

Lessons learned on cover crops

BY MARK LICHT AND LIZ JUCHEMS

COVER crops are an important component of the Iowa Nutrient Reduction Strategy, which calls for a high level of adoption to reach the goals of reducing nitrate-nitrogen and phosphorus in our Iowa rivers, streams, other bodies of water and, ultimately, the Gulf of Mexico.

Landowners and farmers are increasingly seeing the value of single-species cover crops and incorporating them into their cropping systems. However, in Iowa and the Upper Midwest, there has been limited research on using cover crop mixtures. Here's what



CEREAL RYE: At the Southwest Iowa ISU Research Farm, this plot was seeded to cereal rye in fall 2015.



ANOTHER MIX: Oats dominated the mixture that included radish and hairy vetch in this test at the Southwest ISU Research Farm, which was seeded in fall 2015.

we've learned so far.

In theory, cover crop mixtures have the same advantages as natural ecosystems like prairies, which are diverse mixtures of species. To evaluate that theory, the Iowa Cover Crop Working Group established cover crop mixture plots at six ISU Research and Demonstration sites and nine farmer-partner sites.

The ISU sites established plots in two corn and soybean rotation fields by hand-broadcast seeding the cover crop. In each field, the following treatments were replicated for a total of 24 plots: single-species cover crop, cover crop mixture and no cover control. The farmer-partner sites had two treatments: an aerially seeded cover mixture and a no cover control, which were replicated four times at each site, for a total of eight plots on each farm.

Preceding the corn crop, the single-species was oats, and the mix contained hairy vetch, oats and radish. Preceding the soybean crop the single-species was rye, and the mix contained rapeseed, rye and radish. The ISU sites were established for the fourth season in late August and the farmer-partner sites were seeded in fall of 2014 and 2015.

To evaluate the establishment of the cover crops and compare the treatments,



COVER MIXTURE: At the Muscatine County farmer-partner site, this cover crop field plot was seeded with rye, radish and rapeseed in fall 2015.

fall and spring biomass samples were collected from each site and sorted by species. Analyses generated these conclusions:

- Oats and cereal rye had resulted in the majority of the biomass from mixture treatments (all sites).

- Cereal rye was the only cover crop to consistently overwinter (all sites).

- Single species (cereal rye and oats) had greater total fall biomass growth than the mixtures (ISU sites).

- Cereal rye seeded as a single species had greater total spring biomass growth than the mixture treatment (ISU sites)

For a corn and soybean rotation in Iowa, oats and cereal rye work better than any other species evaluated in this project. The single-species treatment (oats and cereal rye) resulted in more total biomass than the mixtures, and dominated within the mixture treatments. Lower biomass from mixture species (radish, rapeseed and hairy vetch) is likely due to slower establishment and limited growing degree days after harvest.

The greater biomass generated by the oats and cereal rye as a single-species than the mixtures is providing better soil erosion protection and larger potential reductions of nitrogen and phosphorus.

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Licht is an ISU Extension cropping systems agronomist; Juchems is events coordinator for Iowa Learning Farms.

