

UTILIZING TILLAGE RADISH AS A COVER CROP

IN COMMERCIAL VEGETABLE PRODUCTION SYSTEMS



Cover crops are established as part of a cropping system between production crops in rotation. Cover crop species and planting dates should not adversely affect crop yield or interfere with the harvest process. A cover crop is defined as grass, legumes or other herbaceous flowering plants planted for seasonal vegetative cover. Grasses function well as erosion control and include cereal rye, triticale, oats and wheat. Clover, vetch and cowpeas (legumes) offer nitrogen fixation. In late fall to early spring, tillage radish may be utilized as cover crop to fulfill several functions.

Tillage radish (*Raphanus sativus* var. *longipinnatus*) is a type of daikon radish specifically bred for use as a cover crop in agricultural systems. Tillage radish is highly effective for soil conditioning before planting vegetables. Its deep taproot breaks up compaction, improves drainage and scavenges nutrients making it ideal for root crops and leafy greens.



Tillage radish forms a dense closed crop canopy which blocks light and prevents weed germination. Photo by Christine E.H. Coker

Purpose and Use of Tillage Radishes

Tillage radishes are planted primarily in late summer to early fall and terminated before spring planting. They are not grown for harvest but for their soil-enhancing properties.

SOIL CONDITIONING. Deep taproots grow up to 6 feet deep to penetrate compacted soil layers. As the radish decays, it contributes organic matter to the soil, improving microbial activity and nutrient cycling. This organic matter also supports beneficial organisms like earthworms, which further enhance soil structure and fertility.

NUTRIENT SCAVENGING. They absorb nitrogen and other nutrients that might otherwise leach away. Upon decomposition, this nitrogen may become available to subsequent crops, reducing fertilizer needs.

WEED SUPPRESSION. Tillage radish suppresses weeds primarily by forming a dense canopy in the fall. When seeded early, it creates a closed cover crop canopy — no visible soil — which blocks light and prevents weed germination. Most winter annual weeds begin germinating in the fall. A well-established tillage radish stand can outcompete these weeds by shading the soil and altering light conditions.

After winterkill, tillage radish leaves behind minimal residue, allowing for no-till spring planting while still suppressing early spring weeds. While effective against annuals, tillage radish is less effective against perennial weeds, which may require additional management strategies.

EROSION CONTROL. Radish roots and foliage help stabilize soil. Tillage radish helps prevent winter erosion by

covering the soil during the fall and early winter months. Its dense canopy and deep taproots stabilize the soil and reduce surface runoff.

Although tillage radish leaves behind minimal residue after winterkill, the soil structure improves and root channels it creates help reduce erosion even after the plant dies.

The biodrilling effect of its taproots breaks up compacted layers, allowing water to infiltrate more easily rather than running off the surface. This reduces erosion and improves moisture retention.

NATURAL TILLAGE. The long taproots loosen soil without mechanical equipment, hence the name “tillage” radish. The decomposed radish biomass helps the soil dry out and warm up faster in spring, which is especially beneficial for early vegetable planting.

Because it winterkills naturally, tillage radish supports no-till spring planting, which further reduces erosion by minimizing soil disturbance. A closed canopy formed in the fall is essential for erosion control. This canopy protects the soil from wind and water erosion during the vulnerable winter months.

PEST MANAGEMENT. Tillage radish produces glucosinolates — sulfur-containing compounds common in brassicas. These compounds break down into biofumigants, like isothiocyanates, which can suppress soilborne pests and pathogens, and reduce weed germination. When plant tissue is damaged (e.g., by chewing insects), glucosinolates are broken down by an enzyme called myrosinase, producing toxic compounds such as isothiocyanates, nitriles and thiocyanates. These breakdown products can repel or kill herbivorous insects, disrupt insect development and reproduction, and function as feeding deterrents.

Planting Guidelines

TIMING

- Late August to early October is ideal in Louisiana.
- Plant at least four weeks before the first frost to ensure full root development.

SEEDING RATE

- Drill: 6-8 pounds per acre
- Broadcast: 8-10 pounds per acre
- Precision planter: 4 pounds per acre in 15-inch rows with 4-inch spacing

DEPTH

- ¼-inch to ½ inch deep; up to 1 inch in dry soils



The taproots of tillage radish grow up to 6 feet deep to penetrate compacted soil layers. Photo by John Komp

Rotation Planning

Avoid Brassica overlap! Do not follow tillage radish with *Brassica* vegetables (e.g., broccoli, cabbage, cauliflower) due to shared pests and diseases.

Ideal successor crops are those planted in early spring or late winter such as:

- **Root crops** benefit directly from the loosened soil channels left by radish. Carrots, beets, onions, parsnips and turnips are recommended crops.
- **Leafy greens** thrive in nutrient-rich, well-drained soil. Lettuce, spinach, kale, Swiss chard, collards and mustard greens work well as successor crops.
- **Fruit-bearing crops** do well in full sun and benefit from the improved drainage following tillage radish cover. Tomatoes, peppers, squash, eggplant and cucumbers are just a few of the crops that can be planted in this rotation.
- **Legumes** like snap beans, Southern peas and lima beans also help fix nitrogen and work well in this system.



Tillage radish as a cover crop is highly effective for soil conditioning before planting vegetables. Photo by Christine E.H. Coker

Termination Options

The most recent chemical termination recommendations for tillage radish in Louisiana are outlined in the 2025 Louisiana Suggested Chemical Weed Management Guide from the LSU AgCenter. Tillage radish is treated as a winter cover crop, and its termination is typically part of a preplant burndown program.

WINTERKILL: This usually occurs after several nights in the mid-teens (Fahrenheit).

MECHANICAL TERMINATION: Mow before seed set to prevent reseeding.

CHEMICAL TERMINATION: Primary burndown options include:

- Glyphosate (1.0 pound a.i./acre)
 - ◆ Strengths: Systemic control, effective on many winter weeds.

- ◆ Weaknesses: Poor to fair control of legume cover crops and some broadleaf species.
- ◆ Enhancement: Add ammonium sulfate if using hard water.
- Paraquat (0.75-1.0 pound a.i./acre)
 - ◆ Strengths: Fast contact control.
 - ◆ Weaknesses: Poor control of large ryegrass, curly dock, and legume cover crops.
 - ◆ Enhancement: Use tank-mix partners for broader control.
- Glufosinate (Liberty 280 SL) (29-43 ounces/acre)
 - ◆ Strengths: Effective on glyphosate-resistant horseweed and other winter weeds.
 - ◆ Limitations: No residual activity; limited seasonal use.

To improve termination of tillage radish and other winter vegetation, consider tank-mixing glyphosate or paraquat with Valor, Envive, Canopy EX, LeadOff, Sharpen, 2,4-D or Dicamba (especially if horseweed is present). These combinations provide broader spectrum control and may offer residual activity to suppress weed regrowth before spring planting.

Apply herbicides six to eight weeks before planting for best results. Vegetation should be destroyed at least three to four weeks before planting to reduce pest pressure (e.g., cutworms) and improve crop establishment.

Always consult product labels for:

- Application rates
- Tank-mix compatibility
- Plant-back restrictions
- Environmental precautions

REMEMBER: THE LABEL IS THE LAW.

Potential Cons of Tillage Radishes

- **ODOR DURING DECOMPOSITION:** Rotting radishes can produce a strong smell.
- **POTENTIAL TO BECOME A WEED:** If not terminated before seed set, they can reseed.
- **SOIL EROSION RISK:** On slopes, decaying roots may loosen soil and increase erosion.
- **SHORT RESIDUE DURATION:** Decompose quickly, leaving less long-term residue.
- **COMPETITION WITH OTHER COVER CROPS:** Can dominate mixtures if seeded too heavily.

Example vegetable crop rotation calendar for Louisiana.

SEASON	ACTIVITY	CROP/ACTION	NOTES
Late summer (August-September)	Cover crop planting	Tillage radish	Do all tillage and shaping before planting radishes. Plant 4-10 weeks before first frost. Use 6-10 pounds/acre.
Fall (October-November)	Radish growth	Soil conditioning	Taproots break compaction, scavenge nutrients. Monitor soil moisture. Radishes do not thrive in waterlogged soils.
Winter (December-February)	Termination	Winterkill or mow	Radishes decompose, releasing nutrients. Decomposing roots leave channels that improve spring soil structure. Avoid <i>Brassica</i> crops next.
Early spring (February-March)	Vegetable planting	Leafy greens, onions, carrots, beets	Direct seed into radish residue. No-till preferred.
Late spring (April-May)	Main season crops	Tomatoes, peppers, squash	Transplant into improved soil. Monitor moisture.
Summer (June-July)	Harvest and prep	Clean beds, soil test	Prep for next radish cycle or summer cover crop.

Suggested crop rotation sequence for Louisiana vegetable farmers.

YEAR	SPRING	SUMMER	FALL
1			Tillage radish
2	Lettuce, spinach, carrots, onions	Tomatoes, peppers, squash	Cowpeas (optional summer cover)
3	Beets, leafy greens	Sweet corn or okra	Tillage radish (again)

AUTHOR

Christine E.H. Coker, Professor, Extension and State Vegetable Specialist

RESOURCES

Lounsbury, N. 2020. No-till spring vegetables after forage radish cover crop. FS-1134. University of Maryland Extension and Department of Environmental Science and Technology.

Smith, A., and G. Zinati. 2019. Using biological and mechanical zone tillage to reduce compaction in organic no-till vegetable production. <https://rodaleinstitute.org/wp-content/uploads/Using-Biological-and-Mechanical-Zone-Tillage-to-Reduce-Compaction-in-Organic-No-till-Vegetable-Production.pdf> Accessed: 23 October 2025.

Stephenson, D.O., M. Foster, D.K. Miller, P. Jha, L.C. Webster, and B. Gueltig. 2025. Louisiana suggested chemical weed management guide for row crops. LSU AgCenter Pub. 1565-A.

Southeastern Vegetable Extension Workers. 2025. 2025 Southeastern U.S. Vegetable Crop Handbook. J.M. Kemble, ed. 380pp.

USDA Natural Resources Conservation Service. 2024. Conservation practice standard-Cover Crop: Code 340 in: Field Office Technical Guide.