Multi-Species Cover Crop Mixtures in the Northern Great Plains

Where precipitation is limited, a fallow season can be used to store water for a following crop. Because cover crops can provide soil health benefits, multi-species cover crops have been promoted as a replacement for fallow systems.

In an article recently published in Agronomy Journal, researchers used relative Land Equivalent Ratio (LER) to show that mixed-species did not always outyield single-species cover crops but were more consistent in total biomass production. Grass and taproot species usually provided greater biomass than legumes, but cover crop consumption left less available nitrate and stored water for a following crop compared with fallow. Relative LER may provide a useful criterion for cover crop mixture construction.

Including cover crops in production systems usually results in improved soil quality, but the short-term negative impact to profit in the semi-arid environment of the Northern Great Plains may limit wide-scale adoption. Building soil quality in this environment will be a marathon, not a 100-m dash. Identifying cover crops with stable and acceptable biomass yield that conserve moisture and nitrogen for the following cash crop is more important than maximizing biomass production in a dryland cropping system.


Fall cover crop forage trial one week before harvest, Elora ON, Canada, 23 Oct. 2014.

Cover Crops after Wheat Produce Excellent Forage

In northern climates, the harvest date of annual cereal cover crops planted after winter wheat for fall forage production is dictated by the date of the first killing frost. The year-to-year variability of the harvest date may cause uncertainty in the yield potential and quality of the forage since harvest date is no longer dictated by stage of development.

In an article recently published in Agronomy Journal, researchers report on multi-year trials conducted in Ontario, Canada where forage yield and quality of barley (Hordeum vulgare L.), oat (Avena sativa L.), and an oat–pea (Pisum sativum L.) mixture planted after winter wheat harvest were measured.

Forage quality of fall-grown annual cereal cover crops was consistently high across years, sites, and nitrogen rates. Oat produced more forage than barley with yield ranging from 1.7–3.7 Mg ha⁻¹. The oat–pea mixture had higher crude protein with similar yield and forage quality to oat.

Planting cover crops after winter wheat can serve a dual purpose by providing soil health and other agronomic benefits as well as a good source of forage. Also, by providing economic value, the incentive to diversify simple corn–soybean rotations with winter wheat increases. As a result, use of fall forage cover crops could also assist in addressing the growing agronomic, soil health, and environmental concerns with simple rotations.

Adapted from Deen, W., K. Janovicek, E. Landry, and E. A. Lee. 2019. Annual cereal cover crops following winter wheat produce high quality fall forage. Agron. J. 111. View the full article online at http://dx.doi.org/doi:10.2134/agronj2018.03.0221

Seeds for mixed cover crop treatments prepared for planting. Photo courtesy of K. McVay.