

magnesium carbonate (dolomitic lime). On coarse-textured (sandy) soils where leaching is a concern or on soils with low levels of magnesium, it is best to use dolomitic lime. Agricultural grade limestone provides maximum reactivity and effectiveness, especially when incorporated into the soil 6 to 8 inches deep in conventional tillage situations.

Nitrogen (N), Sulfur (S) & Potash (K₂O)

Recommended total nitrogen rates depend on the crop (Table 1) and, to some extent, on soil productivity. The timing of the application is very important for efficient use. Good nitrogen sources include calcium nitrate (15.5-0-0), diammonium phosphate (18-46-0), ammonium sulfate (21-0-0) and various nitrogen solutions.

Note: Sodium nitrate (16-0-0) and ammonium nitrate (34-0-0) are also excellent sources, but they will be unavailable soon.

Sulfur helps a plant use nitrogen efficiently so it is not surprising that deficiency symptoms for nitrogen and sulfur (yellow leaves) are similar and often confused. Sulfur deficiency tends to occur on coarse-textured (sandy) soils. Rainfall washes sulfur out of the root zone and into the subsoil, especially on deep sands. Although less likely, levels of plant-available sulfur can also be limiting in organic soils.

The soil test report gives a sulfur recommendation whenever $S-I \leq 25$. Since sulfur leaches as readily as nitrogen, it may be adequate at the time of the report but be limiting later during the season. Plant tissue analysis can be used in-season to test for sufficiency. Fertilizers that supply sulfur include ammonium sulfate (21-0-0-24), potassium sulfate (0-0-50-18), and sulfate of potash-magnesia (0-0-22-22).

Potash may also be a concern on sandy soils. If tomatoes and peppers are growing on sandy

soils where leaching has occurred, it may be beneficial to apply similar amounts of potash and nitrogen at sidedress. If you suspect leaching of nutrients from coarse-textured (sandy) soils, you can use plant tissue tests to find out if supplemental applications of nitrogen, potassium and sulfur are needed.

Boron (B)

Boron is an essential nutrient that plants need in minute quantities. High soil levels can be toxic to plants. Boron is less available to plants when the soil pH is above 6.5; it also tends to leach from sandy soils.

NCDA&CS soil tests do not measure boron, but reports do recommend annual application for certain vegetable crops that are especially sensitive to boron deficiency. These crops include broccoli, brussels sprouts, cabbage, cantaloupe, cauliflower, collards, field cucumbers, okra, peppers, radish, rutabaga, tomato, turnip, and watermelon. In production of asparagus, boron should be applied to the soil every third year.

NCDA&CS recommends a broadcast application of 1 to 2 lb/acre at planting. The lower rate is recommended on coarse-textured (sandy) soils to reduce the risk of toxicity.

Boron can be put out as a foliar application, but timing is very critical to achieve desired results. The recommended rate is 0.2 lb/acre boron in sufficient water for coverage. Apply foliar boron as follows: prior to heading of cole crops, prior to root swell in root crops, and at first bloom for tomatoes and okra.

Special Concerns

Manganese (Mn) Deficiency

Levels of this essential micronutrient are often low in mineral soils of the coastal plain. Because manganese becomes more unavailable as the soil pH increases above 6.3, excessive liming should be avoided.

Table 1. N recommendations (lb/acre) for selected vegetable crops

Crop	Total N Rate	Application Method & Timing	N per Application
Bell pepper	80–130	planting, broadcast	40–50
		1st fruit set, sidedress	40–50
		later in season, if needed	20–30
Cabbage	100–150	planting, broadcast	50–75
		2–3 wks postplant, sidedress	25–50
		late in season, if needed	25–50
Cucumber (field)	80–140	planting, broadcast	40–80
		2 wks postplant	20
		1st vine run	20–40
Irish Potato	100–150	planting, broadcast	50
		4–5 wks postplant, sidedress	50–100
Sweetpotato	60–90	planting	0
		3–4 wks postplant	60–90
Tomato (field)	90–120	planting, broadcast	45–60
		1st fruit set, sidedress	45–60