Quick facts

What's in this publication?

Liming is a new practice for the inland PNW, necessitated by soil acidification caused by nitrogen (N) fertilization (Figure 2). This publication provides guidance on: (1) how to evaluate cropping systems for lime need and (2) how to determine lime application rate.

Determining lime rate

The SMP buffer test is used to determine lime requirement, the rate of lime needed to raise soil pH to the desired value. Quarter-strength SMP buffer is used to determine lime requirement for sandy soils.

Irrigated cropping systems

Irrigation water containing bicarbonate may help to neutralize soil acidity (increase pH). Irrigation water should be tested to determine its "liming effect."

Vegetable crops such as onions are especially sensitive to soil acidity. Increasing soil pH from 5.0 to 6.0 increased bulb size and economic return in Columbia Basin trials.

On very sandy irrigated soils, a low-rate lime application may be needed to maintain soil pH in the desired range. To prevent over-liming, no single lime application should exceed 2 t/a of 100-score lime.

When soil texture and pH vary dramatically within a field, variable-rate lime application may be appropriate. Soil in some Columbia Basin fields under irrigation varies from pH 5.0 to 8.0, justifying the variable-rate approach.

Dryland cropping systems

Most soils in dryland cropping systems have never been limed, but liming may be needed in the near future. Cumulative N fertilizer applications have added 1,000 to more than 2,000 lb N/a to most fields. Many dryland soils are now below pH 5.5, the threshold for potential injury to cereals. Yield response to liming has been demonstrated in Idaho trials when soil pH was below 5.0 for cereals and 5.4 for legumes.

In direct-seeded dryland cropping, soil pH is usually lowest at the depth where N fertilizer is banded. Tillage to incorporate lime to the seeding depth may be required to ameliorate subsurface acidity (Figure 3). Ongoing research is evaluating lime injection and surface lime application for efficacy.

For more information

This publication for the inland PNW is complemented by OSU Extension publications that focus on western Oregon cropping systems (EM 9057 and EM 9061, in press). The western Oregon guides provide a more thorough review of liming materials and how lime application alters soil chemistry and biology to benefit crops.

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Figure 2.—Lime application.

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Figure 3.—Lime incorporation.