

Nutrient Management Resources

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This overview lists sources of information about nutrient management predominantly from California. The list is divided into the following categories:

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A short description about the different resources is added to each item. Links are provided for resources that are available online.

1. Online resources

1.1. California Department of Food and Agriculture - Fertilizer Research and Education Program

<http://www.cdfa.ca.gov/is/ffldrs/frep/index.html>

The Fertilizer Research and Education Program (FREP) funds and facilitates research to advance the environmentally safe and agronomically sound use and handling of fertilizing materials.

Of special interest:

- **Fertilization guidelines**

<http://apps.cdfa.ca.gov/frep/docs/guidelines.html>

The guidelines present accurate and timely crop nutrient information in a user-friendly, visually interactive interface. Information about application rates, time of application, fertilizer placement and types of fertilizers is included. In addition, deficiency symptoms are described and the use of soil and plant tissue analysis is discussed and instructions for representative sampling are provided. Currently, the guidelines include information about nitrogen, phosphorus, and potassium fertilization. An extensive list of references and links to sites with additional information complement the guidelines.

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- **FREP database**

<http://www.cdfa.ca.gov/is/frep/>

The database includes summaries of more than 130 projects that received FREP-funding since 1992. Users can search for specific topics by either entering a keyword or choosing a crop type, a county, or a date range from a drop-down menu. In addition to the summary, the page provides links to the final report, to contributions to the FREP proceedings, and to external sites closely related to the project, such as articles written by the project leaders that are available online.

1.2. University of California Research & Information Centers

University of California Vegetable Information and Resource Center (VRIC)

<http://vric.ucdavis.edu/index.htm>

VRIC's mission is to foster appropriate research, collect and disseminate information relevant to consumers, growers and processors in the California vegetable industry and to continue its role as a leader and nationally-recognized source of research and information in support of the vegetable industry.

Of special interest:

- **Vegetable information searchable by crop or topic**

http://vric.ucdavis.edu/main/veg_info.htm

- **Links to newsletters and blogs from counties in California**

<http://vric.ucdavis.edu/main/newsletters.htm>

University of California Davis Fruit & Nut Research & Information

<http://fruitsandnuts.ucdavis.edu/>

The aim of the page is to aid the coordination and dissemination of University of California research-based information, accomplishments, and statewide research and extension activities related to fruit and nut crops.

Of special interest:

- **Almond N Model**

<http://fruitsandnuts.ucdavis.edu/almondmodels/>

This model calculates the N requirement for almond production based upon the yield history, current conditions and previous N applications. This model can be used to calculate both timing and rate of fertilizer application required to maintain optimum yield. Site specific information is required for accurate projection of N requirement.

- **Nitrogen Prediction Models for Almond and Pistachio**

http://fruitsandnuts.ucdavis.edu/Weather_Services/Nitrogen_Prediction_Models_for_Almond_and_Pistachio/

The models are based on research conducted through a 4-year, multi-state project with goals to optimize resource use in deciduous tree crops. The page provides a protocol for early-season leaf sampling and models to predict N and K status of the trees and in-season N budgeting based on leaf analyses.

University of California Agronomy Research & Information Center

<http://agric.ucdavis.edu/>

The site contains links to web pages with information about the management of specific crops as well as contact information of people associated with the Department of Plant Sciences at UC Davis.

University of California - California Rangelands

<http://californiarangeland.ucdavis.edu/>

The site contains some information about rangeland in California. Currently little information about nutrient management is available.

1.3. Other University of California sites

a) Vegetables

University of California Nutrient Management for Vegetable, Fruit & Nut Crops

<http://ucanr.org/sites/nm/>

A collection of links to research reports about nutrient management. The information is searchable by crop and topic.

CropManage

<http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=8501>

CropManage is an online database-driven tool that assists growers and farm managers in determining water and nitrogen fertilizer applications on a field-by-field basis. The software automates steps required to calculate crop water needs from CIMIS ET data, and estimates fertilizer N needs for lettuce using quick N test data and models of crop N uptake. The web application also helps growers track irrigation schedules and N fertilizer applications on multiple fields and allows users from the same farming operations to view and share data. The software was developed by UC Cooperative Extension specialists and is free to use.

b) Orchards, grapevines

University of California Cooperative Extension Central Sierra Grapevine Nutrition

http://cecentralsierra.ucanr.edu/Agriculture/Viticulture/Grapevine_nutrition/

A collection of links to sites and publications focusing on grapevine nutrition.

University of California Integrated Viticulture

<http://iv.ucdavis.edu/>

On this website, users find publications, video seminars, and useful links on relevant topics from research by the University of California. The website is designed and maintained by the University of California Division of Agricultural and Natural Resources (ANR). The goal of the webpage is to increase accessibility to the work of UC researchers - including faculty, Cooperative Extension specialists, CE advisors, and staff - ensuring a beneficial and productive collaboration in research and extension to the public.

c) Water use, irrigation

University of California Cooperative Extension - Irrigation Management

<http://ucanr.edu/sites/irrmgm/>

A collection of presentations and publications about irrigation management by Larry Schwankl, University of California Cooperative Extension specialist.

California Institute for Water Resources

<http://ciwr.ucanr.edu/>

The California Institute for Water Resources develops and supports water-related research, education, and outreach across the state and beyond. The institute brings together local, state, and federal communities to identify issues and sources of political and financial support for solutions-oriented water research and outreach.

Of special interest:

- **Nitrate Groundwater Pollution Hazard Index**

http://ciwr.ucanr.edu/Tools/Nitrogen_Hazard_Index/

The Nitrate Groundwater Pollution Hazard Index was developed to provide information to farmers interested in voluntary management practices that reduce nitrogen contamination potential in groundwater. The index works with an overlay of soil, crop, and irrigation information. Based on these three components, an overall potential hazard number is assigned and management practices are suggested where necessary.

d) Manure management

University of California Manure Management for California Certified Crop Advisers

<http://manuremanagement.ucdavis.edu/>

This site contains technical information on dairy manure nutrient management intended to help Certified Crop Advisers who are serving dairy farmers in the Central Valley of California. Maintained by Stuart Pettygrove, University of California Cooperative Extension specialist.

University of California Cooperative Extension - Manure Nutrient Management

<http://manure.ucdavis.edu/>

The site contains the latest practical information and easy to use tools for manure nutrient management. The site is primarily authored by Marsha Campbell Mathews, University of California Cooperative Extension Agronomy Farm Advisor in Stanislaus County.

e) Other topics

SoilWeb: An Online Soil Survey Browser

<http://casoilresource.lawr.ucdavis.edu/soilweb/>

Explore mapped soil survey areas using an interactive Google map and view detailed information about map units and their components. This app runs in your web browser and is compatible with desktop computers, tablets, and smartphones.

Agricultural Sustainability Institute at UC Davis

<http://asi.ucdavis.edu/front-page>

The mission of the Agricultural Sustainability Institute (ASI) is to ensure access to healthy food and to promote the vitality of agriculture today and for future generations. This is done through integrative research, education, communication and early action on big, emerging issues.

ASI provides a hub that links initiatives and education in sustainable agriculture and food systems across all divisions of the College of Agricultural and Environmental Sciences at UC Davis, across the University of California, and with other partners across the State of California.

1.4. Other sites

U.S. Department of Agriculture

<http://www.usda.gov/>

Find the latest news about US agriculture and links to all agencies and offices within USDA.

Of special interest:

- **National Agricultural Library - Soil and Water Management**

<http://afsic.nal.usda.gov/soil-and-water-management>

Find information about methods to improve or protect soil and to use water with care on the land. Topics include soil quality and testing, nutrient management, cover crops, compost, conservation tillage, water conservation and irrigation techniques.

- **NRCS Web Soil Survey**

<http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world. NRCS has soil maps and data available online for more than 95 percent of the nation's counties and anticipates having 100 percent in the near future.

- **NRCS Crop Nutrient Tool**

<http://plants.usda.gov/npk/main>

A tool for calculating the approximate amount of nitrogen, phosphorus, and potassium that is removed by the harvest of agricultural crops.

WATERIGHT by the Center for Irrigation Technology at California State University, Fresno

<http://www.wateright.org/>

The WATERIGHT site was developed by the Center for Irrigation Technology at California State University, Fresno with significant support from the US Bureau of Reclamation. WATERIGHT is designed to be a multi-function, educational resource for irrigation water management. The site is designed for three audiences: homeowners, commercial turf growers, and agriculture.

International Plant Nutrition Institute

<http://www.ipni.net/>

The International Plant Nutrition Institute (IPNI) is a not-for-profit, science-based organization dedicated to the responsible management of plant nutrition for the benefit of the human family. Companies that are basic producers of one or more of the major plant nutrients (nitrogen, phosphate, potash, and sulfur) for agricultural purposes are the members of IPNI. As a global organization, IPNI has initiatives addressing the world's growing need for food, fuel, fiber, and feed.

Of special interest:

- **Nutrient Source Specifics**

<http://www.ipni.net/specifics-en>

Nutrient Source Specifics are one-page fact sheets highlighting various fertilizers and nutrient sources. Information about the production, agricultural use, management practices, and chemical properties of common fertilizer materials is included. Written by IPNI scientific staff, these items are primarily for educational use by a non-technical audience.

- **Nitrogen Notes**

<http://www.ipni.net/nitrogennotes>

This series of fact sheets, written by IPNI staff, covers the major nitrogen fertilizer transformations that occur in crop production.

Crop Nutrient Removal Calculator

<https://www.ipni.net/app/calculator/home>

This tool provides crop nutrient removal estimates for a broad, and continually expanding, list of field crops. Results are calculated based on user-selected yield goals and can be displayed in either metric or US/Imperial units. Compatible with all computer and mobile devices.

2. People

University of California Agriculture and Natural Resources Academic Directory

http://ucanr.edu/Find_People/Academic_Directory/

The directory can be filtered by commodity and appointment (e.g. Farm Advisors).

3. Electronic Journals

California Agriculture

<http://californiaagriculture.ucanr.org/>

California Agriculture is a peer-reviewed journal reporting research, reviews and news from the University of California and its Agriculture and Natural Resources division. Access to all publications since 1946 is free.

4. Book Stores

ANR Catalog

<http://anrcatalog.ucdavis.edu/default.aspx>

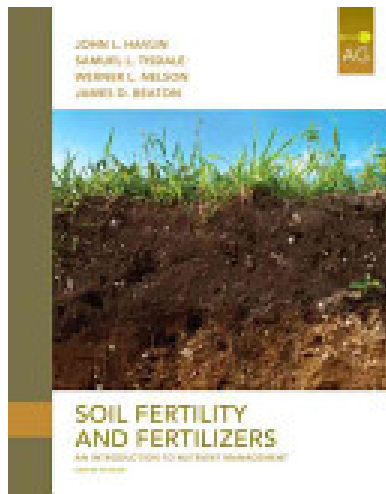
The ANR Catalog features publications, videos, images, interactive learning, and electronic multimedia published by the University of California Agriculture and Natural Resources. Topics include agriculture, natural resources and nutrition. Some publications are free.

International Plant Nutrition Institute (IPNI) online store

<http://ppi-store.stores.yahoo.net/>

IPNI sells a large selection of fertilizer related material, including books, manuals, slides, software and videos.

5. Books

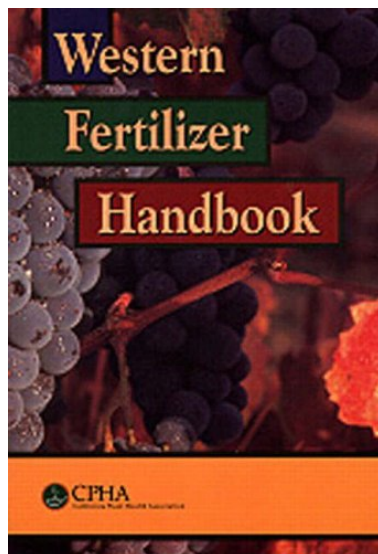


Soil Fertility and Fertilizers

8th edition, 2013

John L. Havlin, Samuel L. Tisdale, Werner L. Nelson, James D. Beaton,

A general book about soil fertility and fertilizers. The book provides a basic introduction to the biological, chemical, and physical properties affecting soil fertility and plant nutrition. It covers all aspects of nutrient management for profitable crop production, with particular attention to minimizing the environmental impact of soil and fertilizer management. The main part of the book is divided into chapters focusing on specific nutrients.

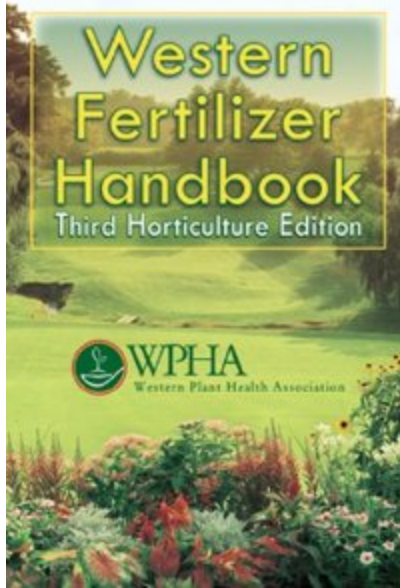


Western Fertilizer Handbook

9th edition, 2002

Western Plant Health Association

Written specifically for western agriculture, this straightforward handbook gives growers an excellent foundation for developing an understanding of agronomic principles and practices to produce healthy crops and meet 21st-century production demands. The text presents fertilization, nutrient management, and related topics based on the fundamentals of biological and physical sciences. It explains the interrelation of soil type, moisture, and the macro- and micronutrients to grow plants successfully. Emphasis is also placed on the relationships of fertilizer application and crop management to environmental quality and long-term productivity.

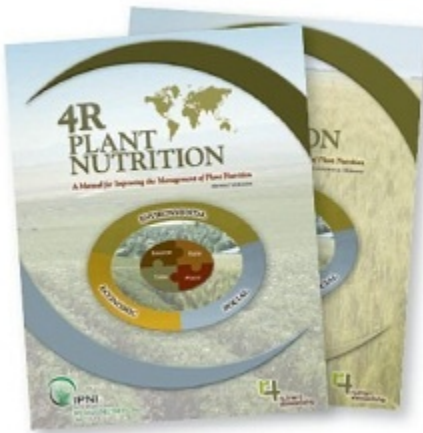


Western Fertilizer Handbook: Horticulture

3rd edition, 2012

Jerome Pier, Dave Barlow

This book presents fertilization, nutrient management, and related topics based on the fundamentals of biological and physical sciences for professionals in the nursery, golf turf, and landscape fields. The information in this book is set in a horticultural context so that it can be more easily understood by the student and the amateur horticulturist and more rapidly applied by the industry professional.



4R Plant Nutrition Manual

IPNI, 2012

The 4R Plant Nutrition Manual includes chapters on the scientific principles behind each of the four R's or "rights". It discusses adoption of 4R practices on the farm, approaches to nutrient management planning, and measurement of sustainability performance. The manual is intended to help the reader adapt and integrate the fundamental 4R principles into a comprehensive method of nutrient management that meets the criteria of sustainability. A mix of learning modules and case studies demonstrate the universality of the 4R Nutrient Stewardship concept through its application to diverse cropping systems used within small enterprises, large commercial farms, and plantations.