

Name of Applicant: Regents of the University of Minnesota

Project Director/Principal Investigator: Mitchell Hunter, Ph.D.

Project Title: OILSEED: OILseed Crops to Sustain the Environment and Meet Energy Demand

The overall goal of the OILSEED project is to advance a highly scalable system that can produce biofuel feedstocks with very low carbon intensity (CI) scores while simultaneously addressing intractable environmental problems in agriculture, including nitrate loss, soil erosion, and declining soil health. This system produces an intermediate oilseed—camelina (*Camelina sativa*) or domesticated field pennycress (*Thlaspi arvense*)—as a harvestable winter crop between a preceding summer-annual grain crop and a following soybean crop. In other words, it produces three crops in two years. Both oilseed species produce plant oil that can be made into sustainable aviation fuel (SAF) and other biofuels and bioproducts.

Our overarching goal is to enable deployment of this oilseed relay cropping system (ORCS) across the “Northern Corn Belt Plus” (NCB+), which extends from the eastern Dakotas to Michigan and from the I-80 corridor to the Canadian border. Specific goals include:

Goal 1: Accelerate commercialization of ORCS in the NCB+ region and enable low-CI relay cropping on up to 35 million acres by generating a region-scale data package; developing robust models of environmental and economic outcomes that can inform policymakers and companies; and conducting targeted experiments to increase yield, reduce CI score, and improve economics.

Goal 2: Advance ORCS from the “Feedstock Experimental Testing” phase to the late stages of “Pre-Commercial Feedstock Assessment”—i.e., the cusp of full commercialization—with an integrated program of agronomic trials, economic assessments, extension programming, market assessments, and policy analysis.

Goal 3: Advance diversity, equity, and inclusion in science and among agricultural communities in the NCB+ region through project culture, trainings, and relationship building.

To achieve the project goals, we will conduct 1) a Core Experiment at 5 sites across the region, over 5 harvest cycles, which will allow us to develop the base data package and model environmental and economic outcomes; 2) targeted experiments to address limitations in on-farm management; 3) activities to advance commercialization, including extension education and a feasibility study that will address market and regulatory challenges; and 4) listening sessions and inclusive and accessible field days that lead to exchanges of knowledge and ongoing connections with underserved agricultural communities in the region

This project has the potential to advance goals for both decarbonizing transportation and addressing environmental challenges related to agriculture. If the project is successful, ORCS could be deployed on up to 35 million acres of land every year, which would produce a substantial amount of low-CI biofuel feedstock—reducing the climate impact of flying, driving, and consuming goods—and also protect soil, water, and wildlife on a vast scale.

This project is led by the University of Minnesota-Twin Cities. Key collaborators include North Dakota State University; the United States Department of Agriculture-Agricultural Research Service units in Morris and Saint Paul, MN; and Cargill, Inc. Cargill will take delivery of all excess oilseed grain produced in this project and use it for business and market development activities.