Increasing Wheat Midge Populations Expected in 2011

Soil sample tests in North Dakota indicate a dramatic increase in levels of overwintering wheat midge larvae (cocoons) for the 2011 season, according to Janet Knodel, North Dakota State University Extension Service entomologist.

Wheat midge larvae feed on the kernel and negatively affect yield, grade and quality.

One hundred eighty-one soil samples were collected from 19 counties to estimate the regional risk for wheat midge. The distribution of wheat midge in the 2011 forecast map is based on unparasitized larval cocoons found in the soil samples collected in the fall of 2010.

"The 2011 forecast for wheat midge risk has increased significantly from 2010, especially in the northwestern and north-central regions of North Dakota," Knodel says.

In 2010, wheat midge larval cocoons ranged from zero to 3,750 larval cocoons per square meter and averaged of 417 larval cocoons per square meter. In contrast, wheat midge cocoons sampled in 2009 ranged from zero to 750 midge larval cocoons per square meter, with an average of 129 larval cocoons per square meter.

“This is an alarming increase in the wheat midge population with pockets of ‘high risk’ in certain counties,” Knodel says. “We haven’t seen such high populations of wheat midge since the mid-90s.”

Areas where populations of cocoons exceed 1,200 per square meter are at high risk for wheat midge infestation in 2011. These areas include isolated pockets in seven counties including the eastern half of Divide, most of Burke, northern Renville, southeastern Mountrail, western and eastern edges of Ward, western McHenry, and west-central McLean. If wheat is planted in these high risk areas, producers must be prepared to monitor their fields closely for wheat midge infestations, and include the cost of an insecticide treatment in their wheat production budget. Otherwise, undetected and uncontrolled infestations may result in significant yield losses and/or unplanned pesticide costs.

The price of wheat is high, which should make pest management decisions easier for producers. Another strategy is to plant a nonwheat host, such as oats, barley, canola, soybeans or sunflowers, to mitigate midge populations.

“Wheat midge populations of greater than 500 to 1,200 larval cocoons per square meter have expanded into eight counties from five counties last year,” Knodel says. “Pockets were found in south central Bottineau, central Ward, central Cavalier, west-central Towner and north-central Walsh, in addition to the previously mentioned counties with a high risk. Areas where populations are above 500 larval cocoons per square meter also require close monitoring by wheat producers. If the wheat crop is heading during adult wheat midge emergence, wheat midge can cause severe injury to the kernels and yield loss can occur.”
Weather conditions prior to and during adult wheat midge emergence will play an important role in determining the level of economic damage. Conditions that favor midge development and outbreaks include high soil moisture in late June and warm, calm and humid conditions during the egg-laying stage in early to mid-July.

There also are several pockets of 201 to 500 larvae per square meter in most of the remaining counties, except in Eddy and Nelson Counties. Areas with more than 200 larval cocoons per square meter should be scouted to determine if an action threshold population level exists. However, these areas are considered lower risk.

"With a moderate to high risk forecast for wheat midge infestation statewide, early planting and field scouting will be critical for controlling wheat midge infestations during the 2011 growing season," Knodel says.

Early planting and selecting an early maturing variety of hard red spring wheat is one of the best preventative strategies to mitigate wheat midge populations and yield loss. The early planting of wheat prior to 200 growing-degree days (using a base of 40 degrees) can reduce midge damage because wheat will flower before peak midge emergence.

Early planting of wheat typically occurs before mid-May in most areas of North Dakota. Wheat is most susceptible from heading to 50 percent of the primary heads with anthers. Planting wheat between 200 and 600 degree days is in the high-risk window because the wheat midge emergence will likely coincide with heading. Producers who must plant during this high-risk window should stagger their planting dates. Late-planted wheat (after 600 degree days) will miss the peak emergence of wheat midge, but has the risk of frost damage and lower yields, or even greater losses due to barley yellow dwarf virus, a virus transmitted by cereal aphids.

Scouting should be conducted at night when temperatures are greater than 59 degrees and winds are calm (less than 6 miles per hour) during the heading to early flowering crop stages. The economic threshold is 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. The critical spray timing is from late heading to early flowering. Most insecticides labeled for wheat midge control can be tank-mixed with a fungicide if scab is a potential problem.

Wheat midge also can be monitored using pheromone and yellow sticky traps. For trapping guidelines and more information, consult the NDSU Extension Service publication "IPM of the Wheat Midge in North Dakota (E-1130)" at http://www.ag.ndsu.edu/pubs/plantsci/pests/e1330.pdf.

To aid in scouting and risk evaluation, a degree-day model has been developed to predict the emergence of adult wheat midge and is available on the North Dakota Agricultural Weather Network at http://ndawn.ndsu.nodak.edu/wheat-midgedd-form.html.

"The parasitic wasp, Macroglenes penetrans, also helps reduce wheat midge populations by killing the wheat midge larvae," Knodel says. "The average wasp parasitism rate increased slightly from 13 percent in 2009 to 17 percent in 2010."
“Parasitism plays an important role in keeping wheat midge in check naturally most years, so we need to continue to conserve parasitic wasp populations when possible by spraying insecticides only when necessary,” Knodel says. “Avoid any late insecticide applications to minimize negative impacts on the parasitic wasps, which are active at that time.”

The soil samples were collected by NDSU Extension Service agents and the wheat midge larval cocoons extracted by the NDSU Department of Entomology.

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