

## REFERENCE NOTES

### CHAPTER 1

Note: Omit tables and headings when counting lines

*page 5, bottom*

Related to this observation is the salt tolerance of experimental grain varieties being irrigated by sea water in tests near Bodega Bay, Ca. Some varieties show excellent salt tolerance at the on-site location, which has a cool, foggy, climate. The salt tolerance of these varieties will probably not be as good in a hot climate.

*page 6, line 6*

Bradford, Gordon **Lithium in California's water resources**, Calif Agric. May 1963, p 6.

*page 6, lines 7,8*

See General Reference No 1 at end of chapter for tables showing guideline levels for various trace elements. These guidelines will be firmed up with time.

*page 7, SAR*

See Gen. Ref. No 5 at end of chapter.

*page 7, RSC*

See Gen. Ref. No. 2, Eaton's paper on carbonates is an intriguing blend of scientific and literary writing that could qualify as a work of art in the field of literature as well as science - quite different from the "just the facts ma'am" papers found in today's scientific journals.

*page 8, lines 5-15* Gen. Ref. No. 3

*page 8, adj SAR*

Rhoades, J.D. **Quality of water for irrigation**. Soil Sci. 113:277-284. 1972. adj. SAR may undergo further adjustment as time goes by. One proposed adjustment was given in 1979, (Oster, J.D. and F.W Schroer, **Infiltration as influenced by irrigation water quality**. Soil Sci. Soc. of Amer. 43:444-447. 1979).

*page 9, 10, pHc*

Tables for calculating pHc were taken from Gen Ref. No. 4. The other lime depositing index mentioned (the Langelier Index) goes back to 1936 (Langelier, W.F.. **The analytical control of anti-corrosion water treatment**. J Amer Water Works Assoc. 28:1500-1521. 1936).

*page 12, bottom*

Pratt, P.P., R.L. Branson and H.D. Chapman. **Effect of crop, fertilizer, and leaching on carbonate precipitation and sodium accumulation in soil irrigated with water containing bicarbonate**. 7th Intern. Cong, of Soil Sci., Madison, Wis., U.S.A. 1960.

*page 13, lines 12-15* See Gen. Ref. 3

*page 13, lines 23-25*

Another report of lime accumulation on plant roots comes from Wyoming. On a crop of sainfoin, 57% of dry weight of roots in one test was calcium carbonate.

(Ross, W.D. and R.H Delaney. **Massive accumulation of calcium carbonate and its relation to nitrogen fixation of sainfoin.** Agron. J. 669:242-246. 1977). Because we normally only observe the above ground portion of plants we tend to forget about what might be happening below the ground. It would be nice if we could see the root system each time we examine a field.

*page 14, lines 1-14* See Gen. Ref. 1

*page 17, lines 26-29*

Dow, **A.I S fertilization of irrigated soils in Washington State.** Sulphur Institute Journal, Spring 1976, p 13-15.

## **CHAPTER 2**

*page 21, line 1*

Personal communication

*page 21, lines 4,5*

Olsen, S.R. and R.S. Watanabe. **Solubility of calcium carbonate in calcareous soils.** Soil Sci. 88:123-129. 1959. This paper shows how the bicarbonate concentration of the soil solution can vary among soils.

*page 21, table*

Hassen, M.N. and R. Overstreet. **Elongation of seedlings as a biological test of alkali soils. I. Effects of ions on elongation.** Soil Sci., 73:315-326. 1952.

## **CHAPTER 3**

*page 23, lines 4,5*

Most of these salinity scientists headquartered at the USDA Salinity Lab in Riverside, Ca. This lab was established in 1937 and is the source of most of the past and present information on saline-alkali soils.

*page 23, bottom*

Gen. Ref. 1, pp 18, 30

*page 24, lines 4,5*

Gen. Ref. 1, p 30

*page 24, lines 13-16*

Bower, C.A., personal communication, 1969; see also. Method 3b, p 88, in Gen. Ref. 1

*page 24, line 21*

Considerable thought should be given to step 1 (grading the land). Salts and boron usually increase with soil depth and on some soil series, significant cuts will expose soil that is very poor from both a physical and chemical standpoint and that would take many years to reclaim; sprinkler or drip irrigation (with minimal grading) would be superior to surface irrigation in such cases. Where practical, level-basin irrigation should be considered; see **Level basin irrigation: a method for conserving water and labor.** USDA Farmers' Bulletin No. 2261, April 1979.

*page 26, lines 3,4*

Gen. Ref. 2 and also found in other literature. 1 acre foot of water will remove significantly less than 80% of the salts from a foot of soil if subsoil restrictions occur; the 80% figure assumes the soil has good drainage.

## CHAPTER 4

*page 29, lines 13-15*

Overstreet, Roy, J.C. Martin and H.M. King. **Gypsum, sulfur and sulfuric acid for reclaiming an alkali soil of the Fresno series**, Hilgardia. 21 (5):113-127. Nov. 1951.

In the above study, sulfuric acid was definitely superior to both gypsum and sulfur (on an equivalent basis) under rigid experimental test conditions. Some growers have a preference for sulfuric acid over other amendments because they have observed its superiority first hand.

San Joaquin Valley row crop farmers successfully apply sulfuric acid to the surface of the soil and incorporate it only a few inches; followed by sprinkler irrigation, this practice can provide a good environment for the sensitive seed germination and seedling growth stages on some soils. With any amendment, the entire root zone does not have to be reclaimed as plants can make good growth when only a portion of the root zone is reclaimed; see Lunin, J. and M. Gallatin, **Zonal salinization of the root system in relation to plant growth**. Soil Sci. Soc. of Amer. Proc. 29:608-61 5. 1965 This concept correlates with the effectiveness of drip irrigation on highly saline soils and with the ability of boron sensitive tree crops to do well on soil that has very high boron levels, but only in part of the root zone.

*page 30, lines 19-22*

Although a good amendment, ammonium polysulfide (Nitro-Sul) is highly corrosive and therefore not widely used. On the other hand, ammonium thiosulfate (Thio-Sul) is relatively non corrosive and is gaining wide acceptance; with an N content of 10 to 12% it is a combination amendment-fertilizer.

*page 30, lines 25-27*

When using a combination of lime on the soil + acidifying amendments in the water, it should be remembered that volatilization losses of nitrogen (to  $\text{NH}_3$ ) are much greater when there is lime in the topsoil. Incorporation and/or immediate watering in of nitrogen fertilizers that contain urea or the ammonium form of nitrogen are much more important when there is lime in the topsoil.

*page 30, lines 31,32*

Miyamoto, S., J Ryan and J.L. Stroehlein, **Sulfuric acid for the treatment of ammoniated irrigation water: I. Reducing ammonia volatilization**. Soil Sci. Soc. Amer. Proc. 39:544-548. 1975

*page 31, lines 3-5*

The largest manufacturer and distributor of  $\text{S}\ddot{\text{U}}_2$  generators is the D & J

Harmon Co., Inc. 3737 Gilmore Ave., Bakersfield, CA 93308.

*page 31, bottom*

Hudson, Bill **Yakima Valley Fruit Facts**. The Goodfruit Grower, March 15, 1974, p 12. Hudson gives an excellent rundown on the history and uses of lime sulfur in orchards in the pacific northwest.

## CHAPTER 5

*page 35, bottom*

The inclusion of sodium nitrate as a possible nitrogen fertilizer may offend some, but this material can have a place in certain situations. When a quick N boost is needed on row crops, sodium nitrate (or nitrate of soda) can be very effective, and not harmful for many soils. A 1978 article praises, probably over-praises, the benefits of sodium nitrate on cotton (A **good cotton fertilizer**. American Cotton Grower, April 1978, p 38, 47.) See also the end of Chapter 1 for a discussion of sodium nitrate.

*page 36, lines 5-7*

The conversion or hydrolysis of urea to ammonium is usually referred to as a rapid process, however the term "rapid" is imprecise. Dr. P.G. Moe has calculated that the "conversion which normally takes place in about one week in the spring when the soil temperature is about 70° can require about one month when the soil temperature is down around the freezing point, or, conversely, be accomplished in only one day in the summer when soil temperatures might be around 100°F." (paper presented at Farm Science Days, Purdue, Univ., Jan. 20, 1964; quoted in Collier Co. Urea Manual for Fieldmen by R.L. Luckhardt, 1977).

*page 36, table*

Aldrich, Tom **Nitrogen, when and how to use it**.  
Diamond/Sunsweet News, April 1979, p 13.

The volatilization table was taken from the above reference A more detailed discussion of N volatilization losses is given in: Sharratt, W.J., **Nitrogen Efficiency, the far west**. Solutions, Sept.-Oct. 1975. p 24, 26, 28, 30.

Much of the basic research on which the above reports are based was done by Dr. L.B. Fenn of Texas A & M.

*page 37, first table*

Acidifying properties of N fertilizers were taken from Western Fertilizer Handbook, (see General References); the acid-lime calculations are open to question since different workers have come up with different answers; see Tisdale and Nelson (Gen. Ref.) for a different computation of acidifying potential.

*page 37, second table*

The sulfuric acid-soil pH table is rough. Both this chart and the preceding fertilizer-acidity chart should not be interpreted precisely. They are rough approximations only; they can, however, give a good indication when pH problems might arise on a particular piece of ground that is under a certain fertilizer regime. Supplemental pH testing of soil will give a more accurate picture.

*page 38, line 24*

Sparks, Darrell. **Nitrogen scorch and the pecan.** Pecan South, Sept. 1976. 3:500-501, 1976.

*page 39, nitrite*

Paul, J.L. and E. Polle. **Nitrite accumulation related to lettuce growth in a slightly alkaline soil.** Soil Sci. 100:292- 297. 1965.

## CHAPTER 6

*page 42, lines 12-14*

See first Gen. Ref. at end of chapter

*page 43, lines 19-21*

Clement, Lawrence. **Sulphur increases availability of phosphorus in calcareous soils.** Sulphur in Agriculture (a publication of The Sulphur Institute, 1725 K St. NW, Washington, D.C. 20006) Vol. 2, p 9-12. 1978.

John Ryan and J.L. Stroehlien. **Use of sulfuric acid on phosphorus deficient Arizona soils.** Progressive Agriculture in Arizona (U. of Ariz.) 25(6): 11-13. Nov.-Dec. 1973.

John Ryan and J.L. Stroehlein. **Sulfuric acid treatment of calcareous soils: Effects on phosphorus solubility, in- organic phosphorus forms, and plant growth.** Soil Sci. Soc. Amer. J. 43:731-735. 1979.

## CHAPTER 7

*page 45. lines 12,13*

Nelson, W.L. **Potassium: one key to high quality, high yield crops.** Solutions, Nov.-Dec. 1975, p 64, 66, 68, 70, 71, 72. (Iowa, N. Dakota reference).

*page 45, lines 13,14*

Skogley, E. **Potassium soil test recommendations not always accurate.** Crops & Soils. Oct. 1976, p 15-16. (Montana reference).

*page 45, lines 14-18*

**Studies on the potassium supplying power of soils.** The Deciduous Fruit Grower, March 1980, p 78.

*page 45, lines 18-20*

Brown, A.L., J. Quick and G.J. DeBoer. **Diagnosing potassium deficiency by soil analysis.** Calif. Agric. June 1973, p 13-14.

*page 45, lines 26-32*

Wilcox, G.E. and R. Coffman. **Simplifying plant evaluation of K status.** Better Crops with Plant Food, Spring 1972. p. 9, 30.

*page 45, lines 33,34*

McLellan, G.W. **Potassium's spectacular economic benefits.** Agrichemical West, Oct. 1968. p 6, 8, 10, 12, 14, 16.

*page 46, lines 17-19*

Carlson, R.M. et al **Displacement of fertilizer potassium in soil columns with gypsum.** J. Amer. Soc. Hort. Sci. 99:221-222. 1974. K-Ca interactions have been reported (one can depress the plant uptake of the other); the displacement benefits of Ca could therefore be offset in some cases.

*page 46, lines 21-23*

Uriu, K., et al. **Potassium fertilization of prune trees under drip irrigation.** J. Amer. Soc. Hort. Sci. 105:508-510. 1980. Significant downward and lateral movement also occurred when potassium was applied directly through the drippers. The calcium content of the irrigation water was not mentioned in this study; it should have been.

*page 47, lines 13,14*

Stebbins, R.L **Goodfruit growing in Oregon.** The Goodfruit Grower, Aug. 15, 1973, p. 6.

**Studies on the potassium supplying power of soils.** The Deciduous Fruit Grower, March 1980, p 78.

## **CHAPTER 8**

*page 48, line 8*

Martin, W.E **How to predict fertilizer needs of alfalfa.**

Univ. of Calif. Ag Extension mimeo, Dept. of Soil Science (also reprinted in Kern County (Ca.) Ag Extension newsletter of March 17, 1972). 1972.

*page 48, lines 8-10*

Olson, R.A., (ed.). **Fertilizer Technology and Use** (2nd ed.) p 337. 1971.

*Page 48, lines 15-16*

Chapman, Homer (ed.) **Diagnostic criteria for plants and soils**, p 448. 1966.

*page 48, lines 16-18*

Christensen, N.W. and P.O Kresge. **Sulphur response in Montana.** Sulphur in Agriculture (published by The Sulphur Institute). 3:2-3. 1979.

*page 49, lines 18,19*

Brezonik, PL et al **Acid precipitation and sulfate deposition in Florida.** Science 208:1027-1029, May 1980.

The above reference describes monitoring of S in rainfall at 24 sites in Florida. An estimated 7 lbs of S/acre per year was added by rainfall in some areas. The deposition of S, if any, in fog would be more difficult to measure.

*page 49, lines 24-27*

Reisenauer, H M **Sulfur needs of western states.** Agrichemical West. October 1961.

*page 49, lines 27-30*

Dow, **AI S fertilization of irrigated soils in Washington state.** Sulphur Institute Journal. Spring 1976. p 13-15.

It could be argued that a sulfur content of 5 lbs per acre foot does not meet the sulfur needs of a crop such as alfalfa. This is true, and a sulfur response is certainly possible with a water source containing 5 ppm S or more. The farmer,

however, that would put all the nutrients on a crop in the proportion and amounts they were used by that crop would soon go broke.

*page 49, bottom*

Meyer, R.D. and D. Marcum. **Alfalfa response to rate and source of sulfur**. Soil and Water (publication of Univ. of Calif. Dept. of Soil and Water Science), #43, Winter-Spring 1979-1980. This is an excellent report on sulfur deficiency of irrigated alfalfa but the S content of the irrigation water is not even mentioned.

## CHAPTER 9

*page 51, lines 2-4*

Not as big a statement as might appear at first glance. Already farms in many areas use more calcium than any other nutrient, mainly in the form of lime or gypsum. A well with a moderate calcium content can add several hundred pounds of calcium per acre annually.

*page 51, lines 6-8*

See Gen. Ref. 1 (at end of chapter)

*page 51, lines 11-12* See Gen. Ref. 2

*page 51, lines 28, 29*

Epstein, Emanuel. **Mineral Nutrition of Plants: Principles and Perspectives**, pp 306-308. John Wiley & Sons, New York. 1971.

*page 51, lines 29,30* Ibid.

*page 51, line 30, page 52, line 1*

The ameliorating effect of calcium on boron toxicity is covered in the following 2 references: Cooper, W.C., et al. **Response of grapefruit on two rootstocks to calcium additions to high-sodium, boron-contaminated, and saline irrigation water**. Soil Sci. 86:180-189. 1958. and Reeve, E. and J.W. Shive **Potassium-boron and calcium-boron relationships in plant nutrition**. Soil Sci 57:1-14 1944.

*page 52, lines 1 -5*

Epstein, Emanuel (see above)

*page 53, lines 1-3*

Gerard, C.J. and Hipp, B.W. **Blossom end rot of "Chico", and "Chico Grande" Tomatoes**. Proc. Amer. Soc. Hort. Sci. 93:521-531. 1968.

*page 53, lines 6-8*

Epstein, (see above)

*page 53, lines 8-10*

Raabe, R.D. and J. Vlamis. **Rooting failure of chrysanthemum cuttings resulting from excess sodium or potassium**. Phytopathology 56:713-717. 1966.

*page 53, lines 10-12*

Bower, C.A. and L.M. Turk. **Calcium and magnesium deficiencies in alkali soils**. J. Amer. Soc. Agron. 38:723- 727. 1946.

*page 53, lines 12-14*

Geraldson, C.M. **Evaluation of the nutrient intensity and balance system of soil testing.** Proc. Soil Crop Sci. Soc Florida 27:59-67. 1967 and Geraldson, C.M. **Intensity and balance concept as an approach to optimal production,** p. 353-364. In P.M. Samish (ed.) Recent Advances in Plant Nutrition. Gordon and Breach Publishers, N.Y. 1971.

*page 53, lines 26,27*

Bower, C.A. and L.M. Turk (see above)

*page 54, lines 1,2*

Spurr A.R. **Anatomical aspects of blossom-end rot in the tomato with special reference to calcium nutrition.**

Hilgardia. 28(12):269-295. 1959.

Weis, S.A., et al. **A sensitive method for measuring changes in calcium concentration in 'McIntosh' apples demonstrated in determining effects of foliar calcium sprays.** J. Amer. Hort. Sci. 105:346-349. 1980.

In both the above works, the authors correlated disorders with low calcium levels in affected parts of the fruit. With careful, judicious sampling of certain sensitive fruiting parts it may be possible to obtain meaningful calcium analysis data.

*page 55, lines 26-32*

Stebbins, Bob. **Goodfruit growing in Oregon.** The Good- fruit Grower, Sept. 15, 1978. pp 42-43.

## CHAPTER 10

*page 57, lines 6,7*

Bower, C.A. and L.M. Turk. **Calcium and magnesium deficiencies in alkali soils.** J. Amer. Soc. Agron. 38:723- 727. 1946.

*page 57, lines 24,25*

Worley, R.E., R.L. Carter and A.W. Johnson, **Effect of magnesium sources and rates on correction of acute magnesium deficiency of pecan.** J. Amer. Soc. Hort. Sci. 100:487-490. 1975.

In this study dolomite lime applied to a soil with a pH of 5.7 was ineffective in correcting Mg deficiency while magnesium sulfate was effective.

## CHAPTER 11

*page 59, lines 6,7*

Wallace, A. **Sulfuric acid may cure iron deficient crops.**

Crops and Soils, March 1978, p 19-20.

With high lime soils it would be impractical to add enough sulfuric acid to completely neutralize the lime, however band application of sulfuric acid can make enough iron available to satisfy crop needs. Caution should be used with band application of acid since severe crop damage can occur if band is improperly placed. Certainly more work needs to be done in this area.

*page 59, line 8*



**Gypsum aids sorghum quality.** (A report of work done by Dr. Sterling Olsen), Agricultural Research (USDA publication) June 1978, p 15.

*page 59, line 12*

A relatively new test for peroxidase activity in plant tissue shows a good deal of promise as a diagnostic tool for iron deficiency. This test is described in HortScience, 13:284- 285, **A rapid tissue test for diagnosing iron deficiencies in vegetable crops** by A. Bar-Akiva, D.N. Maynard and J.E. English. (1978).

## CHAPTER 12

*page 62. lines 9-12*

Wallace, A et al., **Effects of soil temperature and zinc application on yields and micronutrient content of four crop species grown together in a glasshouse.** Agron. J. 61:567-568. 1969.

*page 63, bottom and page 64, line 1*

Smith, M W et al. **Zinc and sulfur content in pecan leaflets as affected by application of sulfur and zinc to calcareous soils.** HortScience 15:77-78. 1980.

*page 64, lines 2-4*

Brown, A.L. et al. **Movement and availability of applied zinc.** Proceedings of Statewide Conference on Role of Micronutrients and Sulfur in Crop Production. University of California at Davis, Ca. Jan. 23, 24, 1964.

*page 64, lines 27-34*

Labanauskas, C.K. et al.. **Low-residue micronutrient sprays for citrus.** Calif. Agric. Jan. 1973, p 6-7.

*page 65, line 11*

**Foliar zinc sprays correct zinc deficiency in 1976.** The Blue Anchor, March-April 1977, p 4.

*page 66, lines 2-4*

Smith, M.W. and J.B. Storey. **Zinc concentration of pecan leaflets and yield as influenced by zinc source and adjuvants.** J. Amer. Soc. Hort. Sci. 104:474-477. 1979.

## CHAPTER 13

*page 68, Boron deficiency*

Boron analysis of fruiting parts is superior to analysis of leaves when diagnosing boron deficiency on some crops, esp. when abnormalities occur on the fruiting parts; see Shear, C.B. and M Faust. **Nutritional ranges in deciduous tree fruits and nuts.** Horticultural Reviews. 2:142-163. 1980.

*page 68, lines 24-30*

Chaplin, M.H. R.L. Stebbins and M.N. Westwood, **Effect of fall-applied boron sprays on fruit set and yield of 'Italian' prune.** HortScience 12:500-501. 1977.  
Callan, N.W et al **Fruit set of 'Italian' prune following fall foliar and**

**spring foliar sprays.** J. Amer. Soc. Hort Sci 103:253-257. 1978.

Tukey, R B **Nutrient spray issue still controversial.** The Goodfruit Grower, April 1, 1971, p 25.

Burkhart, D J **Mid-Columbia pears may need fall boron sprays.** The Goodfruit Grower. October 15, 1978, p 6.

*page 69, lines 16,17*

Prather, R.J. **Sulfuric acid as an amendment for reclaiming soils high in boron.** Soil Sci Soc Amer. Proc 41:1098-1 101. 1977.

*page 69, lines 18-20*

Ryan, J., S. Miyamoto and J.L. Stroehlein. **Relation of solute and sorbed boron to the boron hazard of irrigation water.** Plant and Soil, 47:253-256. 1977.

*page 69, lines 21,22 & table*

Reeve, E. and J.W. Shive. **Potassium-boron and calcium- boron relationships in plant nutrition.** Soil Science 57:1- 14. 1944.

## CHAPTER 14

*page 70, lines 5-7*

Rogers, E.G. Johnson and D. Johnson. **Iron-induced manganese deficiency in 'Sungold' peach and its effects on fruit composition and quality.** J Amer. Soc Hort Sci 99:242-244. 1974.

*page 71, lines 6,7*

Johnson, C.M., G.A. Pearson and P.R. Stout. **Molybdenum nutrition of crop plants. II. Plant and soil factors concerned with molybdenum deficiencies in crop plants.** Plant and Soil. 4:178-196. 1952.

*page 71, lines 15-17*

James D.W. **Soil fertility relationships of sugarbeets in central Washington: phosphorus, potassium-sodium and chlorine.** Technical Bulletin 69, Washington Agric. Exp. Sta., Pullman, Wash. July 1972.

## CHAPTER 15

*page 73. lines 7,8*

Edwards, J.H., B.D. Morton and H.C. Kirkpatrick. **Aluminum toxicity symptoms in peach seedlings.** J. Amer. Soc. Hort. Sci. 101:139-142. 1976.

*page 73, lines 20,21*

Soane, B.D. and D.H. Saunder. **Nickel and chromium toxicity of serpentine soils in Southern Rhodesia.** Soil Sci. 88:322-330. 1959.

*page 73, lines 26,27*

Bradford, G.R. **Lithium in California's water resources.** California

Agriculture, May 1963, p 6-8.

Aldrich, D.G., A.P. Vanselow and G.R. Bradford. **Lithium toxicity in citrus.** Calif. Agric. Oct. 1951, p 6.

*page 74, lines 1,2*

Soane, B.D. and Saunder (see above chromium reference). Mishra, D. and M. Kar. **Nickel in plant growth and metabolism.** Botanical Review, 40:395-452. 1974.

*page 74, lines 3,4*

Gary, E.E. and W.H. Allaway. **Selenium content of field crops grown on selenite-treated soils.** Agron. J 65:922- 925. 1973.

*page 74, lines 11, 12*

Wallace, A., E.M. Romney and R.T. Mueller. **Nitrogen- silicon interaction in plants growth in desert soil with nitrogen deficiency.** Agron. J. 68:529-530. 1976.

*page 74, line 13*

Okuda, A. and Takahashi. **The role of silicon,** p 123-146, in, The Mineral Nutrition of the Rice Plant, Proc. Symp. Intern. Rice Res. Inst, John Hopkins Press, Baltimore, U.S.A. 1965.

## CHAPTER 16

*page 75, table*

Luckhardt, R.L. **Soil testing helps plan preplant nitrogen.** Agribusiness Fieldman, Sept. 1979, p 5. (Article covers U.C.'s Dr. Kent Tyler's work on soil nitrate).

A recent work indicates that soil nitrate data can be pushed through an equation to give a more refined nitrogen requirement index (NRI) for some crops. See, S. Roberts, et al. **Use of the nitrate soil test to predict sweet corn response to nitrogen fertilization.** Soil Sci Soc. Amer. J. 44:306-308. 1980.

*page 75, lines 20-23*

For row crops, taking soil samples for nitrate analysis after each irrigation and correlating the results with petiole nitrate levels will give a firmer grip on N nutrition.

*page 76, lines 30-32*

Jones, J.B. Jr., **Should we, or shouldn't we standardize soil testing.** Crops & Soils. Feb. 1973, p 15-17. (A good discussion on the pros and cons of standardization).

*page 76, last line and page 77, lines 1-4*

A recent U.C. study shows that U.C. is changing this opinion; see, Uriu, et al. **Potassium fertilization of prune trees under drip irrigation.** J. Amer. Soc. Hort. Sci. 105:508- 510. 1980.

*page 77, quote*

Sparks, Darrell. **Predicting the nutrient needs of pecan - a review.** Pecan South, Nov. 1978, p 280-283.

## CHAPTER 17

*page 79, bottom line and page 80, line 1*

Luckhardt, R.L., **Plant analysis: where are we?** Agribusiness Fieldman, Feb. 1980, p 4.

In a recent review, two USDA scientists acknowledge the limitations of plant analysis as a tool for making precision fertilizer recommendations for tree crops: "Unfortunately, predicting the exact amount of nutrient required to bring the tree into nutritional balance is not simple. The method of trial and error must still be used." see Shear, C.B. and M. Faust. **Nutritional ranges in deciduous tree fruits and nuts.** Horticultural Reviews. 2:142-163. 1980. These authors also stress that fruit analysis can be superior to leaf analysis in diagnosing B and Ca deficiencies.

*page 80, lines 3-8*

Summer, M.E. **A new approach for predicting nutrient needs for increased crop yields.** Solutions. Sept.-Oct. 1978, p 68, 71, 74, 78.

Summer, M.E. **Interpretation of foliar analyses for diagnostic purposes.** Agron. J. 71:343-348. 1979.

Beaufillis, E.H. **Diagnosis and recommendation integrated system (DRIS).** Soil Science Bui. 1, University of Natal, Pietermaritzburg, South Africa. 1973.

*page 81, line 1*

**Western Fertilizer Handbook** (see General Reference section) has plant sampling guides.

*page 81, lines 13-16*

Terman, G.L. et al. **Nitrate-N and total-N concentration relationships in several plant species.** Agron. J. 68:556- 560. 1976.

*page 82, lines 13,14*

**Western Fertilizer Handbook** (see General Reference section) has published interpretation guidelines. Other publications have similar guidelines.

*page 82, lines 22-24*

McClellan, G.W. **K for quality alfalfa.** Agrichemical West, Sept. 1967, p 6, 7, 8, 13.

McClellan, G.W. **Potassium's spectacular economic benefits.** Agrichemical West, Oct. 1968, p 6, 8, 10, 12, 14, 16.

Interestingly, McClellan used K/N, P/N and P/K ratios in his work, the same ratios used in the DRIS system.

*page 83, lines 3-5*

Childers, N.F. **Fruit Nutrition of Crops** (see General Reference section), p. 788-790 (Chapter on Grape nutrition by J.A. Cook).

*page 83, lines 26,27*

Sparks, D. **Nitrogen Scorch and the pecan.** Pecan South. Sept. 1976. 3:500-501. 1976.

*page 83, lines 29,30*

Chaplin, M.H., R.L. Stebbins and M.N. Westwood. **Effect of fall-applied boron sprays on fruit set and yield of 'Italian' prune.** HortScience. 12:500-501. 1977.

## CHAPTER 18

*page 85, bottom*

Luce, Bill. **Bill Luce Says.** Goodfruit Grower, May 1, 1977, p 4. (Luce, a highly respected orchard authority in the pacific northwest, discusses the benefits of foliar nutrient sprays applied from pink bud to petal fall).

*page 86, lines 6-9*

Chaplin, M.H et al **Effect of fall-applied boron sprays on fruit set and yield of 'Italian' prune.** HortScience, 12:500- 501. 1977.

*page 86, lines 10,11*

Beeler Dick. **The joys and sorrows of foliar feeding.** Agrichemical Age. July-Aug. 1978. p 8, 17E.

*page, 86, 88,*

Most of the information on cuticular and stomatal entry was taken, some of it verbatim, from 2 articles by Larry Eddings: **Pour it through the pores,** Calif Farmer 226:18, (Feb. 4, 1967), and **Foliar Nutrition,** a mimeo from Chevron Chemical Co., 575 Market St., San Francisco, Ca 94105. Edding's M.S. thesis (from the University of California at Davis, 1967) was on foliar nutrition and is a significant contribution to the body of knowledge on the subject.

*page 89, lines 8,9*

Leonard, CD **Solvent boosts impact of foliar sprays.**  
Crops & Soils, Aug.-Sept. 1966, p 16.

Leece, DR. and J.F Dirou **Comparism of urea foliar sprays containing hydrocarbon or silicone surfactants with soil-applied nitrogen in maintaining the leaf nitrogen concentration of prune trees.** J Amer. Soc Hort Sci. 104:644-648. 1979.

*page 90, lines 8-10*

**Foliar fertilizers "green up" a crop, but don't raise yields.**  
Crops & Soils, April-May 1968, p 31.

*page 90, line 13*

Proebsting, E.L. **Nitrogen sprays.** Calif. Agric. March 1951, p 12.

*page 91, lines 13-15*

Shim K., J.S. Titus and WE. Splittstoesser. **The fate of carbon and nitrogen from urea applied to foliage of senescing apple trees.** J. Amer. Soc. Hort. Sci. 98:360-366. 1973.

## CHAPTER 19

*page 92. lines 24-28*

Elliot, L.F. and F.J. Stevenson (Editors). **Soils for management of organic wastes and waste waters.** American Society of Agronomy publication (book). 1977.

The above reference represents the proceedings of a 1975 symposium. Sewage

and waste disposal is a rapidly evolving subject; there is and will be a lot of literature forthcoming on this subject.

*page 94, lines 3-5*

Guttay, A.J. **Fungus helps plants grow.** Crops & Soils, Aug.-Sept. 1975, p 14-15.

Menge, J.A., et al. **The effect of two mycorrhizal fungi upon growth and nutrition of avocado seedlings grown with six fertilizer treatments.** J. Amer. Soc Hort. Sci 105:400-404. 1980.

## CHAPTER 20

*page 96, lines 17-21*

These ideas (skepticism toward the printed word) are taught by Dr. H.M. Reisenauer in his course on soil fertility at U.C., Davis - useful teaching.

*page 97, lines 7-10*

In most work, we search for little truths - occasionally a larger Truth will be discovered. That holiest of grails, THE TRUTH will always be, and should always remain beyond our grasp, although Einstein, perhaps, got a partial lock on Truth; the pursuit, however, is more important than the conquest.

*page 97, bottom (quote)*

Grierson, W. **The enforced conservatism of young horticultural scientists.** HortScience. 1 5(3):228-229. 1980.

*page 98, quote*

Kondracke, M.H. **The trouble with lawyers.** The New Republic. 178(201:5-6. May 20, 1978.

*page 99, quote*

Day, Boysie E. The morality of agronomy. In: Agronomy in today's society. American Society of Agronomy, Special publication No. 33. 1978. pp 19-27.