Entomologist discovers new insect species on prairie cordgrass

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Graduate student J. Manuel Perilla López examined prairie cordgrass at the Felt farm north of campus.

A newly discovered insect species in prairie cordgrass may explain why

increasing seed production has been so difficult, according to entomologist Paul J. Johnson, a professor in the plant science department.

He and graduate student J. Manuel Perilla López found a new species of gall midge in prairie cordgrass at four locations in eastern South Dakota, including the Oak Lake Field Station.

The research was supported primarily by the U.S. Department of Agriculture through the North Central Regional Sun Grant Center which seeks to develop native grasses as a source of biobased transportation fuels.

The prairie cordgrass gall midge has a different relationship with its host plant than other species of gall midge, which form a pocket called a gall within plant tissues, Johnson explained. "This species feeds on the seeds but doesn't modify the plant itself. That's a new discovery in itself."

The adult gall midge, which is about half the size of a fruit fly, lays its eggs in the plant when it begins to flower in mid to late July, according to Johnson. The larvae feed on the developing seed within the plant. "Depending on when the eggs hatch, the larvae will even feed on the unfertilized ovule."

However, when the adult lays its eggs too late, the larvae don't develop to adult stage because the developing seed has become too hard, Johnson explained.

Adult fall midge in prairie cordgrass.

"They don't have mandibles, so must suck the juice of the plant."

Sun Grant director Vance Owens said this research is important because "seed production has always been a significant issue with prairie cordgrass."

Commercial companies have had problems with prairie cordgrass, in particular, Johnson noted. "Though the demand is high, it's costly to grow and produces very few seeds. Now, we have an idea of what's causing that loss."

Johnson and López also discovered a possible solution to the problem—a parasitic wasp that feeds on the gall midge larvae but doesn't damage the grass. "They have the potential to be used as biological controllers," Johnson said.

Next, the researchers need to determine what can be done to enhance these parasitic wasp populations and what population levels will be needed to prevent seed damage. Avoiding the use of pesticides will reduce input costs, which is important for a crop that has a lower profit margin, he pointed out.

In addition, researchers must address the issue of monoculture versus mixed grass communities, according to Johnson. "Can we put big blue stem in one area, prairie cordgrass in one and switchgrass in another to produce, on average, a good amount of biomass—and how does that affect the insect communities?"

He expects that complex, mixed communities will be more stable ecologically and have fewer pest problems. That may then help increase production of native grasses for use in biofuel production.

Provided by South Dakota State University