

Locally Appropriate Fertilization

BASIC PRINCIPLES: Use limestone and other amendments to balance cations and provide best tilth, drainage, aeration and a healthy root environment. This promotes optimum conditions for the nitrogen cycle to operate, and allows the use of minimum N fertilizer inputs for the yields desired. Availability of all other nutrients will be the best that weather and soil conditions will allow. Biological activity is enhanced by the good aeration and organic matter content, and the increased diversity will provide many benefits. Best drainage during wet periods will pay off in increased nutrient availability and fewer disease problems from root pathogens. Minimum tillage practices will build organic matter content. Legume cover crops will perform as well as possible, cutting down on the need for nitrogen inputs. Inoculation of soil microbes may provide additional benefits. Monitor fertility with annual soil and leaf or petiole analysis.

Fertilization of Tree Fruits for Best Quality

Table 11

Nutrients Removed from Soil - Tree Fruits

| CROP | YIELD | N | P ₂ O ₅ | K ₂ O | Ca | Mg |
|---------|---------|-----|-------------------------------|------------------|-----|----|
| Apple | 20 tons | 118 | 48 | 202 | 88 | 36 |
| Apricot | 15 tons | 129 | 42 | 206 | 114 | 24 |
| Cherry | 12 tons | 118 | 35 | 160 | 91 | 19 |
| Peach | 15 tons | 116 | 30 | 150 | 101 | 24 |
| Pear | 20 tons | 116 | 40 | 174 | 132 | 28 |
| Prune | 12 tons | 101 | 35 | 168 | 91 | 20 |

acid forming N fertilizers. Sometimes these are balanced N-P-K materials, and occasionally custom formulated fertilizers are used.

Cations should be balanced to optimum BCSR: 60-75% calcium, 10-15% magnesium: 3-5% potassium: 0-5% sodium. Raise & maintain calcium level to provide best tilth, drainage, aeration and root environment, and optimize nutrient availability. High removal of potassium by tree fruits requires maintenance of K for best quality and disease resistance. Diseases such as brown rot, scab, blight, and decline are less severe due if fertility is balanced. Resistance to pests such as mites, psylla and aphids is enhanced. Soil microbial inoculations are suggested for nematodes & other root problems.

Phosphorus should be maintained at about 200 #/ac ft of available P₂O₅ for best disease resistance fruit bud formation and quality.

Potassium should be kept at or above 4% of CEC (5% in sandy soils). Supply potash under the tree canopy or drip emitters.

Options for supplying nitrogen include:

- 50 #/ac in compost, (2-3 tons/ac)
- 50 #/ac mineral or organic N applied through irrigation, no more than 10# each time.
- 50 #/ac mineral or organic N broadcast in split applications, in mid-summer through the fall.
- As little as 25 #/ac will be sufficient if a well nodulated clover stand is established.

Secondary and micronutrients, such as sulfur, zinc, and boron should be maintained near the middle of the optimum range.

Foliar sprays of calcium, zinc, and other nutrients that are likely to be in short supply, should be applied during bloom and at the beginning of ripening.

Fertilization of Wine Grapes for Best Quality

Table 12

Nutrients Removed from Soil - Wine Grapes

| CROP | YIELD | N | P ₂ O ₅ | K ₂ O | Ca | Mg |
|-------|--------|----|-------------------------------|------------------|----|----|
| Grape | 5 tons | 49 | 14 | 52 | 38 | 11 |

The standard program in northern California is usually 25-50 #/ac of acid forming N fertilizers. Sometimes these are balanced N-P-K materials, and occasionally custom formulated fertilizers are used.

Cations should be balanced to optimum BCSR: 60-75% calcium, 10-15% magnesium: 3-5% potassium: 0-5% sodium. Raise & maintain calcium level to provide best tilth, drainage, aeration and root environment, and optimize nutrient availability. High removal of potassium by grapevines requires maintenance of K for best quality and disease resistance. Diseases such as bunch rot, crown gall, mildew, and Pierce's are less severe with balanced fertility, as are pests such as mites and leafhoppers. Soil microbial inoculations are suggested for nematodes, phylloxera, oak root fungus and other chronic root problems.

Phosphorus should be maintained at about 170 #/ac ft of available P₂O₅ for best cane formation, fruitfulness, and quality.

Potassium should be kept at 3-5% of CEC (5% in sandy soils). Supply potash under the vine canopy or drip emitters.

Options for supplying nitrogen include:

- 25-50 #/ac in compost, (1-2 tons/ac)
- 10-25 #/ac mineral or organic N applied after bloom through irrigation,

- 10-25 #/ac mineral or organic N applied after bloom through irrigation, with no more than 10# each time.
- 25 #/ac mineral or organic N, applied after harvest
- No nitrogen may be needed if a well nodulated clover cover is established.

Secondary and micronutrients, such as sulfur, zinc, and boron should be maintained near the middle of the optimum range. Zinc and boron are especially important for best production, and should be closely monitored with soil and petiole analysis.

Foliar sprays of calcium, zinc, boron, or any other nutrients likely to be in short supply, should be applied during bloom and at the beginning of ripening.

Fertilization of Table Grapes for Best Quality

Table 13

Nutrients Removed from Soil - Table Grapes

| CROP | YIELD | N | P O ₅ | K ₂ O | Ca | Mg |
|-------|---------|-----|------------------|------------------|----|----|
| Grape | 12 tons | 118 | 34 | 124 | 92 | 26 |

The standard program in northern California is usually 100-250 #/ac of acid forming N fertilizers. Sometimes these are balanced N-P-K materials, and occasionally custom formulated fertilizers are used.

Cations should be balanced to optimum BCSR: 60-75% calcium, 10-15% magnesium: 3-5% potassium: 0-5% sodium. Raise & maintain calcium level to provide best tilth, drainage, aeration and root environment, and optimize nutrient availability. High removal of potassium by grapevines requires maintenance of K for best quality and disease resistance. Diseases such as bunch rot, crown gall, mildew, and Pierce's are less severe with balanced

are suggested for nematodes, phylloxera, oak root fungus and other chronic root problems.

Phosphorus should be maintained at about 200 #/ac ft of available P₂O₅ for best cane formation, fruitfulness, and quality.

Potassium level should be at least 4% of CEC (5% in sandy soils). Supply potash under the vine canopy or drip emitters.

Options for supplying nitrogen include:

- 50-74 #/ac in compost, (1-2 tons/ac)
- 50 #/ac mineral or organic N applied after bloom through irrigation, with no more than 10# each time.
- 50 #/ac mineral or organic N, applied in split applications in July through the fall.
- As little as 10-25 #/ac nitrogen may be needed if a well nodulated clover cover is established.

Secondary and micronutrients, such as sulfur, zinc, and boron should be maintained near the middle of the optimum range. Zinc and boron are especially important for best production, and should be closely monitored with soil and petiole analysis.

Foliar sprays of calcium, zinc, boron, or any other nutrients likely to be in short supply, should be applied during bloom and at the beginning of ripening.