



Cover Crop Termination in Cotton

Cover Crop Termination in Cotton

Cover crop use in cotton has increased as soil health and crop management research has progressed and conservation program enrollment has increased. The potential benefits of including a cover crop are well understood: improved soil and water quality, reduced soil erosion, increased soil moisture, decreased nutrient loss, weed suppression, and an increase in beneficial insects.¹ The benefits sound like a slam dunk, but balancing a cover crop with a cash crop like cotton can require additional management agility.

Cotton is more sensitive to early season stress than other crops, and understanding how and when to terminate a cover crop can help prevent negative effects from cover crops on cotton establishment.² Termination timing can impact germination, soil moisture, soil temperature, nutrient availability, and cover crop biomass production.¹ These aspects can vary by cover crop species and termination method.



Figure 1. Strip-till planting cotton into a terminated rye cover.

Consider the Cover Crop Species

There are several cover crop species that can work well in a cotton production system. Cereal rye (*Secale cereale* L.), wheat (*Triticum aestivum* L.), crimson clover (*Trifolium incarnatum* L.), hairy vetch (*Vicia villosa* Roth), and Austrian winter pea (*Pisum sativum* L. ssp. *sativum* var. *arvense*) have been used successfully prior to cotton planting.² Select grasses for increasing biomass production, suppressing weed emergence, and scavenging nutrients from the soil, while legumes can produce a thick groundcover and increase nitrogen (N) availability for the subsequent crop.¹ Planting a cover crop mix should be considered, though more research is needed on the effects of termination method and timing for cover crop mixes.²

Cover Crop Termination in Cotton

A Method to Termination Madness

Terminating a cover crop can be accomplished chemically, mechanically, or through a combination of both. The method used may be determined by the cover crop planted, target termination timing, and equipment availability on the farm.

Chemical termination uses a herbicide application to kill the cover crop. Applications may be broadcast or directed as a strip application where the cotton crop will be planted. **Mechanical termination** includes mowers, undercutters, plows, disks, and roller-crimpers. Mowing is not ideal, as regrowth is common, and it creates a non-uniform seed bed. However, roller-crimpers help create a uniform seed bed and regrowth is typically not a problem. **Combination chemical and mechanical termination** starts with a herbicide application to kill the cover crop, followed by a roller-crimper to create an even mat to cover the soil surface. This method is recommended in the northern Cotton Belt, though managing for thrips will be important if this method is used. Strip termination begins with a herbicide application directed in the row where the cotton will be planted weeks later. This allows biomass to continue to accumulate and cover between the rows while limiting the negative effects of planting into a cover crop. The rest of the field is terminated at planting.² Direct seeding, or not using row cleaners, into a terminated cover crop can decrease emergence.³

Timing Can Be Everything

Determining when to terminate a cover crop requires balancing potential risks and benefits. Early termination limits the amount of biomass accumulation and shortens the duration of soil coverage. Late termination can impact emergence, lead to delayed cotton maturity, and provide an uninterrupted feeding source for insect pests.²

Research performed at the University of Tennessee studied the effects of cover crop termination at planting, three weeks prior to planting, and six weeks prior to planting. Termination at planting resulted in emergence decreased by 25% and maturity delayed by 65% compared to the six-week termination timing. Termination at six weeks had lower biomass accumulation and soil coverage, but lower incidence of three-cornered alfalfa leaf hopper damage.²

Cover crop planting delays, which can occur when cash crop harvest is delayed, can lead to a substantial reduction in biomass production. Planting that is delayed by a month, from early October to early November for example, can result in 50% lower biomass.² Fertilizing the cover crop may help increase biomass production and soil coverage.

Cover Crop Termination in Cotton

Take the Good and Mitigate the Bad

Allelopathy should be considered when selecting a cover crop species and determining termination timing. Allelopathy occurs when a plant produces chemical compounds that negatively affect another plant. Allelopathy can be a desired effect, as in the case of weed species suppression, or a problematic effect when the cash crop is negatively impacted. Research conducted at the University of Tennessee tested oats, winter pea, rye, hairy vetch, and wheat as potential cover crops for cotton and found that wheat and hairy vetch had the lowest allelopathic effect on cotton germination while winter pea inhibited cotton germination the most. Cotton emergence was lower when cover crops were terminated at the time of cotton planting, so it is recommended to terminate a cover crop at least three weeks prior to planting a cotton cash crop to help mitigate allelopathic effects.⁴

Final Considerations

Soil moisture retention has been observed to be similar between rolled and standing cover crops, so exploring the use of a cover crop without investing in a roller is possible.³ Cover crops reduce weed germination through shading, competition, and allelopathic effects, though a cover crop with a poor stand and limited soil coverage may require the use of a pre-emergence herbicide application to control any weeds present prior to planting.³ Terminated and decomposing legume cover crops can help increase the N available to the cash crop,¹ and letting cover crops like crimson clover mature to hard seed can help reduce seeding costs in the fall through self-seeding.³ Cover crops can also help increase the populations of beneficial insects.²

However, soils may take longer to warm due to residue coverage. Planting cash crops into lower temperatures can lower germination and lead to more seedling disease. Residue left in the row should be cleared with row cleaners to help improve seed-to-soil contact. Be mindful creating a higher C:N ratio, especially with grass cover crops, which may “lock up” nutrient availability to the cotton crop.¹

There are more benefits to using a cover crop than can be observed in a single year. Continued research is necessary and important for using cover crops in a cotton production system.

Cover Crop Termination in Cotton

Sources

- ¹ Denton, S.D., Dodds, D.M., Krutz, L.J., Varco, J.J., Gore, J, and Raper, T.B. 2020. Evaluation of cover crop species termination timing prior to cotton production in Mississippi. The Journal of Cotton Science. 24:97-103. <https://www.cotton.org/journal/2020-24/3/upload/JCS24-097.pdf>.
- ² Denton, S., Raper, T., Stewart, S., and Dodds, D. 2022. Cover crop termination timings and methods effect on cotton (*Gossypium hirsutum* L.) development and yield. Crop Forage & Turfgrass Management, 9, e20206. <https://access.onlinelibrary.wiley.com/doi/epdf/10.1002/cft2.20206>
- ³ Vann, R.A., Reberg-Horton, C., Edmisten, K., and York, A. 2022. Investigating cover crop mulches in North Carolina cotton production. NC State Extension. AG-833. <https://content.ces.ncsu.edu/investigating-cover-crop-mulches-in-nc-cotton-production/>.
- ⁴ Shekoofa, A., Safikhan, S., Raper, T., and Butler, S. 2019. Cover crop residues impact cotton seed germination and seedling growth at different termination timings. University of Tennessee Extension Institute of Agriculture. W 838. <https://news.utcrops.com/2019/03/cover-crop-residues-impact-on-cotton-germination-and-seedling-growth-at-different-termination-timings/>.

Legal Statements

Performance may vary, from location to location and from year to year, as local growing, soil and environmental conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on their growing environment.

The recommendations in this material are based upon trial observations and feedback received from a limited number of growers and growing environments. These recommendations should be considered as one reference point and should not be substituted for the professional opinion of agronomists, entomologists or other relevant experts evaluating specific conditions.

Bayer and Bayer Cross are registered trademarks of Bayer Group. All other trademarks are the property of their respective owners. ©2023 Bayer Group. All rights reserved. 1410_306754

