Kansas State University Extension Entomology Newsletter

For Agribusinesses, Applicators, Consultants, Extension Personnel & Homeowners

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The Soybean Gall Midge

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. To date, soybean gall midge has not been documented in Kansas, however this pest should be actively scouted for during the growing season, especially in counties along the Nebraska border. Losses from soybean gall midge infestation are due to plant death and lodging (Figure 1 Photo by Justin McMechan, UN-L). 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 light and dark markings (Figure 2 Photo by Mitchell Helton, Iowa State University).

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

Figure 2

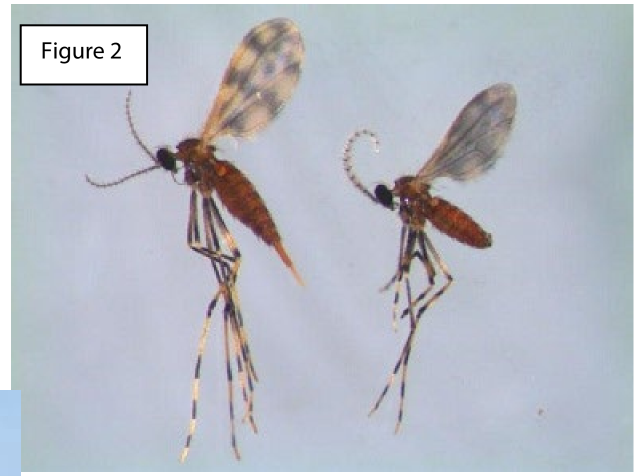

Figure 3

Soybean gall midge overwinter 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 appears 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 Photo by Justin McMechan, UN-L)
2. Darkening and swelling at the base of stems (Figure 5 Photo by Adam Varenhorst, SDSU)
3. Brittle stems that break easily near their base
4. Small orange larvae present in split open stems


Figure 4


Figure 5

Management

Being such a new pest, there are currently no published research-based management recommendations. On-farm studies in impacted states are examining the effects of cultural practices and insecticides on preventing losses. Seed treatments have not 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

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Chinch Bugs

Chinch bug populations seem to be increasing throughout south central and north central Kansas. Adults are currently very actively feeding, but more importantly, depositing eggs. This has been going on for the last couple of weeks in both corn and sorghum, which are still vulnerable to this chinch bug feeding, especially in later planted sorghum under hot dry conditions. Much sorghum is in the whorl stage or just starting to head out. Chinch bugs are usually difficult to control, but are especially difficult during these growth stages because, for the most part, the chinch bugs are feeding in and around the base of the plants and behind leaf sheaves. Either way they are relatively well protected from insecticides. The younger, tiny chinch bug nymphs are reddish with a white stripe while the older instar nymphs turn gray with a white stripe (see fig). For treatment recommendations please refer to the 2022 KSU Sorghum Insect Management Guide: https://www.bookstore.ksre.ksu.edu/pubs/MF742.pdf

Chinch bug nymphs-older nymph gray; younger nymph reddish (photo by Cayden Wyckoff)

Jeff Whitworth – Field Crop Entomologist

HOME

Research Spotlight

Stored product insects get caught up in the netting: Using insecticide netting to combat phosphine-resistant insects after harvest

Stored products like cereals grains, legumes and other durable or processed products, significantly contribute a high value to the economy as well as to global food security. Stored product insects can easily attack as these commodities move along the supply chain from farms to end consumers, which reduces the quality and quantity of food for human consumption. Annually, stored product pests causes over $100 billion in losses of food products globally after harvest. So, it's crucial to develop efficient pest management strategies to mitigate losses. Currently, the most common pest management tactic after harvest is fumigation in bulk storage of commodities. The most common used fumigants were methyl bromide and phosphine, but the methyl bromide was phased out due to its harmful effect on ozone layer in the atmosphere. Phosphine is still widely used as the main fumigant after harvest but has experienced increasing problems with its use, for example there has been a dramatic rise in phosphine-resistant populations of eight stored product species. Thus, there has been an increasing push to diversify integrated pest management (IPM) programs after harvest.

The expanded use of controlled release materials (CRMs) can provide an additional tactic to diversify postharvest IPM programs. A controlled release material is a fabric that contains insecticide in it, which is released over time to affect pests of interest. The efficacy of a deltamethrin-incorporated long-lasting insecticide netting (LLIN) (e.g., a subset of CRMs) has been intensively investigated for both sublethal and lethal effects. However, there is a concern about the role of LLIN in promoting resistance among stored product insects at food facilities, and whether LLIN could be effective at controlling phosphine-resistant insects. Further, there has been a dearth of studies testing CRMs with different AIs possessing other modes of action different from pyrethroids. To the best of our knowledge, no study has assessed whether LLINs are effective at preventing movement by or inducing mortality of phosphine-resistant populations of stored product insects. Therefore, there is a critical need to assess CRMs with new insecticides, as well as assess how existing and new insecticides may be effectively employed in CRMs against phosphine-resistant stored product insects. Hence, our aims in this study were to evaluate the efficacy of different CRMs with alternative insecticides, including a high concentration of deltamethrin, indoxacarb, permethrin, or

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dinotefuran, mimicking that found in commercially available CRMs compared to untreated controls using movement of two important and cosmopolitan stored product pest species, the red flour beetle, *Tribolium castaneum* (Herbst) (Coleoptera: Tenebrionidae), and the lesser grain borer, *Rhyzopertha dominica* (Coleoptera: Bostrichidae) and to determine the efficacy of the CRMs against phosphine-susceptible and resistant strains of *R. dominica* and *T. castaneum*.

Our study found that deltamethrin was the most effective insecticide for both species, while dinotefuran and indoxacarb were the least effective for *R. dominica* and *T. castaneum* adults, respectively. Importantly, we observed that exposure to deltamethrin incorporated LLIN significantly reduced the movement of both species compared to the other CRMs regardless of their susceptibility to phosphine. This study demonstrates that deltamethrin incorporated LLIN can be an additional tool to combat phosphine-resistant populations of stored product insects around food facilities. For more detailed information about this study, please check the link below:

https://doi.org/10.1093/jee/toac033

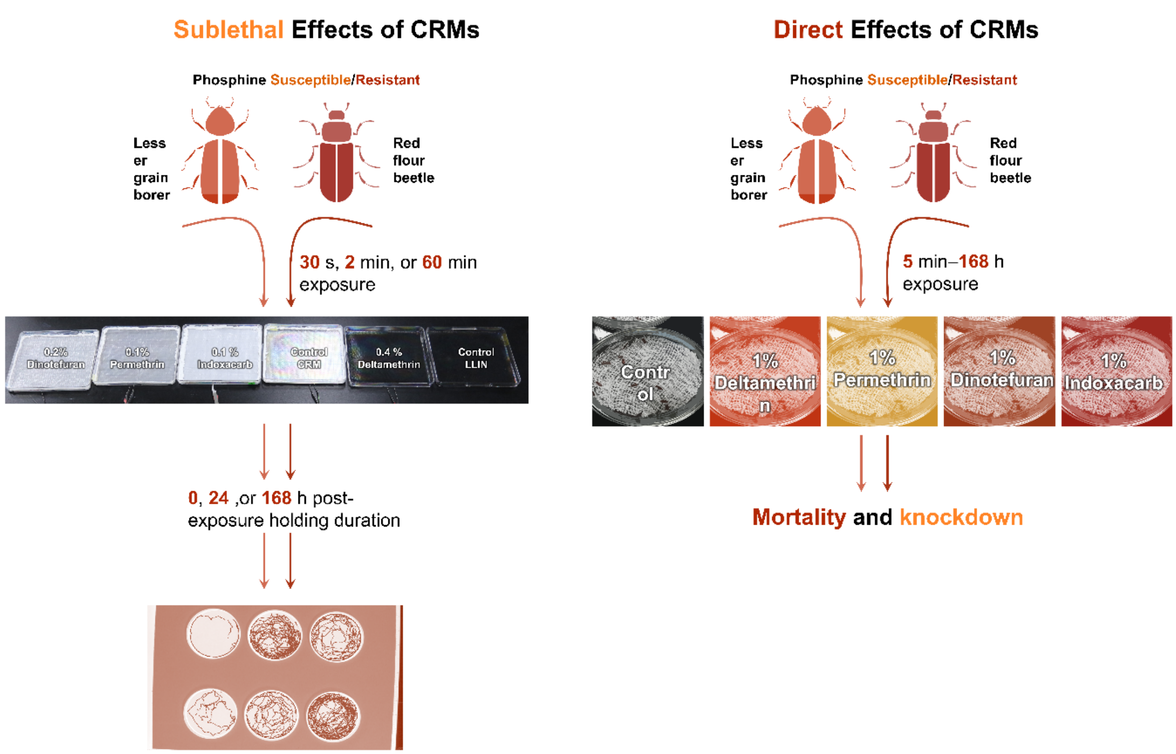

Figure 1: Graphical abstract of latest study by Ranabhat et al. 2022

Figure 2: Phosphine resistant lesser grain borer and red flour beetle severely affected by insecticide netting

Figure 3: Bulk storage is vulnerable to infestation by stored product insects but can be protected by long lasting insecticide netting

Figure 4: Sabita Ranabhat, PhD Candidate at Kansas State University, is the lead author of the latest research on insecticide netting and phosphine resistant populations, appearing on *Journal of Economic Entomology*

Sabita Ranabhat, PhD Student in Entomology

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Need an insect identified? Visit the Insect Diagnostics Program Website

Department of Entomology

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Kansas State University Agricultural Experiment Station and Cooperative Extension Service