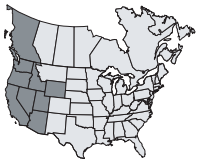
IPNI INSIGHTS
INTERNATIONAL PLANT NUTRITION INSTITUTE



August 2010

Western Region Research Update

Research to Maintain Competitiveness

Farmers are always looking for a better way to grow their crops. Even though the agricultural productivity in Western North America is among the highest in the world, there are still things that can be done better.

A recent emphasis of IPNI has been to remind people of ways to improve nutrient stewardship. There are many economic, ecological, and social pressures that are encouraging farmers to reevaluate some of their traditional practices. In particular, better understanding of the "4R" concept for nutrients (the Right Source, Right Rate, Right Time, and Right Place) has helped growers implement management practices that may improve nutrient stewardship.

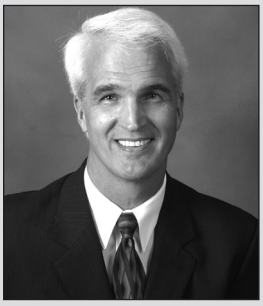
Implementing the 4R approach to fertilizer use reminds us that we cannot be satisfied with always doing things the way they have been done in the past. IPNI is pleased to partner with leading researchers to learn better ways of using valuable plant nutrients in the most appropriate way.

The reports provided here reflect only a small fraction of the research projects that IPNI supports worldwide. Supporting important agronomic research is central to our mission of responsible management of plant nutrients for the benefit of the human family.

This issue of INSIGHTS features a brief summary of some research projects supported by IPNI in Western North America. Further information on these and other global projects supported by IPNI can be found at the research database on our website: >**www.ipni.net/research**<.

Upcoming Events...

American Society of Agronomy-Crop Society of America-Soil Science Society of America (ASA-CSSA-SSSA) 2010 International Annual Meetings. Oct. 31 - Nov. 4, Long Beach, California. www.acsmeetings.org



Dr. Robert Mikkelsen
Western North America Director
International Plant Nutrition Institute (IPNI)
4125 Sattui Court
Merced, CA 95348
Phone: 209-725-0382
Fax: 209-725-0382
E-mail: rmikkelsen@ipni.net
Website: www.ipni.net

California

Evaluation of Improved Methods for Tissue Testing of Alfalfa

Project Leader: Mr. Steve Orloff, University of California, Cooperative Extension, 1655 S Main St., Yreka, CA 96097. Telephone: 530-842-2711. E-mail: sborloff@ucdavis.edu

Project Cooperator: Dan Putnam

Adequate nutrition is essential to achieving high alfalfa yields. The nutritional status of alfalfa fields is determined through soil analysis or plant tissue analysis. Despite the reliability of plant tissue tests, most alfalfa growers do not conduct tissue testing due to the complicated, time consuming, and tedious procedure currently recommended by the University of California. Current critical values are also based on alfalfa at one-tenth bloom growth stage. However, to produce highly digestible alfalfa, growers harvest alfalfa in the bud stage and many fields never reach one-tenth bloom.

Alfalfa tissue samples were collected from five different fields in Northern California. Tissue samples were collected at three different maturity stages. Whole plant samples (which simulate bale samples), top 6-in. samples, and fractionated plant samples were analyzed for various nutrients. Phosphorus concentration declined considerably with advancing maturity, which is in agreement with previous research. Potassium and sulfur (S) also declined with advancing maturity. Plant maturity must be considered when interpreting plant tissue test results. If the values are not adjusted for maturity, a sample collected at early bud stage may appear to have adequate P, but if the same plants were sampled at one-tenth bloom the tissue values may indicate they are deficient. It was believed that some sampling techniques may be less affected by advancing maturity and therefore the same critical values could be used regardless of the alfalfa stage of growth. However, it was found with all three sampling methods that P concentration decreased at a similar rate as the alfalfa matured from early bud to mid-bud to approximately 10% bloom.

The effect of maturity on nutrient concentrations observed in this study was used to adjust established deficient, marginal, adequate, and high plant analysis values for whole plant or cored bale samples. *CA-26F*

Soil-Specific Potassium Management in the Lodi Winegrape Region

Project Leader: Dr. Stuart Pettygrove, University of California, Department of Land, Air & Water Resources, One Shields Ave, Davis, CA 95616. Telephone: 530-752-2533. Fax: 750-752-1552. E-mail: gspettygrove@ucdavis.edu

Project Cooperator: A.T. O'Geen, R.J. Southard, Paul Verdegaal, and Chuck A. Ingels

The importance of K for grapevine productivity and wine quality is well known, but the relationship between soil properties and K availability is not always clear. Potassium is the most abundant inorganic element in grapes, and the main cation in must (the grape juice before fermentation) and wine. Not only are K deficiencies a problem, but excesses are also a problem in relation to wine quality. A recent grower survey in the Lodi (California) district showed 85% of vineyards had received K fertilizer additions during the previous 3 years. About one-third of vineyard blocks in the survey reported K deficiency based on petiole samples, soil testing, or low yields. Only a few growers reported any problem with excessive K levels in fruit.

Soil studies were done in 36 Lodi district vineyards over the past 4 years, with the digging of more than 120 soil pits, and the collection of more than 700 soil samples. Soils in the region vary widely in K-supplying capacity. Some clays have high K fixation capacity, where K is removed from solution and trapped within mineral layers. A portion of the K fixed in this manner can be a slow-release source for plants, but most will not be available fast enough during times of high demand.

Potassium fertilization trials were started in 2009 in two established commercial Syrah vineyard blocks with different soil properties. Potassium application rates of 0, 30, 60, or 90 lb/A were applied. After the first year, little response was observed to K additions, although some increase in petiole K concentrations was observed at veraison. (the onset of ripening). Additional trial sites will be established in the coming year. *CA-28*

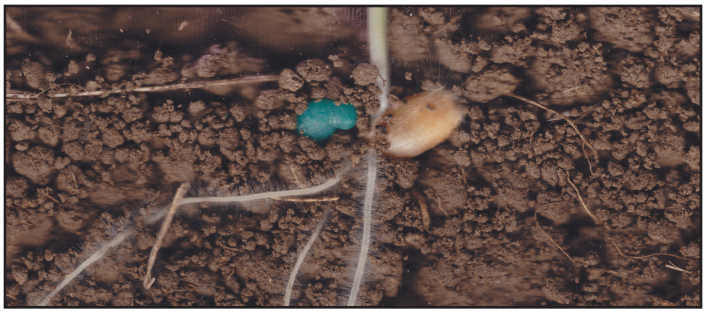
Washington

Root Responses to Fertilizer Placement and Source

Project Leader: Dr. William Pan, Washington State University, Department of Crop & Soil Science, 210 Johnson Hall, Pullman, WA 99164. Telephone: 509-335-3611. E-mail: wlpan@wsu.edu

A limiting factor in studying the response of root growth to various stresses has been the difficulty in making accurate observations and measurements. Various methods have been used, including rhizotrons, mini-rhizotrons, cameras, and low-resolution scanners. A new greenhouse technique has been developed that allows root growth and development to be measured without disturbance. The rhizosphere of plants growing in field soil are measured daily with high-resolution scanners and the images are quantified by assessing root length and root surface area.

With the equipment now properly working and calibrated, the response of roots to various environmental stresses will be observed and measured. These measurements may include response of different plant species to variably-placed nutrients and various forms of nutrients. Final products will include both photographs of root development over time and also quantitative understanding of how various nutrient management strategies impact root development. *WA-14F* ■



This image of a wheat seedling soon after germination shows no adverse effect on roots from close proximity of a controlled release fertilizer granule.