Soil sample tests in North Dakota indicate increasing levels of overwintering wheat midge larvae for the 2010 season, according to Janet Knodel, North Dakota State University Extension Service entomologist.

A total of 186 soil samples were collected from 20 counties in the fall of 2009 to estimate the regional risk for wheat midge. The distribution of wheat midge in the 2010 forecast map is based on unparasitized cocoons found in the soil samples collected.

"The 2010 forecast for wheat midge risk has increased from 2009, especially in the northern tier of North Dakota," Knodel says. "Overall, the higher wheat midge populations of greater than 200 midge larvae per square meter are concentrated in Divide, Burke, Renville, Mountrail and Towner counties."

Wheat midge populations ranged from zero to 750 midge larvae per square meter, with an average of 129 larvae per square meter among the positive samples in 2009. In contrast, wheat midge populations ranged from zero to 286 midge larvae per square meter, with an average of 70 larvae per square meter, among the positive samples during 2008.

A pocket of 501 to 800 midge larvae per square meter was in northeastern Divide.

"Areas where populations are above 500 larvae per square meter can cause economic damage if the wheat crop is heading during adult wheat midge emergence, so wheat farmers will need to be alert to wheat midge emergence and population levels," Knodel says. "There also are several pockets of 201 to 500 larvae per square meter in the eastern half of Divide County, northwestern Williams into southwestern Divide, north-central Burke, central Renville and two small pockets in north and south Towner County."

Areas with more than 200 midge larvae per square meter should be scouted to determine if an action threshold population level exists. However, these areas are not considered high risk (more than 1,200 midge larvae per square meter). There were no soil samples that were considered a high risk for wheat midge infestation. At high risk, some control tactic, such as insecticide spraying or planting a nonwheat host, such as oats, barley, canola, soybeans or sunflowers, is recommended to mitigate midge populations.

"With a low to moderate forecast for wheat midge infestation statewide, field scouting will be critical to indicating where economic population densities occur during the growing season," Knodel says.

Scouting should be conducted at night when temperatures are greater than 59 degrees and the winds are calm (less than 6 miles per hour) during heading to early flowering crop stages.

"An insecticide should be applied during heading and when the adult midge density reaches one midge per four to five wheat heads for hard red spring wheat or one midge per seven to eight heads for durum," Knodel says. "A late insecticide application should be avoided to minimize negative
impacts on the parasitoid. Wheat midge larvae feed on the kernel and negatively affect yield, grade and quality."


"To aid scouting, a degree day (DD) model has been developed to predict the emergence of adult midges," Knodel says. "The threshold temperature for wheat midge development is 40 degrees F."

Observations indicate the following DD accumulations for wheat midge development:
* 450 DD - Wheat midge breaks larval cocoons and moves close to the soil surface to form pupal cocoons
* 1,300 DD - 10 percent of the females will have emerged
* 1,475 DD - About 50 percent of the females will have emerged
* 1,600 DD - About 90 percent of the females will have emerged

Observations in North Dakota indicate that by about 1,800 DD, adult midge numbers decline to the point where field activity is below economic threshold levels. However, in areas where reduced or minimum tillage is common, significant adult activity has been reported and observed up to about 1,900 DD.

The DD model can be found on the North Dakota Agricultural Weather Network at http://ndawn.ndsu.nodak.edu/wheat-midge-dd-form.html.

Select midge degree days and enter March 1 as the base date for accumulating DD units in the planting date space and the current date in the end date space. This will produce a North Dakota map of the accumulated degree days for midge development.

"With the cool temperatures last summer, wheat midge development, as well as crop development was about two weeks behind normal," Knodel says. "As a result, wheat was in the susceptible growth stage (heading to early-flowering) when the wheat midge were at peak emergence in many areas. Weather, mainly temperature and rainfall, will determine the timing of wheat midge emergence in 2010."

Research from Canada indicates that areas receiving less than 0.8 inch of precipitation prior to the end of May will delay adult emergence.

"The parasitic wasp, Macroglenes penetrans, also helps reduce wheat midge populations," Knodel says. "There was a slight increase in the average parasitism rate from 9 percent in 2008 to 13 percent in 2009."

Overall, parasitism ranged from 0 percent to 100 percent across the state, with the higher rates occurring in areas where midge populations have been high the past few years. About 73 percent of the sites where soil samples were collected had zero parasitism.
“This is not surprising since there were low populations of wheat midge during the past several years and wasp population levels follow the wheat midge population levels,” Knodel says.

The soil samples were collected by NDSU Extension Service agents in the fall of 2009. Midge larvae are extracted from the soil samples in the laboratories of the NDSU Department of Entomology.

The wheat midge survey is supported by the North Dakota Wheat Commission.

----

NDSU Agriculture Communication

:Source: Janet Knodel, (701) 231-7915, janet.knodel@ndsu.edu
:Editor: Rich Mattern, (701) 231-6136, richard.mattern@ndsu.edu