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CRIMSON CLOVER *(Trifolium incarnatum L.)*

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Crimson clover is an erect annual legume that grows up to 2.5 feet tall. Its foliage is light-green and covered with soft hairs. In spring, crimson clover may be identified by the oblong, bright crimson-colored flower, carried at the end of erect, hairy flower stems. The root system consists of a central taproot and fibrous branch roots. Seeds are small (90,000–150,000/lb).

Crimson clover generally is planted in the fall. During the fall and winter, it grows slowly, the leaves forming a low rosette clump. It puts on most of its growth in spring, when tall, erect flower stems emerge and develop leaves at numerous nodes. Flowering is induced when day length exceeds 12 hours. Crimson clover reseeds well if allowed to mature and if sufficient moisture is available. Many varieties have high proportions of hard seed.

Environmental preferences and limitations

Crimson clover does not survive extreme heat or cold and grows best in cool, humid weather. It cannot endure much drought and does not do well on poorly drained soils. Moist soil is essential for germination and establishment.

Crimson clover is adapted to soils of low fertility and has an intermediate lime requirement. It can tolerate pH ranging from 4.8–8.2 but does better at pH closer to 6.5. It grows on a wide range of soil types as long as drainage is good; however muck or extremely acid soils do not support good growth.

Crimson clover is moderately shade-tolerant.

Uses

Crimson clover may be used as a cover crop, green manure, pasture, or hay. It often is used as a winter annual cover crop in annual rotations. It has been used successfully in reduced-tillage farming systems, and in orchards and vineyards where it can be managed to reseed itself.

It may be relay-interplanted into vegetable crops by broadcasting immediately before the final cultivation. However, Willamette Valley trials where crimson clover was relay interplanted into sweet corn have produced mixed results. Intensive shade, seedling water stress, and heavy harvest residue often result in very thin stands. Surviving clover may flower in fall, reducing its winter-hardiness.

Dry matter and N accumulation

In a mid-Willamette Valley replicated trial over 5 years, 'Common Dixie' crimson clover planted in mid-September accumulated a maximum of 4.5, minimum of 0.9, and average of 2.8 tons dry matter/acre and a maximum of 157, minimum of 55, and average of 108 lb N/acre by mid-April.

Management

Suggested seeding rates for crimson clover range from 15–25 lb/acre. Best stand establishment is obtained when crimson clover is drilled $\frac{1}{2}$ to $\frac{3}{4}$ inch deep into a firm, well-prepared seedbed. Alternative seeding methods that can reduce seedbed preparation but require higher seeding rates are: drill into a rough seedbed prepared by disking, or broadcast over a rough or smooth seedbed and then disk lightly to cover seed. If the soil is dry, irrigate or plant before a fall rain.

Plant crimson clover early enough so that the stand is established at least 6 weeks before the first frost to prevent frost heaving damage and winter-kill. Plant prior to October 1 in western Oregon.

Crimson clover roots need to be colonized by an *appropriate* strain of

Quick facts: Crimson clover

Common names	Crimson, scarlet, Italian, and incarnate clover
Hardiness zone	6 (see Figure 1)
pH tolerance	4.8–8.2, optimum is 6.5
Best soil type	Wide range with adequate drainage
Flood tolerance	Low
Drought tolerance	Low
Shade tolerance	Moderate
Mowing tolerance	High if mown higher than 4 inches
Dry matter accumulation	3 tons/acre
N accumulation	110 lb/acre
N to following crop	Approximately half of accumulated N
Uses	Use as winter cover crop in annual rotations and self-seeding cover in perennial systems to smother spring weeds, fix N, and improve tilth. Often grown with cereal grains. Use hard-seeded varieties if irrigation is not available.
Cautions	Needs moist soil to germinate, and seedlings do not tolerate drought. Can become weed in following crop.



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rhizobia bacteria to be able to convert atmospheric nitrogen into plant-available forms. Inoculating seed with the proper rhizobia bacteria ensures that the bacteria will be present when the seed germinates. Use fresh inoculant, protect it from heat and light, and apply it to seeds just before planting according to the manufacturer's directions. Cover broadcasted seed with soil to protect inoculant from sunlight.

You may not need to inoculate if the appropriate rhizobia bacteria already are present in the soil. You can find out by planting a section of the field with raw (non-inoculated) seed and watching for differences in growth.

Seedlings are not drought-resistant and may die if dry fall weather follows germination, and irrigation is not available. Varieties that have high percentages of hard seed (e.g., 'Common Dixie') work best in this situation because ungerminated seeds remain in the soil and germinate when rains begin again.

Crimson clover often is grown in mixtures with cereal grains, annual ryegrass, and less commonly, with other legumes. Seeding rates of clover and the companion crop are reduced from their monoculture rate, but generally the seeding rate of crimson clover is reduced less than that of the companion crop.

Once established, crimson clover should be mowed or grazed no closer than 3 to 5 inches. Mowing or grazing can improve growth and reduce lodging.

Crimson clover can be killed with an herbicide. Consult your county agent of the OSU Extension Service for recommendations. Follow all herbicide label instructions.

Crimson clover often is mown or flailed before incorporation with a moldboard plow or disk. Stems become very tough if allowed to reach maturity, slowing field operations. It's best to incorporate residues about 3 weeks before planting to allow time for decomposition.

When self-reseeding is desired in orchards and vineyards, the use of hardseeded varieties increases success. Plan mowing schedules to allow seed to reach maturity because crimson clover flowers are carried at the top of the plant. Likewise, closely control grazing to prevent removal of too many flowers.

Pest interactions

Crimson clover flowers produce a large quantity of nectar and attract bees and beneficial insects, including lady beetles and minute pirate bugs.

Crimson clover is more resistant to diseases than are most alternative clovers, tolerating viral diseases unless sowing occurs in midsummer.

In general, crimson clover is tolerant of weeds.

Varieties/cultivars

Common varieties of crimson clover germinate rapidly with a minimum of hard seed. The varieties 'Dixie,' 'Autauga,' 'Auburn,' 'Chief,' and 'Kentucky' were developed to self-reseed and have a high proportion of hard seed. They are most appropriate for fall planting when irrigation will not be used. 'Common Dixie' crimson clover is widely available in Oregon.

For more information

World Wide Web

Orchard floor management information—<http://www.orst.edu/dept/hort/weeds/floormgt.htm>

OSU Extension Service publications—eesc.orst.edu

The University of California, Davis cover crop information—<http://www.sarep.ucdavis.edu/sarep/ccrop/>

Oregon Cover Crop Handbook

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Figure 1.—Oregon plant hardiness zone map. Crimson clover normally will survive in Zone 6 or any warmer zone.

(Extracted from the USDA's national plant hardiness zone map, based on average annual minimum temperature in °F.)

Zone 4 = -30 to -20; Zone 5 = -20 to -10

Zone 6 = -10 to 0; Zone 7 = 0 to 10

Zone 8 = 10 to 20; Zone 9 = 20 to 30

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