

# Winter cereal cover crop evaluation for organic no-till soybean production

Cornell Soil Health Train-the-Trainer Workshop: August 8, 2015

What winter cereal cover crop species and cultivar provides the best weed suppression? When is the optimal time to roll a winter cereal cover crop? Based on this timing, what is the trade-off between soybean yield and weed control?

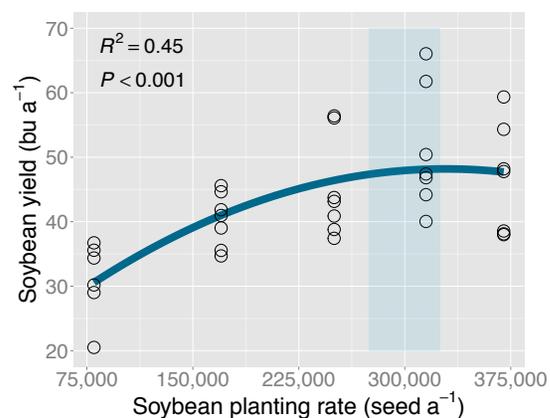
In organic no-till soybean production, winter cereal cover crops are typically rolled at anthesis to ensure adequate termination. In this experiment, we double-rolled winter cereal cover crops (cereal rye, triticale, and barley) at different soybean planting dates to compare the effects on soybean yield and weed suppression. As some of the winter cereal cultivars were not at anthesis at the earlier rolling-crimping dates, double rolling was implemented to improve termination.

### Cover crops:

- Seeding date (2014): September 19
- Seeding rate: 2 bu/acre

### Soybeans:

- Planting dates (2015): May 22, May 29, June 5, and June 12
- Planting rate: 300,000 seeds/acre
- Cultivar: Viking O.2299N (2.2 relative maturity)



Soybean yield across five planting rates; highlighted area indicates optimal planting rate range for greatest yields. Data are from 2014 in Kingston, NY.

Soybean planting rate (seed a <sup>-1</sup> )	Soybean seed cost (\$ a <sup>-1</sup> )	Average soybean yield (bu a <sup>-1</sup> )	2014 soybean* market value (\$ bu <sup>-1</sup> )	Partial profit (\$ a <sup>-1</sup> )
80,000	25	31	29	876
170,000	53	41	29	1132
250,000	79	45	29	1225
315,000	99	50	29	1364
370,000	116	45	29	1199

Partial budget analysis of five different soybean planting rates. The greatest partial profit is highlighted in bright yellow. Data are from 2014 in Kingston, NY. \*Food-grade soybean price.

Questions? Feel free to contact Jeff Liebert (jal485@cornell.edu) or Matt Ryan (mrr232@cornell.edu) for more information. Also, please visit our website to learn about our other research: <https://scslabcu.wordpress.com/>



**1.** Seed winter cereal cover crops in early fall. Use locally-adapted seed, a high seeding rate (3 bu/a), and drill the seed – as opposed to broadcasting – for a more uniform cover crop stand.



**2.** Terminate the cover crop when it reaches anthesis (Zadoks 60-69), which is indicated by flowering (visible anthers) and pollen shedding.



**3.** Use a roller-crimper to terminate the cover crop. If possible, roll the cover crop perpendicular to the direction it was seeded to create more uniform ground cover and provide better weed suppression.



**4.** Soybean seed can be no-till planted on the same day as rolling. Ideally, a tractor with a front-mounted 3-point hitch is used so that rolling and planting can be completed with a single pass. Use a high planting rate of ~300,000 seeds/acre.



**5.** When managed well, winter cereal cover crops can provide excellent weed suppression. Since the cover crop is the main source of weed control, cover crop management – from cultivar selection to rolling – is critically important.



**6.** As the season progresses, the cover crop mulch increases soil organic matter, moderates extreme soil temperature fluctuations, and provides enhanced soil moisture retention. At season's end, harvesting 45-50 bu/acre is typical in NY.