

Growing perennial forages in traditional annual crop rotation requires finesse

Sara Brown, Prairie Star

For the highest yields and fewest weeds, the best method of converting perennials – mainly grasses – to annual crops is no-till, according to research by John Hendrickson, research rangeland management specialist at the Northern Great Plains Research Laboratory.

“There are still people who think about using minimum till when converting from perennials to annuals,” Hendrickson said. “In alfalfa for example, there’s a lot of pocket gophers that can make the surface real rough and they often say, ‘Why don’t we smooth this out a little.’”

Different tillage options for converting from perennial grasses to annual crops were evaluated at the Northern Great Plains Research Laboratory, USDA-ARS, in Mandan, and the results published in 2014. The research into the best method for transitioning came about because of renewed regional interest in including a perennial phase in annual crop rotations.

“Producers want to diversify,” Hendrickson said. “They’re planting different fields at different times, so they always have perennials out there and always have annuals.”

Perennials and annuals generally thrive in different weather conditions – wet, dry, hot, cold, and so on – so having both allows producers to lessen their risk in any given growing season.

That diversified cropping system – some producers are calling it “perennial cover cropping” – has all but replaced the old wheat-fallow system, Hendrickson said. The new system offers producers much-



Flax planted into intermediate wheatgrass plots at the Northern Great Plains Research Laboratory USDA-ARS near Mandan, N.D. in 2007. The intermediate wheatgrass was terminated using either no-till or minimum-till in fall, 2004.

needed stability and flexibility. And in combination with water-preserving no-till, it also offers something more elusive and difficult to quantify: soil health.

Soil health can boost forage quantity and quality, nutrient, carbon and water cycling, as well as encourage wildlife and pollinator habitat, according to study co-author Mark Liebig, USDA-ARS research soil scientist.

This is especially true as the climate gets wetter, warmer and more variable – all factors that could degrade soil through increased rates of erosion, nutrient loss and salinization. Adding perennial grasses - and their lasting ground cover - could buffer climate-induced stresses and improve soil, he said.

“It’s higher management that’s for sure,” he said. “Depending on what your goals are and where you’re going you need to plan ahead, ‘What’s going to be the crop you seed the year before you convert?’”

The no-till findings were actually the second part of an earlier study that looked at the effects of grazing intermediate wheatgrass at various growth periods. The results were not conclusive, but one initial finding interested researchers: the impact timing of grazing had on weeds. They posit that grazing perennial grasses before conversion to annual crops can help control weeds.

The 2014 study did not evaluate the best cropping sequence to convert from annual crops to perennial forages, but new just released research has. Researchers in Mandan studied different perennial monocultures and mixtures planted into spring

wheat, corn, soybean, dry pea and spring canola residue to determine which annual crop works best to seed perennials.

Results indicated that no-till perennial planting after glyphosate-tolerant soybean resulted in the highest stand frequencies. Cool-season grass treatments tended to have higher stand frequencies than warm-season grass treatments and low-input high diversity (LIHD) mixture consisting of 16 native species.

Biomass yields were highest for intermediate wheatgrass. Switchgrass produced the highest average biomass yield of the warm-season grass treatments. The LIHD mixture was primarily cool-season grasses

followed by weeds, warm-season grasses, and forb/legumes.

The annual crop that the perennials were seeded into did impact biomass yields. For example, switchgrass had the highest yields when seeded into soybean residue but an intermediate wheatgrass-alfalfa mixture had the greatest yield when seeded into canola residue.

For more information on the 2014 study, go to <https://naldc.nal.usda.gov/catalog/59520> and for more information on the 2017 study, go to <https://www.ars.usda.gov/research/publications/publication/?seqNo115=33647>

John Hendrickson 701.667.3015 john.hendrickson@ars.usda.gov



Intermediate Wheatgrass