**Fallow replacement can improve bottom line and benefit water quality**

Replacing fallow with field pea can improve net revenue from wheat production systems, while also offering potential benefits for water quality, according to preliminary results of a three-year study in the Judith River Watershed. Results also point to potential benefits of other fallow replacement crops.

“We see this as a real win-win for farmers”, said Adam Sigler, MSU Extension water quality associate specialist in the Dept of Land Resources and Environmental Sciences (LRES). “Using field pea as a fallow replacement strategy can make more money and likely limits loss of nitrogen from farm fields to groundwater.”

The Judith River Watershed Nitrogen Project was started in 2011 to determine sources of high levels of nitrate in shallow groundwater in both Fergus County and Judith Basin County, and evaluate management options that might reduce nitrate losses. Nitrate, a form of nitrogen, comes from soil, fertilizer, and manure, and can be harmful to infants and young livestock at high concentrations.

The study tested three management practices: controlled release nitrogen fertilizer, splitting nitrogen fertilizer into two applications, and replacing summer fallow with pea. Two advisory groups, made up of mostly local farmers and residents, identified these practices as having a reasonable chance for adoption and a potential to reduce the amount of nitrate leaching into groundwater. Each practice has been tested four times on local farms near Stanford, Moccasin and Moore, using the farmers’ equipment.

“This project’s goal is to identify practices that can reduce nitrate leaching, but still provide the economic returns that make it possible for farmers to adopt”, said Stephanie Ewing, soil scientist in LRES. The research team has collected grain yield and protein data which are necessary to calculate net revenue.

Splitting nitrogen fertilizer into two (early and mid/late spring) applications did not significantly affect yield, protein, or net revenue on winter wheat in 2013 or spring wheat in 2014. Meanwhile, the use of controlled release forms of nitrogen fertilizer appeared to increase grain protein in 2013 but not in 2014, and did not affect wheat grain yield or net revenue either year.

By contrast, while winter wheat crops planted after pea had lower grain yield and protein levels than after fallow, the pea-wheat combination provided equal or better financial returns to farmers. Study results suggest that in 2012-13, there was no difference in net revenue between pea-winter wheat and fallow winter wheat, likely due in part to the dry fall and winter that hurt grain yield after pea. Conversely, in 2013-2014, net revenue was higher in the pea-winter wheat system by $17/ac per year. Given the availability of incentive payments to plant pea from the USDA Natural Resources Conservation Service, the financial advantages could be even higher.

“Summer fallow is common in the region because it has historically helped with winter wheat grain yields and weed management, but our results suggest that pea may be better than fallow for the bottom line”, said Clain Jones, MSU Extension soil fertility specialist in LRES.

For those who haven’t grown pulses, which include pea, lentil, and chickpea, use of residual sulfonylurea herbicides within a three year period can be a barrier to growing these crops. Rocks should also be rolled so that they don’t end up in the combine, because pulses are generally shorter than small grains. Finally, a local pulse buyer would help decrease marketing and transportation costs. Bing Von Bergen, Moccasin, pointed out that other than small changes to the combine and header, growing pea isn’t much different than growing wheat or barley, and requires no nitrogen fertilizer.

Preliminary results also suggest that growing pea (or any other crop) instead of fallowing can prevent the build-up of soil nitrate from natural biological processes that are a major source of nitrate leaching to groundwater in this area. Growing crops can capture nitrate and reduce soil moisture, thereby reducing leaching. Formal estimates of nitrate leaching rates associated with each of the three management practices in this study are being calculated, and will be summarized in a press release and a newsletter this spring.

The research team and advisory groups would like local producers to be on the lookout for a survey that is being sent to a random sample of producers in both Judith Basin and Fergus Counties later this month. The survey is designed to gather information about farmer management practices, perspectives, and ideas for future research.

If you have questions on this study or the survey, please contact Clain Jones at (406) 994-6076.