

Final report

FREP Project 08-0629

Development of a comprehensive nutrient management website for the California horticultural industry

Project leader

T.K. Hartz
Extension Specialist
Department of Plant Sciences
University of California
1 Shields Ave
Davis, CA 95616
(530) 752-1738
tkhartz@ucdavis.edu

Executive summary

Producers of horticultural commodities in California are under increasing regulatory pressure to improve nutrient and irrigation management practices to protect environmental water quality. In addition to a continuing need for grower education, there is also a demand for training for technical service providers, who increasingly are being engaged by growers to help meet regulatory requirements. This grant funded the development of a comprehensive nutrient management website for vegetable, fruit and nut crops. This website contains a broad array of information regarding nutrient management of more than 40 crops from both an agronomic and environmental perspective. Interactive learning modules on specific topics have been developed for this website to provide accredited continuing education for growers and technical service providers.

Introduction

California growers of horticultural commodities are under increasing pressure to modify production practices to safeguard water quality. In the coastal vegetable and berry production areas intensive water quality monitoring since 2006 has shown that ditches, creeks and sloughs receiving runoff from irrigated agricultural land are frequently above the Federal drinking water standard of 10 PPM NO₃-N. Groundwater in these areas is similarly impaired. Although overshadowed by the nitrate issue, surface water soluble phosphorus concentration is also above desirable levels at many of the monitoring sites. In the Imperial Valley, a major vegetable production area, a nutrient TMDL is currently under development. The east side of the San Joaquin Valley, home to most of California's tree fruit and nut production, has widespread groundwater nitrate contamination.

In recognition of the reality that concentrated horticultural production and water quality problems are geographically linked, FREP has dedicated

substantial funding to developing more agronomically efficient and environmentally sensitive fertilization and irrigation practices for vegetables, berries, tree fruits and nuts. These projects have investigated a wide range of issues, and significant advances have been made in our understanding of crop nutrient requirements, uptake patterns and monitoring techniques, and of the environmental fate of applied nutrients.

As regulation to safeguard environmental water quality advances, the need for grower education will increase, and documentation of that education may become a condition for continued operation. For example, the Central Coast Region Water Quality Control Board (CCRWQCB) required growers to complete a 15 hour shortcourse on water quality protection in order to qualify for the Conditional Waiver for Irrigated Lands (commonly called the 'Ag Waiver') granted in 2005. The development of a farm nutrient management plan is now a requirement in several parts of the state as a condition for continued coverage under the Ag Waiver system. To meet the increasing demand for technical service providers with nutrient management expertise, additional educational opportunities will be needed for various types of industry professionals [(Pest Control Advisors (PCA), Certified Crop Advisors (CCA), etc.).]

The internet provides a platform to collate and disseminate information about nutrient management for horticultural crop production; it also provides a convenient way to deliver continuing education for growers and associated industry professionals. This project was undertaken to develop a website containing comprehensive information on nutrient management of the important horticultural crops grown in California, and to provide on-line continuing education opportunities for growers and holders of professional licenses.

Objectives

Develop an informational website on agronomically and environmentally efficient nutrient management for vegetable, fruit and nut crops.

Methods

A website was constructed on the UC Agriculture and Natural Resources (UC ANR) server using Sitebuilder 3.0 software. The site was organized around four main menu choices:

- 1) Information by crop
- 2) Information by topic
- 3) Learning modules
- 4) Resources

The crop menu contains 27 vegetable crops and 20 fruit and nut crops. The various crop pages contain items relating to nutrient management or other aspects of production that affect nutrient management (irrigation, crop rotation, etc.). The topic menu contains a dozen listings, ranging from agronomically focused information on soil testing and soil fertility to environmentally focused information on water quality. The learning module menu contains narrated powerpoint presentations on specific topics relating to nutrient management or environmental issues pertaining to nutrient management. The resources menu

links users to university, government and industry web-based information on nutrient management issues.

There were two primary criteria used to decide what material to include on this website. First, only information from credible, impartial sources was included; no material intended to promote proprietary commercial products was loaded on the site. Second, since the primary purpose was to provide practical information to industry professionals, scientific journal articles were included only if they covered topics of practical significance and were written to be understood by a non-specialist in the field.

Results

The website is now operational (<http://ucanr.org/sites/nm/>). Several hundred individual items are accessible, drawn from UC sources, and from institutions and industry groups around the country and the world. Included in the collection are all completed FREP final reports since the inception of the FREP program. An extensive list of links to other university, industry and government resources has been assembled. Included are links to the Proceedings of International Society for Horticultural Science symposia relating to nutrient management of horticultural crops (http://ucanr.org/sites/nm/International_Symposia/), a significant source of information. (Note: ISHS Proceedings are copyright protected, so individual reports could not be made accessible directly on this website).

Six learning modules have been created to date by the Project Leader, covering the following topics:

- Efficient phosphorus management for vegetable production
- Managing calcium in vegetable production
- Vegetable irrigation and nutrient management for water quality protection
- Drip irrigation scheduling of processing tomatoes
- Managing fertility in drip-irrigated processing tomatoes
- Improving fertilizer management in coastal lettuce production

These modules consist of a narrated powerpoint presentation, paired with an interactive quiz to allow users to evaluate their mastery of the material. These modules are the initial building blocks of an on-line system for accredited continuing education for holders of professional licenses, and potentially for grower training mandated by government regulators. The Executive Board of the California CCA program has approved each of these modules for one hour of continuing education credit for the more than 500 CCAs in the state. The CCRWQCB is contemplating requiring additional grower education on environmental water quality protection as part of the renewal of the Ag Waiver in fall, 2011. Should that requirement be adopted, the Project Leader will work with CCRWQCB staff to accredit for this purpose the current modules relating to water quality, and to develop additional modules. Additional learning modules currently under development including a strawberry nutrient management guide and an in-depth examination of soil testing and interpretation.

UC ANR information technology professionals are currently perfecting the software for an on-line education system that will provide the automated data

collection and management necessary to handle accredited continuing education programs. The Project Leader continues to work with UC ANR personnel to incorporate these modules into that system. It is anticipated that the system will be operational by the end of summer, 2011.