

2017 Statewide Wheat Crop and Pest Survey

Cooperator: Minnesota Association of Wheat Growers, NDSU IPM Survey

Purpose of Study:

The objective of this project was to allow for timely wheat crop staging and pest identification across the state of MN in order to inform producers of current crop conditions and potential threats. Information was released through media (e.g., radio, internet-based news releases, archived web pages, consultant conversations and e-mail. The survey was conducted in coordination with the NDSU IPM Survey, providing extensive, continuous coverage of small grains across MN and ND.

Results:

Just over 200 small grains fields were scouted across Minnesota during the 2017 growing season. Areas scouted ranged from Roseau County in the North, to Nicollet and Steele Counties in the south. Scouting started in early June and continued until the crop had reached maturity in late July. Data was collected on severity and incidence of the major cereal diseases in Minnesota as well as some of the important insect pests. Data was submitted each week to the NDSU IPM team who generated distribution maps for the region. Archived distribution data can be found for each crop at:

<https://www.ag.ndsu.edu/ndipm>

Postings were also made to the Minnesota Association of Wheat Grower's website:

<http://mawg.cropdisease.com>

the US wheat/Barley Scab Initiative scab prediction website:

<http://www.wheatscab.psu.edu>

And, to receive notification of the survey updates, subscribe to the Northwest Cropping Issues Newsletter at:

<http://nw-minnesota-crops.blogspot.com/>

In general, 2017 was a relatively quiet year as far small grains diseases were concerned. This was largely due to lack of moisture in many parts of the state which did not provide the ideal conditions for many of the fungal diseases to develop to concerning levels.

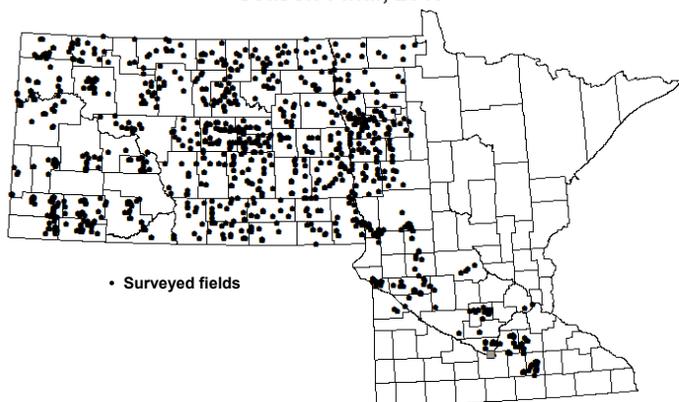
Disease Situation

See the Research Report later in this document for details on small grain disease situations, including summary maps, during 2017.

For Additional Information:

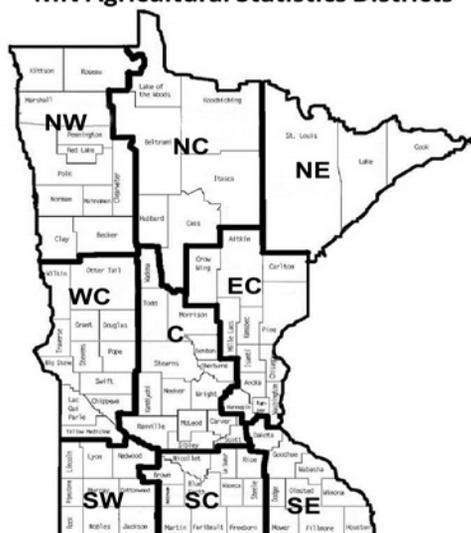
Madeleine Smith, Phillip Glogoza, Jared Goplen and Jochum Wiersma

Wheat Field Locations Surveyed Season Final, 2017



• Surveyed fields

MN Agricultural Statistics Districts



Insect Situation

Cereal aphids, grasshoppers, wheat stem maggot and wheat stem sawfly were all recorded as part of the 2017 survey data.

Cereal aphids were found in 43% of fields surveyed June 12th -16th although numbers were far below economic thresholds. This trend continued through the growing season until a marked increase in aphids in early July, particularly in southern area of the Red River Valley. However, again these populations generally did not reach economic thresholds for spraying, and by this time the

Project Funding Provided by:
Minnesota Association of Wheat Growers

Wheat Crop Survey (continued) — Statewide

crop was heading and impact on yield would have been minimal. Further north, aphid populations failed to materialize.

Barley yellow dwarf virus (BYDV) is vectored by cereal aphids. BYDV was found at moderate levels in the WC -C - SC reporting districts. These are the same areas where aphids were found.

Grasshoppers appeared in the sweep net sample from mid-June onward but were very low in numbers and not a concern for growers.

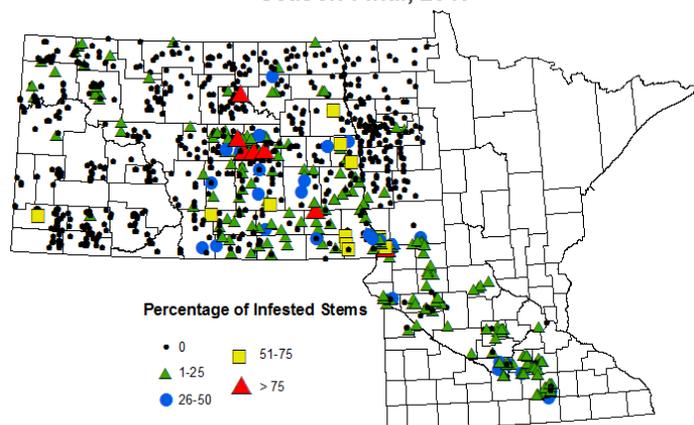
Wheat stem maggot numbers were also reportedly at low levels throughout the season. These white heads tend to be concentrated on field margins and rarely reach levels of concern throughout a wheat field.

Wheat stem sawfly was detected in a very localized area near Crookston, MN. This insect has not been a significant concern in many years in NW MN. There were some fields with very large infestations concentrated near field margins (*30 yds from edge, next to 2016 wheat fields*).

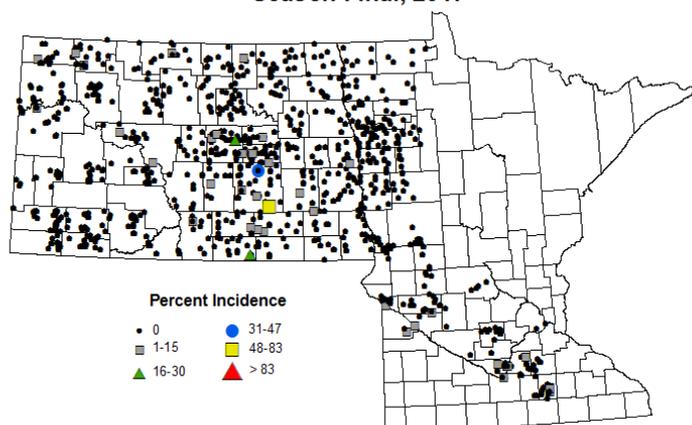
A directed survey in Polk County suggests that the sawfly infestation was localized. Moving about 5 miles from the heaviest infested field margins (*13 to 16 cut stems per row foot, 100% lodging*), infestations dropped to less than 4 cut stems per row foot along field borders.

These areas should be monitored in 2018 to observe the impact of suggested, aggressive tillage along infested borders.

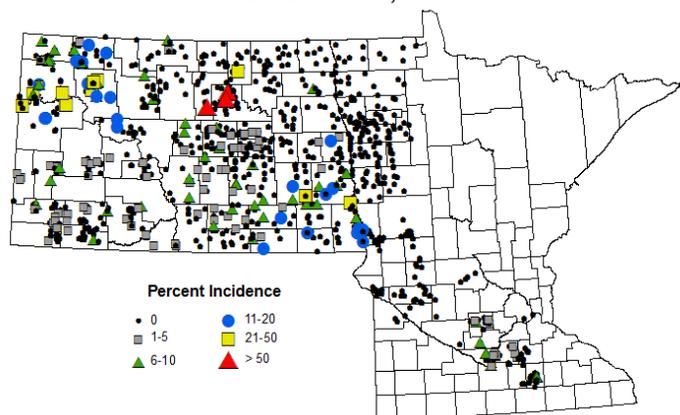
Aphids in Wheat
Season Final, 2017



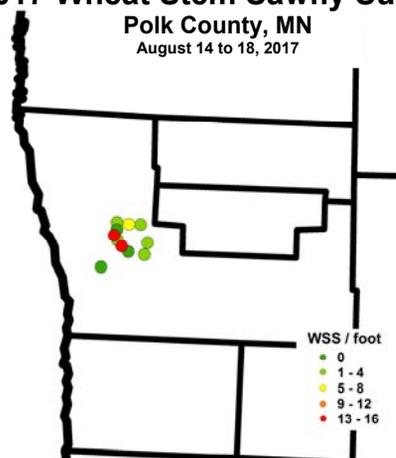
Wheat BYDV
Season Final, 2017



Wheat Stem Maggot
Season Final, 2017



2017 Wheat Stem Sawfly Survey
Polk County, MN
August 14 to 18, 2017



For Additional Information:

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Wheat Crop Survey (continued) — Statewide

Wheat Stem Sawfly Information

The following storyboards highlight general facts about the wheat stem sawfly. To read more, go to:

<https://www.ag.ndsu.edu/publications/crops/integrated-pest-management-of-wheat-stem-sawfly-in-north-dakota/e1479.pdf>

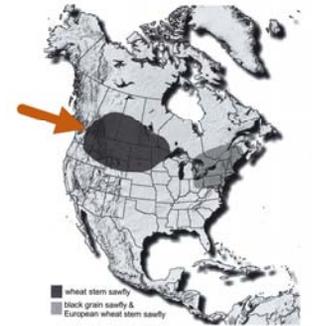
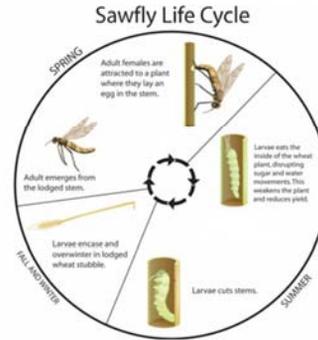
Crop Damage by Wheat Stem Sawfly

- Damages **vascular tissue**
- **Fewer kernels per head** and
- **Lower kernel weight** (up to 20 %)
- Can **reduce protein content**
- Grain loss by **lodging**



Lodging caused by wheat stem sawfly near Mott, N.D. (NDSU)

Life Cycle and Distribution



Identification



Stem cutting by Wheat Stem Sawfly



- Larva move down to the base of the stem
- Chews a notch around inside of the stem
- Stem is plugged with frass below the notch
- Forms a chamber
- Notch weakens the stem, which usually breaks
- Leaves stub anchored in ground



Management

Resistant Varieties – solid stem wheats

Wheat cultivar	Type ¹	Year Released	Releasing Agency ²
Chickadee	HRS	2003	MAES
AC Libani	HRS	2005	AC
Coden	HRS	2006	WB
Mott	HRS	2009	NDAES
Dudley	HRS	2011	MAES
SY Tyra	HRS	2011	AP
WB Gureston	HRS	2011	WB
WB 8079 CLP	HRS	2012	WB
WB 8277	HRS	2014	WB
WB653	HRS	2015	WB
Conco	HRW	2004	MAES
Bearpaw	HRW	2011	MAES
Jade	HRW	2011	MAES
WB Quake	HRW	2011	WB
Warhorse	HRW	2013	MAES
Explorer	HWS	2002	MAES
Agaven	HWS	2005	WB
WB Prentiss	HWS	2012	WB

¹ HRS = hard red spring wheat, HRW = hard red winter wheat, HWS = hard white spring wheat.

² AC = Agriculture Canada, AP = AgriPro.

MAES = Montana Agricultural Experiment Station.

NDAES = North Dakota Agricultural Experiment Station.

WB = WestBred LLC.

Biological Control – *Bracon cephi* A parasitic wasp attacking the larva



- Females sense sawfly larvae feeding in the stem
- females lay their eggs in the wheat stem near the sawfly larvae
- Wasp larvae emerge and feed on sawfly larvae and will kill them
- Parasites have two generations/year.
- First generation will cut a small circular hole in midseason
- 2nd generation overwinters in cocoon in the upper half of stem

Chemical Control

- **Overall, insecticides are ineffective** in controlling wheat stem sawfly; relatively costly for a low-value, large-acreage crop such as wheat; and
- The egg, larval and pupal stages are well-protected inside the plant stem.
- **Spraying for adults has not been successful**
 - ✓ newly emerged adults can migrate
 - ✓ the sawfly emergence window is long and adults that emerge after spraying
 - ✓ The adult does not feed or drink water, which minimizes exposure to insecticides.
- **Insecticides kill the beneficial parasitic wasp populations.**

Cultural Control

- **Swathing and using a stripper header** are the only practices useful in the current year of the infestation. If more than 15% of stems are infested swath or use stripper header
- **Fall and spring tillage** to expose overwintering sawfly larvae to cold and dry conditions to increase mortality. However, research has shown that 10 percent larval survival can lead to infestation levels as high as the previous season
- **Tillage negatively impacts parasitic wasp survival.** Survey of tilled and no-till fields in Montana, found 75% of no-till fields had more parasites and less sawfly
- **Delayed planting** has been suggested since a late-planted crop will not reach stem elongation stage when sawfly females lay eggs, but lower yields usually are obtained

For Additional Information:

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