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New Knowledge on 'Re-Discovered' Switchgrass Moth

Scientists are learning more about the life stages and biology of an insect that may compete with humans for the energy crops of the future -- the insect some scientists are calling the switchgrass moth.

In an article in the Oct. 25, 2010, issue of the journal *Zootaxa*, researchers for the first time described the immature stages of the insect species *Blastobasis repartella* (Dietz), first described in scant detail from two male specimens of the adult moth collected in Denver, Colo., in 1910. The article re-describes the adult insect far more closely and discusses some aspects of its biology in relation to its host plant, switchgrass. *Blastobasis repartella* bores into the stems of switchgrass at some periods of its life cycle. The insect has only recently come to the attention of science once more because researchers are only now thinking of biomass from native grasses such as switchgrass as a possible feedstock for producing cellulosic ethanol, a next-generation biofuel. That means researchers are interested for the first time in insects that feed on native grasses such as switchgrass.

Already in May 2004 at the Dakota Lakes Research Farm, Professor Arvid Boe, a forage and biomass grass breeder, and postdoctoral research associate DoKyoung Lee estimated that up to 40 percent of new tillers of a few scattered plants of switchgrass was lost to the caterpillar. However, many other plants were unaffected, so the average was estimated to be less than 10 percent. Johnson, the curator of SDSU's Severin-McDaniel Insect Research Collection, collected adult moths using simple emergence traps in 2008, and estimated population densities. SDSU scientists first suspected the stem-borer might be a new species. But David Adamski, a research associate with the Department of Entomology at the Smithsonian Institution in Washington, D.C., and a specialist in small moths, ultimately identified the insect.

The current study used insects collected from Brookings County, S.D., and Champaign County, Ill.

Adamski is the lead author of the journal article. Professors Paul Johnson and Arvid Boe, both of South Dakota State University, are co-authors, along with J.D. Bradshaw of the

University of Nebraska-Lincoln and Alan Pultyniewicz of Columbia, Md.

The journal article notes that while some *Blastobasis* species feed on various grasses, *Blastobasis repartella* "appears to be restricted to switchgrass."

Johnson said if the need for new biofuels means farmers grow switchgrass as a biomass crop in the future, it's very likely that switchgrass moth populations will increase along with the acres devoted to switchgrass. That means it is very likely that agricultural producers will want researchers to develop insect control regimens to limit damage to energy crops.

The journal article notes that larvae are presumably inactive during the coldest months but were found to be active in South Dakota when plants were brought into the greenhouse in early spring and forced into early growth. In the field, mature larvae are commonly found in late May actively feeding. Pupae are found primarily during mid to late June within the plant stem. However, no viable pupae have been found in the field in early July in Illinois or by the third week of July in South Dakota.

Adults of *Blastobasis repartella* are nocturnal with a peak of activity during the early pre-sunrise hours. In eastern South Dakota, adult activity occurs from mid-July to mid-August; however, individuals are occasionally collected at evening lights during late August. Seasonal peak adult activity related to reproductive behavior was measured by the frequency of arriving males (40-50 males per night and occasionally exceeding 75 males per night) at cages containing calling females. The flight period at Savoy, Ill., appears to be two to three weeks earlier than in South Dakota. There is no evidence to suggest the occurrence of a second generation or overlapping cohorts in either South Dakota or Illinois populations. This is consistent with the single per year growth of switchgrass and appears to correlate with geographic variations in growing season differences of switchgrass, Boe said.