

A TRAINING MANUAL FOR  
SOIL ANALYSIS INTERPRETATION  
IN NORTHERN CALIFORNIA

by

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A curriculum project submitted to  
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(Signed)

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Date

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## ABSTRACT

### Purpose of the Project:

Napa, Sonoma, Mendocino, Lake and Contra Costa counties are important agricultural areas in northern coastal California. The major deciduous crops are wine grapes, pears, apples, peaches, nectarines, and cherries with smaller plantings of prunes, walnuts, and other fruits. Production of these agricultural commodities relies on fertilizers to improve growth, yield, and replace nutrients removed by crops.

European wine producers have spent hundreds of years defining and promoting quality in their product. The sensory experience of wine tasting encompasses general appearance, color, bouquet and flavor. The general consensus is that quality lies in the fruit. The interaction of the soil with the climate, cultivar, and cultural practices is described by the French as *terroir*. This project is an attempt to combine my professional experience in northern California tree fruit and vine production with the many contributions of the scientific literature into a concise educational program to teach farmers, advisors, and fertilizer technicians how to achieve optimum *terroir* through nutritional management. Quality and health in fruit production through a positive soil building program is the goal - and good yields of high quality fruit will follow.

As an agronomist practicing in the area for over 20 years, with involvement in both the fertilizer industry and education, I have identified three major deficiencies of knowledge: basic soil science, the nature of our local soils, and which fertilizers are appropriate for the area

### Procedure:

To identify and document the gaps in knowledge of soil science and the problems associated with improper fertilization this study examined the industry from several perspectives: California Department of Food and Agriculture (CDFA) fertilizer sales figures, a fertilizer dealer survey, literature review, and compilation of soil analysis data.

Actual fertilizer use from a survey of all 40 dealers in the study area showed nitrogen to be the most commonly used fertilizer. Sales figures from CDFA showed actual tonnage of N to be 62.3% of N-P-K sales from 1975-1995. Soil analysis data showed that area soils needed varying amounts of calcium, with many also needing phosphorus, potassium, or micronutrients. A trend towards an over reliance on nitrogen by agriculture in northern California was clearly demonstrated.

A method of soil analysis interpretation, using Base Cation Saturation Ratios, is used by most soil laboratories in the United States. The research and teachings of William Albrecht and others has resulted in the use of this method by many agronomists. The history and development of the BCSR method was critically examined in the literature review. The value of this approach, with its emphasis on balancing major minerals in the soil, is discussed. A hybrid program of soil analysis interpretation is proposed, with the goals of more efficient use of fertilizers, less pollution and erosion, improved soil structure and biological activity, and increased crop pest and disease resistance.

#### Results:

A model was formulated showing how to interpret soil analyses using BCSR methods as a base for the fertilization program. The manual will be valuable for farm managers, winemakers, pest control advisors, fertilizer salespeople and researchers who need basic knowledge of soil science and soil analysis interpretation. It should be used by researchers who wish to integrate fertilization or nutrient management into pruning, training, irrigation, or pest and disease studies. As a curriculum tool, the model uses a common sense approach with narrative, graphics, color diagrams, and exercises to present the material.

(Signed)

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"Those who teach must constantly hold up the challenge  
to study nature, not books."

William A. Albrecht

The Albrecht Papers (1975)

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