

CoverCress – a novel oilseed winter crop with canola-like composition that helps sequester carbon and prevent soil erosion

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Abstract

There is an urgent need for reducing carbon footprint and other detrimental impacts of civilization on the environment. One of the solutions proposed in agriculture are cover crops that are generally grown between regular cropping seasons and provide significant benefits such as enhanced soil health and increased carbon sequestration. The main problem with lack of wide-spread cover crops adoption is in their economics, as most farmers avoid planting cover crops due to guaranteed costs and uncertain returns from the benefits to the following cash crop. This results in misplaced economic incentive where the society greatly benefits from increased cover crop use, but most farmers are not prepared to pay for that.

To address this dilemma, CoverCress Inc. developed a novel oilseed crop that doubles as a cover crop but can also be used as a feedstock for bioenergy, human and animal consumption. The main advantage is that it doesn't compete for land with any of the established crops, resulting in ultra-low Carbon Intensity score of the oil and meal. Developed from a known weed (field pennycress *Thlaspi arvense*), CoverCress can be used to produce oil with attractive properties for renewable diesel, jet fuel or food use. The protein-rich seed meal can be used for animal feed or as an excellent source of plant-based food protein. Pennycress seeds have high oil content (~32%) with the lowest saturated fat content among all commercially available plant-based oils (<4%).

The winter annual life cycle of pennycress enables planting in early fall immediately following corn harvest and collecting the grain prior to soybean planting in mid-to-late May. Using a combination of conventional breeding and CRISPR-mediated genome editing we were able to rapidly domesticate wild pennycress into CoverCress, canola-like productive cover crop that we are planning to launch in central Midwest in fall of 2022.

Key words: pennycress, biofuels, cover crop, soil health, carbon sequestration