infestation (Justin McMechan, Univ. of Nebraska).

Figure 5. Darkening and swelling of stem. (Adam Varenhorst, South Dakota State Univ.).

Management

As such a new pest, on-farm studies in impacted states are examining the effects of cultural practices and insecticides on preventing losses. Seed treatments have not been shown to be effective.

Please report any occurrence of soybean gall midge to your local extension professional or contact the K-State Entomology Department. The Soybean Gall Midge Alert Network, https://soybeangallmidge.org/, can be used to track developments regarding this new pest.

Anthony Zukoff—Southwest Research and Extension Center – Garden City, KS

HOME

LEARNING CORNER

The Endangered Species Act: What you need to know!

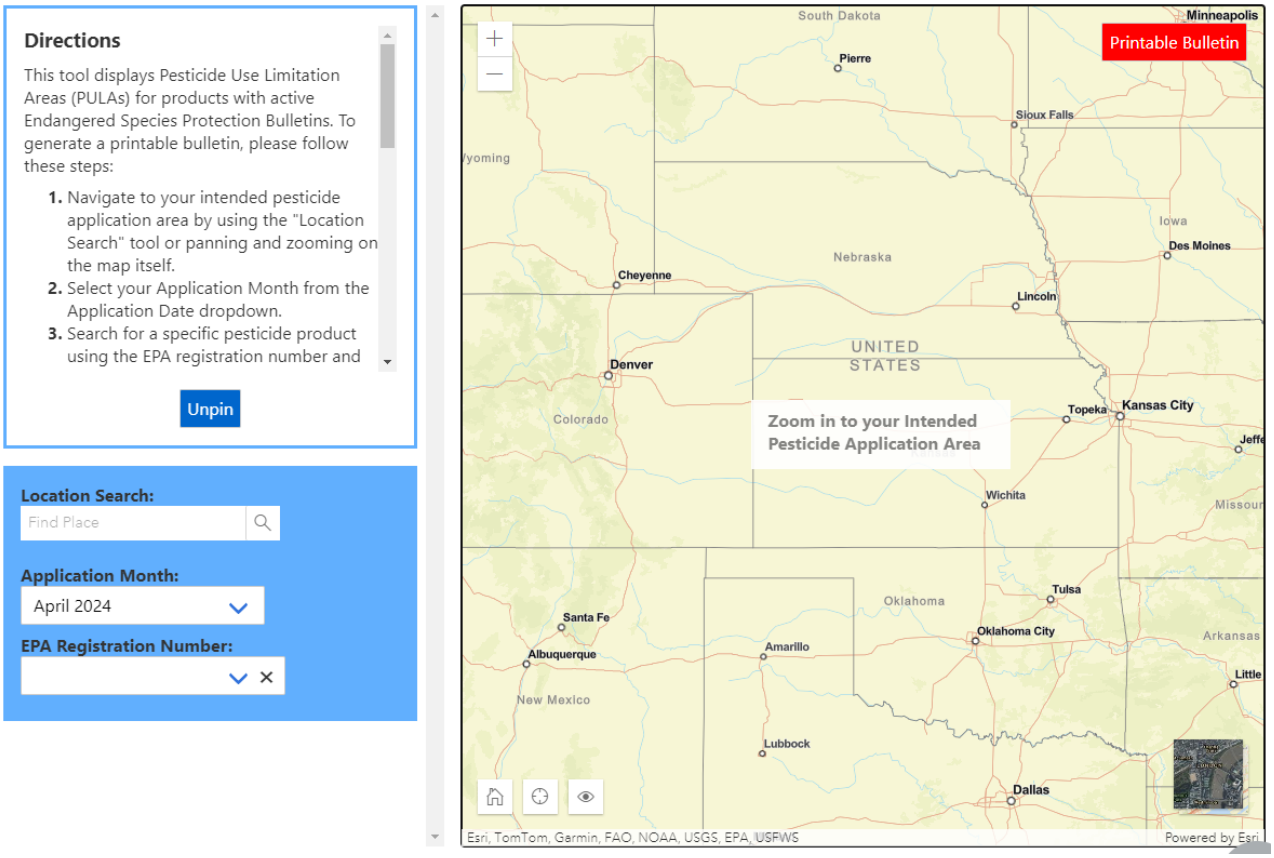
The Endangered Species Act (ESA) established in 1973 protects threatened and endangered species and the critical habitats in which they live. This act requires federal agencies to ensure that any action they authorize or fund does not have negative effects on any listed species or any critical habitat needed by the organism to survive. For the EPA, this means they are required to assess potential risks to these species when they register or reregister a pesticide product. In 1988, the Environmental Protection Agency (EPA) established the Endangered Species Protection Program (ESPP) to meet their obligations under this Act. A lawsuit filed in 2011 alleged that the EPA violated ESA when it registered or reevaluated certain pesticide active ingredients, which is now driving some changes that will affect Kansas producers.

The expected changes are being outlined in the EPA's herbicide, insecticide, fungicide and rodenticide strategies, which have not been finalized yet. The goal of the strategies is to minimize exposure of protected species to pesticides. Many of the new risk mitigation measures outlined in the strategies will apply to all pesticides, but some will be specific to a particular site, product, or application timing.

Because the strategies have not been finalized, there is still a lot of uncertainty, but we do know pesticide labels will be changing. Changes will include additional runoff, erosion, and spray drift reduction measures for many products In addition, some applications will be affected by Pesticide Use Limitation Areas (PULAs), which will have additional restrictions beyond those listed on the product label. Applicators will need to read Endangered Species Protection Bulletins to determine if an application will be affected by a PULA.

ESP Bulletins

The Endangered Species Protection Bulletin will identify the species of concern and identify the pesticide active ingredient that my affect the species. The bulletin will also provide a description of protection measures necessary to protect the species and a county-level map showing the affected geographic areas.



If the pesticide label directs you to the Bulletins Live! Two website or the toll-free number, you are required to follow the pesticide use limitations found in the Bulletin for your location, pesticide active ingredient, and application month. You can obtain Bulletins using EPA's Bulletin's Live! Two system at https://www.epa.gov/endangered-species/bulletins-live-two-view-bulletins or through the toll-free number 844-477-3813. Bulletins should be obtained no more that six months ahead of your application. It is recommended that applicators keep a record of the Bulletins they obtain as part of their application records. Remember, these bulletins will be required for all pesticides, not only restricted use products.

As an applicator or producer, now is the time to become familiar with Bulletin's Live! Two and how to search, use and save these bulletins. It is important to be aware of the upcoming changes and existing resources that can help you navigate and understand how to comply.

Frannie Miller – Pesticide Safety and IPM Coordinator

HOME

Identifying and controlling stable and horn flies

Stable flies and horn flies cause significant damage in livestock production systems, especially for cattle on pasture. Both flies are obligate blood feeders and can often co-occur. Identification of fly species and breeding sites are important to developing good integrated pest management strategies.

All Muscid flies, including house flies and stable flies, have a similar reproductive biology. Eggs are laid in clutches, 10 - 100 at a time in the preferred larval breeding environment. Eggs hatch into larvae and consume microbes and small particulate matter in the larval habitat. Once fully developed (7-14 days), larva will move from the moist larval environment to dryer surrounding areas, a process called wandering. During the pupal stage, the body rearranges into the adult form. The number of eggs a female fly can lay is determined by the amount of food (blood) she consumes. All insect development is strongly controlled by temperature. Warmer temperatures result in faster development and more fly activity as an adult. Due to larval flies needing moist areas, we often see population peaks around warm, wet weather. Populations may decrease temporarily over the dryer parts of summer.

Identifying horn and stable flies

Horn flies are commonly found parasitizing cattle on pasture. The horn fly needs to have intact fresh manure to use as a breeding site. Any disruption of the manure pat will inhibit larval fly growth. Adult flies are commonly found on the back of the animal but may extend over the belly and underside (especially when temperatures rise). Both adult male and female flies bites and blood. This happens approximately 20-30 times a day for each fly. Flies can be seen feeding in groups with a 'head down' orientation (Figure1).

Cattle will often show signs of fly worry such as throwing the head back to disrupt flies and attempting to lick the affected area. As adults, horn flies stay on the animal throughout the day with females only leaving temporarily to lay eggs. Flies show animal-animal preferences with some animals carrying higher fly burdens than. The cause for this variation is not known. High levels of pesticide resistance are becoming common and are likely to accelerate in the future. Even low numbers of horn flies can cause economic losses in stocker calves while mature animals to be able to withstand about 200-300 flies per animal without negative impacts.

Figure 1. Horn flies on the back of cattle feeding in groups with the head down facing the ground.

Stable flies breed in any decaying plant material, especially if they also contain animal waste (manure and urine). Standing hay bales, feed spilled over the edge of feed bunkers or straw waste trampled into soil mixed with animal waste are prime breeding habitats (Figure 2).

Stable flies are the first to emerge often seen in early spring. Populations tend to diminish over the peak summer period when temperatures are high and lower levels of rainfall occur. The impact of stable flies is often underestimated, if you see an animal 5 times a day and it has 5 -10 flies each time, what you actually have is 25-55 flies! Stable flies are bigger than horn flies and are primarily found on the legs (particularly front) of animals with a 'head up' orientation (Figure 3). They can also be seen on the neck and belly of animals.

Figure 2. Hay waste generated by hay bales is one of the primary breeding sites for stable flies. Over 50 000 flies can be produced from a single standing round bale each week.

Figure 3. Stable flies feeding on the legs with their head pointing up towards the sky.

Integrated pest management for Muscid flies

Kansas has some of the highest rates of pesticide resistance in flies in the U.S, a trend which is likely to continue in the future. With such widespread resistance, even if new chemical groups and compounds are discovered, flies are likely to show some level of tolerance or even resistance to them. Implementing a good Integrated Pest Management (IPM) program tailored to your operation is essential for sustainable long term fly control.

Cultural control focuses on removing breeding site for larval flies. Once you have identified which fly you have you can begin to identify breeding sites. Look for larva/maggots and pupa (reddish ovoid shapes) (Figure 4) and target where you find them for cleaning up and drying out.

Figure 4: Muscid fly larva (maggots) in manure contaminated areas (left) and reddish brown pupa (right) collected from the base of a hay bale.

Physical/mechanical focuses on removing flies from the animal through walk through horn fly traps. Stable flies are a common problem encountered by horses, fly sheets and leg wraps are good control options.

Biological control is difficult to achieve for many veterinary important pests. Our two main options are parasitoid wasps and using dung beetles. Parasitoid wasps are tiny wasps which lay their eggs in Muscid fly pupa. These are very useful around barn or stable environments. Confined production settings (feedlots, stables and dairies) can and often do rely entirely on parasitoid wasps for stable and house fly control however they are not effective for horn fly control. Do not use any pesticides if you are using parasitoid wasps. Dung beetles remove manure and bury it below the ground. In each ball (called a brood ball) a single egg is laid. The developing larva feeds on the brood ball underground and emerges as an adult. Dung beetles provide essential services like soil aeration, improving nutrient cycling, reduce pasture fouling as well as pest control. By removing manure, breeding sites for pasture flies like horn flies is reduced. Dung beetles are impacted significantly by the use of oral dewormers, particularly ivermectin based products. Ivermectins and other macrocyclic lactone products are fat soluble and are excreted over a month-long time period. Injectable macrocyclic lactones (eg. LongRange) will contaminate manure for over 5 months. Oral dewormers impact larval development and with long term use can significantly impact dung beetle populations. Fenbendazole (SafeGard and Panacur) are listed as safer for dung beetles. If possible deworm early in the year before insects emerge in the spring or later in the fall once insect activity is diminishing.

Chemical control: A number of chemical control options in various formations exist and historically have been the mainstay of fly control. These are most effective for horn as they are in continuous contact with the host. They are not very effective for stable fly control. To minimize the rate at which resistance develops, rotate chemical classes annually. In year 1 use only pyrethroid based products, Year 2: organophosphate based products and Year 3: macrocyclic lactone (pour on like Cydectin or Tri Zap tag). Cydectin labels itself as dung beetle safe potentially because it is a topical treatment. Potential impacts on dung beetles need to be weighed up against resistance developing in fly populations.

Insect growth regulators (Clarifly, Justifly, Solitude etc.) work by inhibiting hormonal or chitin synthesis in developing larva. Although larva may be present, they are not able to complete their development. Products are often listed for use in controlling both horn flies and stable flies, however, the product will only be effective in controlling flies breeding in intact, bovine manure like horn flies. Garlic powder has been increasing in popularity although controlled experiments have not been able to show it impacts horn fly numbers.

Ear tags are commonly used for horn fly control and are often marketed for protection up to 4 months but realistically we only get about 90-100 days of protection from them. If possible, remove tags after 90 days. Tag both ears of the animal with a fly tag. Pesticide is transferred from the tag onto the skin so tagging both ears gives optimal coverage. Do not 'daisy chain' tags. A fly tag must be placed directly into the ear of the animal. If using a pour on, get an accurate weight for each animal and adjust the dose accordingly. Apply pour-ons along the entire length of the back to get optimal fly control.

Cassandra Olds – Veterinary Entomology

HOME

Sincerely,

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