**Weed Suppression from Frost-seeded *Brassicaceae* Cover Crops**

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Cover crop-based organic no-till cropping systems can reduce tillage and agrochemical uses, but such practice is inconsistent in weed control, and cover crop termination versus cash crop sowing can be challenging to coordinate. The performance of soybean (*Glycine max*) planted into rye (*Secale cereale* L.) residues is inconsistent due to high rye residue biomass. Terminating rye early and continuing soil coverage with winter-hardy crops could alleviate the soybean performance inconsistency. Red clover (*Trifolium pratense* L.) is a winter-hardy cover crop that provides multiple benefits and requires minimal management, but its weed suppression performance is inconsistent. Brassicas are cool-season crops. Residues of cool-season Brassicas crops, such as white and yellow mustard (*Sinapis alba* L.) and spring canola and winter rapeseed (*Brassica napus* L.), when incorporated with soil, can reduce weed seedling emergence. A randomized complete block design with 4 replications experiment (N = 48) was conducted at Cornell University’s Musgrave Farm to examine if brassicas provide reliable weed suppression. Each replication consisted of ten brassica cover crop species, a red clover, and a no cover crop treatment. Red clover and no cover crop are control treatments. The ten *Brassicaceae* species and red clover were frost-seeded into rolled cereal rye mulch on March 23rd, 2022. The no cover crop was rolled cereal rye mulch residue. Crop coverage was evaluated from a 0.25 quadrat per plot on Jun 2nd, 2022, and crop and weed biomass were sampled from a 0.25 quadrat per plot on Jun 3rd, 2022. A non-linear model for crop–weed competition was fitted with nls, and a linear model for crop coverage was fitted with lm (stats package version 3.6.2) in R version 4.2.1. The crop-weed competition conforms to = , where is the weed biomass, C is the weed biomass when no cover crop presented, is the crop – weed competition coefficient, and is the cover crop biomass. This study suggested that 1) Collard provided the strongest weed suppression among all the examined *Brassicaceae* species and 2) Collard’s coverage was significantly higher than that of red clover.