FERTILIZERguide
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Red clover

Western Oregon—west of Cascades

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Red clover is an important seed and forage crop in western Oregon. Lime, phosphorus, potassium, sulfur, and boron will increase yields under some western Oregon soil conditions. The need for nutrients other than sulfur can be estimated using a soil test. Red clover is best adapted to well-drained soils.

Good management practices are essential if optimum fertilizer responses are to be realized. These practices include use of recommended varieties, selection of adapted soils, weed control, disease and insect control, good seedbed preparation, proper inoculation and seeding methods, and timely harvest.

Follow recommended soil sampling procedures to estimate fertilizer needs. The Oregon State University Extension Service agent in your county can provide you with soil sampling instructions, soil sample bags, and information sheets.

Management of Red Clover

Inoculate seed immediately before seeding

Use red clover inoculant that has been refrigerator-stored, and use inoculant prior to the expiration date on the container.

Dampen the legume seed, using as little liquid as possible. Approximately 1 pint of liquid per 100 lb of seed is required. Use milk (whole, condensed, or skim), diluted pancake syrup, or gum arabic solution as an adhesive. Mix the seed and liquid thoroughly until every seed is moist but not wet enough to cause seeds to stick together. If too much liquid is added, add a handful of finely ground agricultural limestone. Do not use containers or mixers contaminated with seed disinfectants or fertilizer materials that might be toxic to legume inoculants.

Add the inoculant to the seed in small quantities until at least the amount recommended by the manufacturer has been applied. Two to three times the suggested amount can be used without difficulty. Mix thoroughly until every seed has come into contact with the inoculant. When planting under less-than-ideal conditions, increase the inoculant rate.

Be sure inoculated seed does not come into direct contact with fertilizer.

Plant seed into a well-prepared, firm seedbed immediately after inoculation. Avoid exposing the seed to sunlight, severe drying conditions, or high temperatures. If seed is not planted within 24 hours, repeat the inoculation step because the bacteria from the previous treatment may have been destroyed by drying.

Use the recommended seeding methods, rates, mixtures, varieties, and soil type

Consult your county office of the OSU Extension Service for additional information on the adaptation, establishment, and management of red clover for forage.

Nitrogen (N)

As a legume, red clover can obtain N from symbiotic N fixation. This source of N should be adequate to meet plant needs. Since symbiotic N fixation is depressed by fertilizer N, application of N fertilizers to legumes generally is not recommended.

If red clover responds to applied N, the red clover has not been effectively nodulated.

Phosphorus (P)

The need for P fertilization can be determined by a soil test (Tables 1 and 2).

Table 1.—P fertilization rates for new red clover seedlings.

If the soil test for P is (ppm)	Apply this amount of phosphate (P_2O_5) (lb/a)
0–15	90–120
15–30	70–90
30–45	40–70
over 45	0

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P can be applied to red clover fields most effectively by banding ½–1 inch to the side or below the seed when seeding. Some soil should separate the seed from fertilizer.

Do **not** include boron in band applications.

Working P into the surface 2 inches of soil during seedbed preparation is more effective than broadcasting following seeding.

Table 2.—P fertilization rates for established red clover stands.

If the soil test for P is (ppm)	Apply this amount of phosphate (P_2O_5) (lb/a)
0–15	70–100
15–30	50–70
over 30	0

On established stands, the P application should be made in the fall or early spring prior to March 15.

Potassium (K)

On new seedings, work K into the seedbed before seeding (see Table 3).

Table 3.—K fertilization rates for red clover.

If the soil test for K is (ppm)	Apply this amount of potash (K_2O) (lb/a)
0–75	60–100
75–150	40–60
over 150	0

On established stands, broadcast K in the fall or early spring prior to March 15.

A K deficiency is indicated by light-colored spots around the margins of the leaves.

Sulfur (S)

Include 20–30 lb S/a in the annual fertilizer program for red clover. S sometimes is contained in fertilizers used to supply other nutrients such as P and K, but may not be present in sufficient quantity.

Plants absorb S in the form of sulfate. Fertilizer materials supply S in the form of sulfate and elemental S.

Elemental S must be converted to sulfate in the soil before the S becomes available to plants. The conversion of elemental S to sulfate usually is rapid for fine-ground (less than 40-mesh) material in warm, moist soil.

S in the sulfate form can be applied at planting time. Some S fertilizer materials such as elemental S have an acidifying effect on soil.

The S requirements of red clover can be provided by:

1. Annually applying 20–30 lb S/a in the form of sulfate. Fall or early spring application is satisfactory.
2. Applying 40–50 lb S/a as sulfate or fine-ground elemental S every second year.
3. Applying coarser ground elemental S at higher rates and less frequently.

Boron (B)

Adequate B levels in the soil are necessary for legume seed production. If the soil test value for B is below 1.0 ppm, an application of 2 lb B/a is suggested.

B and other materials should be thoroughly mixed when B application is combined with other fertilizers. Fertilizer containing B should be applied evenly to the soil.

B can be toxic to plants if applied at rates higher than recommended. For this reason, B-containing fertilizer should not be banded.

Apply B in fall or early spring.

Other Micronutrients

Responses of red clover to micronutrients other than B, such as zinc and copper, have not been observed in western Oregon.

Lime

Soil acidity and the lack of lime can limit the production of red clover in western Oregon. A soil pH value of 6.0 is suggested for red clover.

The SMP test is used to estimate the amount of lime required to raise the pH of the soil to the suggested level (Table 4). This test takes into account the soil type and texture since clayey soils require more lime to change soil pH than do sandy soils.

Table 4.—Lime application rates for red clover.

If the SMP buffer test for lime is	Apply this amount of lime (t/a)
under 5.4	4–5
5.4–5.8	3–4
5.8–6.1	2–3
6.1–6.4	1–2
over 6.4	0

The suggested liming rate is based on 100-score lime. Liming materials should be checked for score.

A lime application is effective for several years.

Lime is more effective to seedling crops if applied several months before seeding. Thoroughly mix the lime with the surface 4–6 inches of soil.

Some soils may have a fairly high SMP buffer value (over 6.2) and a low pH (below 5.3). This condition can be caused by the application of acidifying fertilizer. In this case, the low pH value is temporary, and the pH of the soil will increase as the fertilizer completes its reaction with the soil. This temporary "active" acidity from fertilizer is encountered following recent applications of most nitrogen fertilizer materials. Acidifying fertilizers also have a long-term acidifying effect on soil that is cumulative and leads to lower SMP buffer readings.

When the soil test value for magnesium is less than 0.8 meq/100 g and the application of lime is suggested, include 1 t/a of dolomitic lime in the lime application. Dolomite and ground limestone are about equal in their ability to neutralize soil acidity.

For More Information

How to Take a Soil Sample ... and Why, EC 628, by E.H. Gardner (revised 1997). No charge.

A List of Analytical Laboratories Serving Oregon, EM 8677, by J. Hart (revised 1997). No charge.

To order copies of the above publications, send the complete title and series number, along with a check or money order for the amount listed (payable to Oregon State University), to:

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Fertilizer and Lime Materials, FG 52, by J. Hart (reprinted 1997). No charge.

You can access the above publications, as well as FG 17, *Red Clover: Western Oregon—West of Cascades*, our Publications and Videos catalog, and many other publications via our Web site at **eesc.orst.edu**

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