Tips to protect wheat midge parasitic wasps from insecticide spray

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Wheat midge (Sitodiplosis mosellana), a non-native spring wheat pest that feeds on developing wheat kernels, is a serious economic concern to producers, particularly in the Golden Triangle and Northeastern Montana. Currently, Montana producers largely depend on the use of synthetic chemicals (e.g., Lorsban® and Warrior®) for effective wheat midge control. However, the time has come that producers may need to realize and pay attention to the "role of natural biological control parasitic wasps" on managing the wheat midge population on spring wheat fields. Based on wheat midge monitoring data (2015-2017), it is evident that two tiny black parasitic wasps Macroglenes penetrans and Platygaster tuberosula are known to be present in the Golden Triangle, Montana as stated in articles published by Thompson and Reddy (2016) in Crop Protection Journal and Shrestha and Reddy (2018) in Traders Dispatch Magazine of March issue. Macroglenes penetrans appears to be well established, while the P. tuberosula population level is building up at slower rate in the natural environment of Montana. These two wasp species were brought from Canadian sources of Alberta and Saskatchewan and released in Golden Triangle in 2014 and 2016. Efforts are underway to introduce an additional parasitic wasp species of Euxestonotus error from Saskatchewan to Golden Triangle area of Montana.

How do these parasitic wasps act as midge natural predators and are they considered as friends of crop producer's? Parasitic wasps are organisms that live on or in a host and consume it until it eventually dies. Female parasitic wasps lay eggs in the eggs or larvae of wheat midge; then the wasp larvae soon after emergence feed on developing midge larvae and ultimately kills it. These wasps can help producers to keep midge population under control and prevent them from causing economic damage. For instance, one of these parasitic wasp species (M. penetrans) is providing nearly 40% of wheat midge control and help to reduce or save Canadian producers the expense of insecticide application for wheat midge control. In order to see tangible benefits of parasitic wasps, it is now imperative that they be carefully managed and considered as an important method to control wheat midge.

There could be several techniques implemented to protect the wheat midge parasitic wasps. However, the focus here is only on what strategies spring wheat producers should consider while spraying chemicals for midge control to minimize the chemical's negative impacts on existing parasitic wasp species population levels (Figure 1). Listed below are the tips that producers may consider to protect wheat midge parasitic wasp's population:

1. Producers should target to control wheat midge adults. In the Golden Triangle, midge adults start emerging second to third week of June and the population usually peaks in late June to early July. Female midge adults deposit eggs on developing wheat heads. If adult populations are above an economic threshold (one or more adults are observed for every six wheat heads) between booting and the 75% flowering stage, producers may consider chemical application. Spraying chemicals at an earlier or later growth stage may not only reduce the chemical efficacy, but may also kill parasitic wasp adults because their emergence often occurs one to two weeks after midge adult emergence as mentioned in an article published by Shrestha and Reddy (2017) in Insect Science Journal.

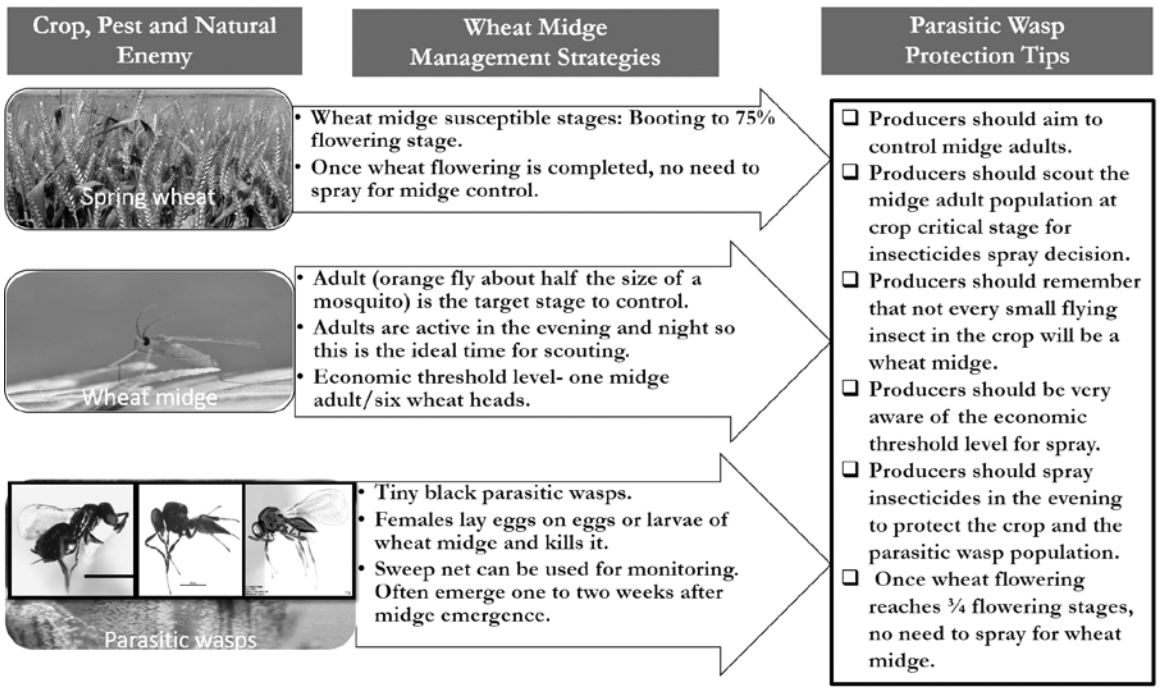

Figure 1. Wheat midge and its parasitic wasp management strategies. (Photo Credit: Wheat midge; Saskatoon Research Centre, Canada and Parasitic wasps; Saskatoon Research Centre, Canada and Peter Buhl, Denmark).

2. Producers should scout the midge adult population at the crop's critical growth stage to make a chemical spray decision. It sounds strange that midge adult population should be scouted in the late evening and night, but this is the time when midge adults are active and can be seen flying around the wheat canopy. You often may not find adults during day time. In the Golden Triangle, midge scouting should be done from last week of June to first week of July during the susceptible crop growth stages from booting to 75% flowering. Effective scouting will help producers to determine whether spring wheat fields have a midge problem or not. Spraying insecticides without scouting midge population may not only increase producer's expenses but may kill the developing parasitic wasp populations.

3. Producers should remember that not every small flying insects in the crop will be a wheat midge. Because of small size, the midge adults may be mistaken with yellow lauxanid fly, which can also be commonly seen in wheat fields. In order to avoid this mis-identification, one has to know that the yellow fly is typically a little larger than the midge, active during day time or early evening and often resting on the wheat leaves or the awns. Don't bother spraying for these yellow flies as they are harmless to the crop.

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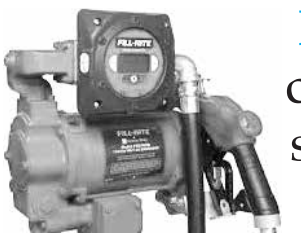

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4. Producers should be aware of the economic threshold level for spraying. Producers should only spray insecticides if they see one adult per six wheat heads during the susceptible stage of wheat (booting to flowering). Spraying insecticides below the recommended threshold level may not be economical to producers and it may also be harmful for the parasitic wasp populations.

5. Producers should spray insecticides in the evening to protect the crop and the parasitic wasp population. If producers decide to spray, please do it in the evening and not during the day time. Adult midges are active in the evening and night so spraying at that time will increase insecticide efficacy. Evening spraying will also reduce the negative impact on parasitic wasp population as they are often more active in day time than in the evening.

6. Once wheat flowering is completed, no need to spray for midge. This is because by that time, the wheat plant is able to produce their own natural chemicals (ferulic acid) that defend midge attack. Therefore, insecticide spray at this time is not required and can do more harm than good by killing off the natural parasitic wasps that normally help to control the wheat midge population.

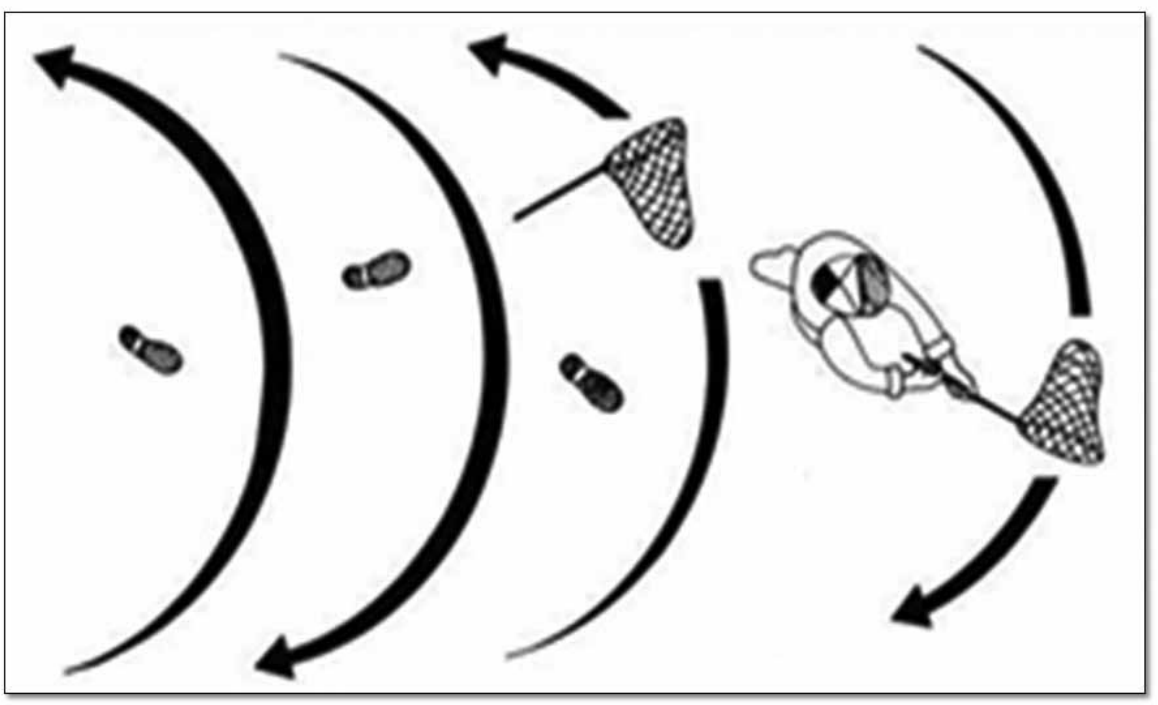

Figure 2. Sweep net sampling for parasitic wasp in spring wheat fields. The Sweep net should carry an arc of 180˚ for each of 120 sweeps. One step forward should be taken between sweeps. The net should remain below the top of the canopy for the entire sweep.

7. How do producers know their spring wheat fields have parasitic wasps? Producers may use sweep nets to determine whether their fields have wasp adult population. About 120 sweeps should be made in each field. The following procedure should be practiced while sweeping in fields: i) Grasp the sweep net in both hands. Starting on one side of your body drive the net with force across your body making a 180˚ arc, ii) Take one step forward and repeat from the opposite side of the body (see Fig-2), iii) Make 120 sweeps total in each field sampled. (120 sweeps = 120 paces), iv) Make sweeps from the edge to the center of the field, v) At the end of the 120 sweeps flip the net several times with some force to knock the insects to the bottom of the bag, vi) Grasp the bag ~6 inches above the bottom of the net, vii) Invert the bag into the Ziploc bag, viii) Place location data inside the bag and ix) Place the bag in the freezer as soon as possible. Please send samples to WTARC, 9546 Old Shelby Rd., P. O. Box 656, Conrad, MT 59425 or County Extension Agents in your area for the identification and number of parasitic wasps in the sample.

Proposed rule for National Bioengineered Food Disclosure Standard

From USDA

The U.S. Department of Agriculture invited public comment on the proposed rule to establish the National Bioengineered Food Disclosure Standard mandated by Congress in 2016. The standard will provide a uniform way to offer meaningful disclosure for consumers who want more information about their food and avoid a patchwork system of state or private labels that could be confusing for consumers and would likely drive up food costs.

"This rulemaking presents several possible ways to determine what foods will be covered by the final rule and what the disclosure will include and look like," said Agriculture Secretary Sonny Perdue. "We are looking for public input on a number of these key decisions before a final rule is issued later this year."

The proposed rule is open for comment for 60 days. Due to the Congressionally mandated timeline for this rulemaking, the comment period will not be extended, so it is important that anyone interested file comments in a timely manner.

Comments may be submitted online through the Federal eRulemaking portal www.regulations.gov. Comments may also be filed with the Docket Clerk, 1400 Independence Ave., SW, Room 4543-South, Washington, DC 20250; Fax: (202) 690-0338.

The deadline for comments is July 3, 2018.

The National Bioengineered Food Disclosure Standard Law was enacted by Congress on July 29, 2016. The proposed rule previewed in the May 3, Federal Register (https://www.federalregister.gov/documents/2018/05/04/2018-09389/national-bioengineered-food-disclosure-standard).