

## COVER CROP MIXTURES

Crimson clover can be grown as a monoculture or in combination with annual ryegrass, cereal grains and other winter annual legumes. When sown in combinations with companion crops, plant crimson clover at 40-60% of the normal rate, and the other crop at 50-75% of the monocultural rate. For example, when sown in combination with annual ryegrass with a drill, the recommended seeding rate is 8-12 lbs/acre crimson clover and 5-10 lbs/acre annual ryegrass. Other cover crop mixtures include 8-12 lbs/acre crimson clover sown with one of the following: 30-40 lbs/acre of cereal rye, 3-5 lbs/acre of oilseed radish, or 40-50 lbs/acre of spring oats. Planting crimson clover with more than 2 other cover crops is not recommended.



Figure 2. A mixture of crimson clover and cereal rye in a soybean/corn rotation.

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Figure 3. Suppression of tansy mustard weeds by crimson clover in corn/soybean rotation in southern Illinois.

## BENEFITS OF USING CRIMSON CLOVER AS A COVER CROP:

- Nitrogen Fixation
- Improve Soil Quality
- Weed Suppression
- Erosion Control
- Attracts Beneficial Insects
- Builds Soil Organic Matter
- Increases Moisture Holding Capacity
- Reseeding potential in perennial systems



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# Improving Cover Crops with Crimson Clover



Improve soil quality.

## DESCRIPTION

Crimson clover (*Trifolium incarnatum* L.) is a legume that has been traditionally used as a forage in the southern United States. In recent years, university researchers, extension agents and farmers have begun successfully using this rapidly growing winter annual as a cover crop or “green manure” in a variety of rotations including corn, soybeans, wheat, cotton, potatoes, snap beans and grain sorghum. Crimson clover is also effective as a living cover crop in orchards, berry fields and vineyards because of its shade tolerance and reseeding potential. Crimson clover is adapted to cool humid conditions and tolerates most soil types making it a versatile plant that can be grown in many climatic regions. Nitrogen fixation, erosion control, improved soil quality and weed suppression are among the many benefits that crimson clover provides as a cover crop.

## NITROGEN CONTRIBUTION

Like many other legumes, crimson clover has nitrogen (N) fixing root nodules that capture atmospheric N and fix it into the soil in organic forms that are useable for the subsequent crop. Clovers and other legumes fix N into a stable form that is less susceptible to leaching. Manufactured nitrogen-based fertilizers often contain N in a very mobile form, potentially leading to significant losses if rainfall leaches soluble N into the groundwater. Documented studies report crimson clover may supply the soil with **50-150 lbs N / acre**. The amount will vary depending on planting date and killing date. Grazing or harvesting top growth for hay will reduce N availability for the following crop.



**Figure 1.** Nitrogen (N) fixing nodules found on a crimson clover plant in an Indiana field.

## ESTABLISHING THE CROP

**FERTILITY:** Crimson clover is adapted to soil of low fertility and can grow well on a wide range of soil types. Best growth occurs on loam soils but crimson clover can easily thrive on sand or clay soils as long as drainage is good. Poor cover crop growth is likely to occur under drought conditions, in areas of poor drainage, and on extremely acid soils. Best growth is seen on soils with at least medium levels of phosphorus (30 ppm) and potassium (150 ppm) and when pH is no less than 5.5 and no greater than 7.0. Obtain soil nutrient information for each field by collecting representative soil samples and requesting a laboratory analysis prior to planting.

**SEED INOCULATION:** Crimson clover roots must be colonized by rhizobia bacteria to convert atmospheric N into plant available forms. Crimson clover fixes more N and produces more biomass if inoculated with the proper rhizobia bacteria. Inoculate the seed prior to planting with the rhizobium inoculant for true clovers. Always use an inoculant unless a noduleated true clover has been grown in the field in the past 3 years. Use fresh inoculant, protect it from heat and light, and apply to seeds 4 to 6 hours prior to planting. If seed is pre-inoculated, purchase the seed early in the growing season (spring) and store it in a cool dark location to keep the inoculant viable. Crimson clover seed that has not been properly inoculated may not grow as vigorously or produce as many N fixing nodules.

**SEEDING METHOD:** Crimson clover is commonly seeded in the early fall when night temperatures are below 60° F and sufficient soil moisture is present for seed germination and establishment. Plant at least 6 weeks before the average date of the first frost to reduce heaving damage and winter-kill. In the Midwestern U.S., plant crimson clover earlier than cereal rye or wheat.

Crimson clover seed may be planted with a drill, air seeder, high clearance equipment, broadcast or aerially. As with many cover crops, crimson clover seed germinates better when drilled rather than broadcasted. If drilling, plant crimson clover seed to a depth of 0.25 to 0.5 inches below

the surface. If broadcasting crimson clover seed, use light tillage tools to shallowly incorporate after broadcasting unless rain is eminent.

**SEEDING RATE:** Seeding rates vary with geographic location, seeding method, and planting dates. The recommended seeding rate for crimson clover is 10-15 lbs/acre drilled, 11-17 lbs/acre broadcast. Later planting dates require the higher seeding rate.

## MANAGEMENT

Crimson clover will begin flowering as day length increases in the spring and will vary among varieties. Maximum N is available at late bloom or early seed set. To obtain maximum N contribution, allow plants to reach the late bloom stage before killing.

**KILLING:** Killing time for crimson clover is determined by the planting date for the succeeding crop and/or soil moisture. If you need to maximize your soil moisture availability for the subsequent crop, kill the crimson early. In situations where soil moisture is adequate, crimson clover can be killed just prior to planting a summer vegetable or grain crop to allow sufficient time for residue decomposition. Its simple taproot makes crimson clover easy to kill mechanically. In no-till, conservation, or organic situations, mowing after early bud stage will kill crimson clover, however; crimson clover can also be killed in conventional systems by moldboard plowing or with herbicides. Consult a university Extension agent or crop consultant for specific killing recommendations. If using a herbicide, follow all label instructions.

**RESEEDING:** Crimson clover is available in hard-seeded and soft-seeded varieties. Hard-seeded varieties are ideal for self-reseeding in orchards and other perennial cropping systems. These varieties do not germinate until fall if seed is set in late spring. Germination will occur when adequate soil moisture is present.

