Impacts of cover crops on subsequent crop yields



Cover crops are plants grown between main crops, not for harvest, but to improve soil health and provide ecological benefits. Examples include legumes, grasses, and brassicas.

Cover Crop Adoption Trends



National Trend

- Cover crop acreage in the U.S. increased by 50% between 2012 and 2017 but slowed to 17% growth by 2022.
- Only 4.7% of U.S. cropland is under cover crops (2022).

Nebraska Context

• Cover crop adoption is more common in the wetter eastern region (4.3% of cropland) than in the arid west (2.4%).

Key Findings from Nebraska Experiments

East Central Nebraska (ENREC): Two	Dryland and Irrigated Sites: Six years of
years of planting green with cereal rye and	planting corn green found no yield
hairy vetch showed late termination	differences on average. Four site-years had
decreased corn yields by 28% in a very dry	corn yield declines (0.5–0.87 tons acre ⁻¹),
year [1].	and one site-year saw a yield increase [2].
Soybean Planting Green: Two years of study found yield declines (23%) in drier conditions with hail/windstorms and increases (28%) in another year [3].	Multiple Sites (Mead, Concord, Clay Center): Four years of trials found mostly neutral soybean yield effects, with one year showing a 13% decline and another showing an 18% increase after a cover crop mixture [4].
Wheat Following Cover Crops (Sidney): A	Grant and North Platte: Two years of trials
two-year study showed slight yield	showed that most cover crop species
reductions (10%) on the first year but no	reduced corn yields by 17–30%, while spring
yield impact on the second year under both	oats had no statistically significant effect on
irrigated and dryland conditions [5].	yield [6].

General Research Insights and Major Takeaways

Crop-Specific Effects

- Legumes and cover crop mixtures can increase corn yields by 13–21%, whereas lateterminated grass species may reduce yields, particularly in dry years.
- Research on soybeans following cover crops is limited, but existing studies indicate minimal yield effects.
- There are even fewer studies that have examined wheat, though findings suggest similar trends to those observed in corn.
- In semi-arid regions, spring oats serve as a viable alternative to cereal rye.

Synthesis Studies

 Field-scale experiments, on-farm research, and farmer surveys generally show neutral yield effects of cover crops on cash crops [7, 8, 9].

Learning Curve:

 Farmers and researchers often face a learning curve with termination practices; once overcome, negative yield effects are limited [10].

Management Considerations

- **Species Selection:** Corn following mixtures or legumes often experiences less yield reduction than with grass cover crops.
- **Termination Timing:** Terminating cereal rye 10–14 days before corn planting can lead to less negative yield effects. However, soybean tends to be more forgiving when it comes to cover crop termination timing
- **Long-Term Benefits:** Yield increase becomes more consistent over time with proper management.
- No-Till Systems: Cover crops better support yields in no-till systems.

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