

Weed Growth and Crop Performance Following Hairy Vetch, Rye, And Wheat Cover Crops in a Cool Semiarid Region

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SUMMARY

Tillage is used to control weeds but can degrade soil quality. Our objective was to determine if tillage could be replaced by killed cover crop mulch for weed control when growing organic grain crops. An attempt was made to kill winter cereal and hairy vetch cover crops using a roller-crimper, wide-sweep blade plow, and disk (control) and then follow with warm-season buckwheat, dry bean, and maize grain crops during three growing seasons in southwestern North Dakota, USA. Above-ground weed production was greater in rolled-crimped hairy vetch than in rolled-crimped and disked rye plots. Maize failed to produce grain in any season, while buckwheat and dry bean produced harvestable grain following undercut or rolled-crimped cover crops in only one season. Even then, grain yield averaged only 37 kg ha⁻¹ across cover crop and grain crop treatments in rolled-crimped plots, compared with 255 kg ha⁻¹ in undercut plots and 487 kg ha⁻¹ in disked plots. Yield likely would have been higher in tilled plots but tillage was imposed within 13 d of rolling-crimping, which required cover crops to reach advanced growth stages for effective termination. Rolled-crimped rye mulch can suppress weeds, but soil water deficits following cover crops and the delay needed for consistent termination may prevent timely seeding and successful grain crop production in single-season cover crop/grain crop relay systems in semiarid upper-latitude environments. Preliminary research indicates potential for use of rolled-crimped cover crop mulch for weed suppression in multi-year cover crop/grain crop relay systems in these regions, though additional research is needed which demonstrates commercial viability of this 2-yr cropping strategy.

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