Minnesota- MCCC State Report 2014

Scott Wells

Minnesota reported more than 400,000 acres of cropland planted to cover crops (NASS, 2012). Cover crops are frequently utilized in canning operations including sweet corn (106,858 ac) and peas (57,808 ac) and following corn silage (361,189)(NASS, 2012). The canning industry reports that half of their contracted farmers are using cover crops in their rotations (Hoffman, Del Monte, Personal communication, 2015). Albeit much lower than in canning operations, cover crops are being used in corn/soybean rotations. Exact estimates are presently unknown, however, in the 2012-2013 North Central SARE Cover Crop Survey, corn growers (N=2) reported 21 bushel reduction in corn yield with cover crops when compared to trials without cover crop. Similar trends were observed in soybeans where soybeans with cover crops yield 51.5 bu ac^{-1} and without cover crops 55.5 bu ac^{-1}.

Cover crop integration into Minnesota's corn and soybean cropping systems is met with several challenges. These challenges center on reduced growing degree-days (when compared to Iowa), poorly drained fine texture soils, and lack of late season soil moisture and precipitation to support the cover crop. Several researchers at the University of Minnesota and USDA-ARS have organized and developed a strategic plan to increase the adoption of vegetative covers in Minnesota. This includes: breeding efforts for improved and new materials (e.g. field pennycress, hairy vetch, and cereal rye), agronomic management (e.g. cover crop establishment and termination, nitrogen management of new crops, and quantification of ecological services), and enterprise development of new markets (e.g. intermediate wheatgrass for forage and bread, winter oilseeds for biofuels).

Recent Publications:

Dorn, KM, Johnson, EB, Wyse, DL, and Marks, MD. Towards an Anchored Reference Genome for Field Pennycress (Thlaspi arvense L.) - 2015/1/12 - Plant and Animal Genome XXIII Conference.

Dorn, KM; Fankhauser, JD; Wyse, DL; Marks, MD. 2013. De novo assembly of the pennycress (Thlaspi arvense) transcriptome provides tools for the development of a winter cover crop and biodiesel feedstock. The Plant Journal. Volume 75. Issue 6, p.1028 – 1038.

Dorn, KM; Fankhauser, JD; Wyse, DL; Marks, MD. 2015. A draft genome of field pennycress (*Thlaspi arvense*) provides tools for the domestication of a new winter biofuel crop. DNA Research. doi: 10.1093/dnares/dsu045

Sedbrook, JC, Phippen, WB, Marks, MD. (2014). New approaches to facilitate rapid domestication of a wild plant to an oilseed crop: Example pennycress (Thlaspi arvense L.). Plant Science. 227. 122-132.

Xiaofei, Z; DeHaan, L.R.; Higgins, L; Markowski, T.W.; Wyse, D.; Anderson, J.A. 2014. New insights into high-molecular-weight glutenin subunits and sub- genomes of the perennial crop Thinopyrum intermedium (Triticeae). Journal of Cereal Science 59 (2014) 203-210.

Wilson, M.L.; Allan, D.L., Baker, J.M. 2014. Aerially seeding cover crops in the northern US Corn Belt: Limitations, future research needs, and alternative practices. Journal of Soil and Water Conservation 69(3):67A-72A.