Meghann Jarchow

I am originally from Brandon, SD where I attended and graduated from Brandon Valley High School. After high school, I went to Ripon College, a small liberal arts college in Wisconsin, for my Bachelor's degree. My studies at Ripon emphasized botany and ecology. I specifically became interested in prairies at Ripon College because many of my botany and ecology courses emphasized the tallgrass prairie ecosystem. This ecosystem was emphasized because there is a 130 acre restored tallgrass prairie, the Ceresco Prairie Conservancy, on the college campus. I graduated from Ripon College in 2002 with a B.A. in biology.

After Ripon College, I attended Minnesota State University, Mankato to pursue my Master's degree in plant ecology. I worked in Dr. Brad Cook's lab and researched *Typha* (cattail) species. I studied whether *T. angustifolia* (narrow-leaved cattail) was allelopathic and whether *T. angustifolia* was biochemically similar to the two other *Typha* species found in Minnesota, *T. latifolia* (common cattail) and *T. x glauca* (hybrid cattail). In addition to my research, I was also a teaching assistant at MSU and taught the laboratory portions of microbiology and general biology. I received a M.S. in biology from MSU in 2005.

Using the teaching experience that I gained at MSU, I became a laboratory instructor in the Biology Department at Gustavus Adolphus College, a liberal arts college in St. Peter, MN, from 2005 to 2007. At Gustavus, I had the opportunity to expand my breadth of biological knowledge. I taught the laboratory and laboratory lecture portion of cell and molecular biology. I also taught microbiology and organismal biology laboratories. During the January terms, I was a faculty sponsor for biology and pre-professional students taking Career Explorations, including students that were selected for the Mayo Scholars Program. In addition to teaching at Gustavus, I taught the lecture and laboratory portions of General Biology II at MSU during the summer of 2006.

In June 2007, I began pursuing my Ph.D. at Iowa State University in Dr. Matt Liebman's lab where I am studying the plant ecology of agricultural ecosystems. I am co-majoring at ISU in Ecology and Evolutionary Biology and Sustainable Agriculture, and my home department is the Agronomy Department. My research at ISU generally focuses on alternative cropping systems for lignocellulosic feedstock production. The goal of the research will be to examine potential cropping systems that are productive while still protecting and conserving environmental resources. One type of cropping system that I am studying in detail is using polycultures of native, prairie plants as a feedstock.

My research focuses on comparing the ecology of different possible lignocellulosic feedstock production systems with an emphasis on using herbaceous, native, perennial polycultures (prairie-like systems). I am working on two different, but complementary, projects. One of the projects, Comparison of Biofuel Systems (COBS), is a large scale cropping systems experiment that includes researchers with expertise in cropping

systems, soil science, and water resources. This research will be unique because COBS directly compares and extensively monitors the aboveground and belowground dynamics of five different cropping systems. The cropping systems are a conventional corn-soybean rotation for grain production, a continuous corn crop with grain and stover removal with and without a winter cover crop, a fertilized prairie-like system, and a high diversity restored prairie. I am studying the aboveground growth characteristics of the cropping systems in order to assess advantages and disadvantages of each system.

The second project, Diversity and Nitrogen (DIVN), is examining the relationships between functional diversity and nitrogen fertilization of prairie-like systems used for feedstock production. We are examining how functional polycultures differ from functional monocultures in biomass production and phenology. We hypothesize that functional polycultures will outperform functional monocultures with regard to biomass production because functional polycultures are able to more fully utilize the environmental resources. The effect of nitrogen fertilization on functional diversity and biomass production is also being examined to test how fertilizer additions affect the productivity and functional diversity of the systems. Finally, a fertilized continuous corn treatment will be included in the study to allow for comparison with the prairie-like systems.

Although ethanol production from lignocellulosic feedstocks is still largely in the research phase, there is great political, social, and economic momentum to further develop lignocellulosic ethanol technologies. It is critical that research is done to ensure that lignocellulosic feedstocks are produced in a manner that is both economically viable and environmentally sound. Using prairie-like systems for feedstock production may be one potential option that satisfies both of these goals.