COOPERATIVE EXTENSION UNIVERSITY OF CALIFORNIA

SOIL and WATER

Winter 1980 - No. 46



Fertilizer skips result in an unintended demonstration of the importance of nitrogen nutrition in wheat production. Plant tissue analysis may aid in diagnosing the nitrogen status of wheat this winter. Story on Page 1. (Photo - Stuart Pettygrove)

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ROY BRANSON RETIRES

Roy L. Branson, Extension Soils and Water Specialist located at the UC Riverside campus since 1958, announced his retirement, effective Dec. 1, 1980. Roy also worked at the Citrus Experiment Station, UC Riverside from 1953-1958. Roy conducted extension and applied research programs on the evaluation of irrigation water quality and management of saline soils, artificial soils and soil mixes, management of organic wastes and sludges and soil fertility for many crops. Roy developed a close working relationship with the nursery industry and was (still is!) knowledgeable in the water and fertility requirements of ornamental plants. We will sorely miss Roy's experience with these subjects, not to mention his creative intellect. We wish him well in his next adventure.

- Stuart Pettygrove

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NITRATE TISSUE TEST FOR HARD RED SPRING WHEATS IN CALIFORNIA

Early diagnosis of nitrogen deficiency in wheat is required if corrective action is to be taken. Yield potential is determined at an early stage of growth, and a growth rate reduction due to insufficient nitrogen cannot be made up by fertilizer applications later than the jointing stage of growth.

Nitrate-nitrogen concentration in the lower stem tissue of the wheat plant may be useful in diagnosing nitrogen deficiency during the vegetative stage of growth. The results of a field experiment conducted in 1979-80 in Sutter County (Table 1), and a field experiment conducted by Kite and Rauschkolb in Kings County in 1976 suggest a critical level in the late tillering or early jointing stage of growth of 4000 to 6000 ppm NO_3^--N (Figure 1). This is close to the recommended critical levels of 7,000-12,000 ppm in the 3-4 leaf stage and 5,000-10,000 ppm in the jointing stage for wheat grown under Arizona desert conditions (Gardner and Jackson. 1976. Agron. J. 68:75-78).

An important observation in both the Sutter County and Kings County experiments was that the critical level dropped very rapidly during the join-

ting stage of growth, declining from 4000-6000 ppm NO_3^--N during early jointing to 2000-2500 ppm only two weeks later during the late jointing period.

RECOMMENDATIONS

1) Fields should be sampled during the late tillering-early jointing stage of growth and no later than the one- or two-joint stage.

2) Collect 20-40 tillers from the area to be sampled, pulling up the entire plant or tiller.

3) Cut off roots and plant tops, saving the bottom 1-2" of stem. This will include the below-ground portion of the stem. (In pre-jointed plants there is no true stem)

4) Send samples immediately to laboratory for nitrate nitrogen analysis. If samples will not reach laboratory within a few days, they should be dried in an oven.

CAUTION

The above recommendations are preliminary and are based on a small amount of data involving only two varieties of hard red spring wheat planted in irrigated experiments.

Low nitrate concentrations in plant tissue may result from poorly drained or poorly aerated soil. In such a case, the application of nitrogen topdressing may not increase yield.

- Stuart Pettygrove, John Williams, Farm Advisor, Sutter County, and Richard Pelton, Staff Research Associate

See Figure 1 and Table 1 for this article on Page 3.

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J.R. SIMPLOT ACQUIRES VALLEY NITROGEN

On October 28, 1980, the J.R. Simplot Company acquired Valley Nitrogen Producers, Inc. The reorganized company, which will operate under the name of SimCal Chemical Company, is a subsidiary of Simplot, a large diversified agribusiness corporation headquartered in Boise, Idaho.

During the transition of Valley Nitrogen to SimCal, the company will continue to utilize some supplies, documents, equipment and buildings bearing the name of VNP. The company will continue to market the same product line as was the case under VNP and in the future hopes to add new products.

-Roland D. Meyer and Stuart Pettygrove

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LARGE INCREASE IN LIME APPLICATIONS ON CALIFORNIA CROPLAND

In only seven years, the use of liming materials to amend soils in California has increased five-fold (see Figure 1). Much of the increase has taken place since 1977. Use is concentrated in the central and northern parts of the San Joaquin Valley, with Fresno, Merced, San Joaquin, and Stanislaus counties accounting for 54% of the 1979 state total (see Table 1).

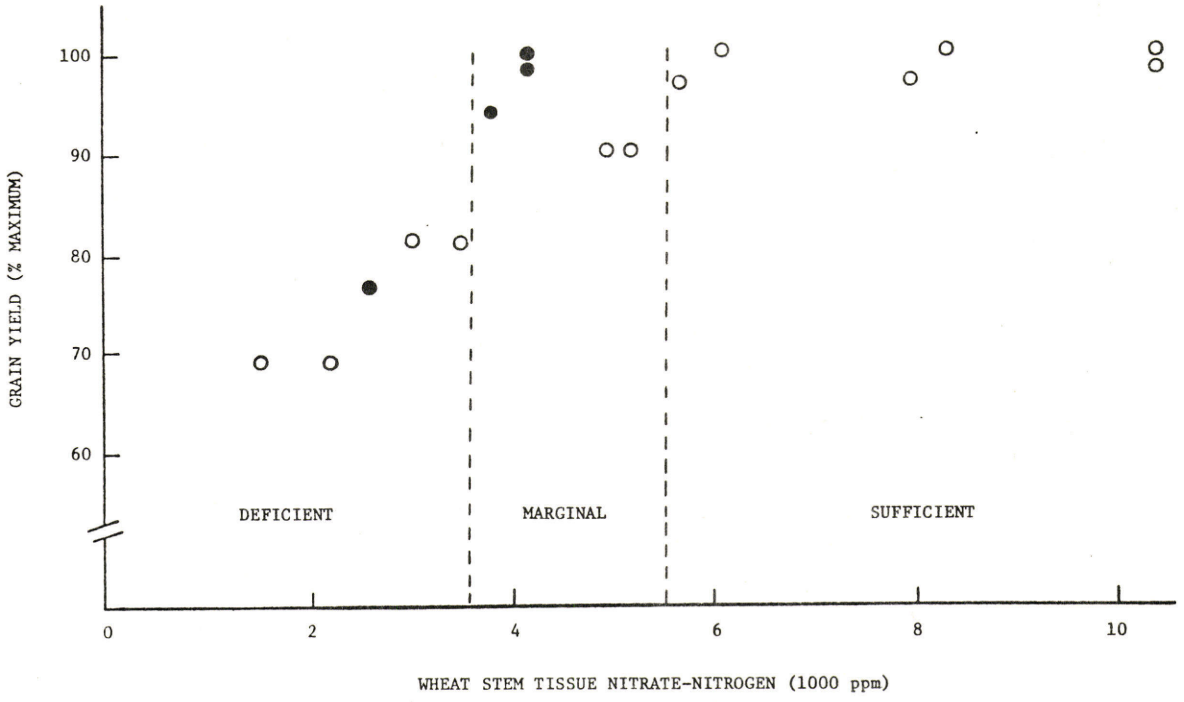
About one-third of all liming material (expressed on a calcium carbonate equivalent basis) sold in the state is classed as by-product lime and is mostly sugarbeet lime. Use of by-product lime is highest in the counties where sugar refineries are located.

Why the increase in lime use in California? Several factors account for it:

TABLE 1. Response of Anza wheat to N fertilization, Sutter County, 1979-80.

Preplant rate lbs N/A	Stem NO_3^--N, ppm: Early jointing	Stem NO_3^--N, ppm: Late jointing	Yield, lbs/A	Yield change due to topdressed N, lb/A
0	2603	1413	5858	+1690
60	3895	2233	7104	+ 624
120	4230	3498	7580	- 358
180	4250	3902	7404	- 447

FIGURE 1. Wheat lower stem tissue NO_3^--N concentration during late tillering to early jointing growth stage. Each point represents mean of 3 or 4 replicates. ○ = Cajeme wheat, unpublished data of Kite and Rauschkolb, 1976. ● = Sutter County, Anza wheat, 1980 harvest.



1) Expansion of orchard and vineyard production onto soils which are naturally strongly acidic. We are seeing some of this, but overall it is probably not an important factor.

2) Acidification of soils by the use of ammoniacal fertilizers, especially ammonium sulfate, and by the overuse of elemental sulfur or other acidifying soil amendments. Sometimes such problems are not easily resolved. Dr. Les Stromberg, Fresno County Farm Advisor, has observed strongly acid soil (pH 3.9-4.3) down to a four foot depth below drip emitters in orchards. Apparently, ammoniacal fertilizers applied through the drip system resulted in a localized soil acidification.

3) A desire by growers to invest in soil improvement and reduce taxable income.

4) Availability of low cost, high quality lime from sugar refineries.

5) Misuse of soil testing and sales tactics to sell lime where it is not needed. The Lime Requirement Test (LiR), run by many commercial laboratories, does provide a fairly good estimate of the amount of lime required to raise the pH of a given soil to a specified level - pH 6.5 for example.

   What the LiR test does <u>not</u> tell us is whether a particular plant species will respond to an increase in soil pH. This must be determined by experience and field experimentation. On many California soils, highly productive orchards and vineyards are found where the pH is between 5.0 and 6.0. According to the textbooks, corn will not do well at a soil pH 5.0, yet good yields are obtained by dairymen on sandy soils in the San Joaquin Valley where the saturated paste pH is 5.0 or even lower.

   Both pH and a LiR test are useful in evaluating soil acidity but by themselves won't tell you whether liming will provide a good economic return.

-Stuart Pettygrove

See Figure 1 and Table 1 for this article on Page 5.

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HOW MANY GALLONS/TREE/DAY?

In the drip irrigation session at our recent training conference, a simple problem set was developed to show a method of calculating water use by trees or vines if you know the evapotranspiration (ET) or at least a reasonable estimate of ET.

The formula is: gallons/tree or vine/day = ET_{crop} (inches/day) x canopy area ($feet^2$) x .623.

For example, if you believe the crop ET is .3" day and the tree spacing is 10' x 12' then: .3 x 10' x 12' x .623 = 22.4 gal/tree/day.

If you have a class A weather bureau pan and the ET_{pan} is .4"/day and the crop coefficient (K_{crop}) is .75 then $ET_{pan} \times K_{crop}$ is .4 x .75 = .3 inches per day.

This approach is somewhat limited by our lack of ET_{crop} and K_{crop} values, and our class A pan data (ET_{pan}) is sparse. However, this approach may be used with minimal information when trouble shooting on a drip irrigation farm call. You might try it out next

TABLE 1. Liming materials sold as agricultural minerals in 1979. Data obtained from Fertilizing Materials Tonnage Report, California Dept. of Food and Agriculture.

	County	All liming materials	Dolomite[a]	By-product lime[b]
		----tons, pure $CaCO_3$ equivalent----		
1.	Fresno	44,413	2,627	10,878
2.	San Joaquin	31,659	5,076	207
3.	Stanislaus	18,556	15,118	-
4.	Monterey	17,168	2,873	14,124
5.	Merced	12,816	3,784	619
6.	Santa Barbara	11,307	105	11,191
7.	Tulare	9,826	2,098	5,825
8.	Madera	8,041	1,968	216
9.	Yolo	7,601	88	6,376
10.	Glenn	7,234	4,588	-
11.	Kern	7,136	1,301	5,080
12.	Sacramento	3,630	602	501
	STATE	200,393	43,235	63,901

[a]Dolomite is magnesium and calcium carbonate. By California law, a material must contain at least 12% Mg to be classed as dolomite.

[b]By-product lime includes sugarbeet lime.

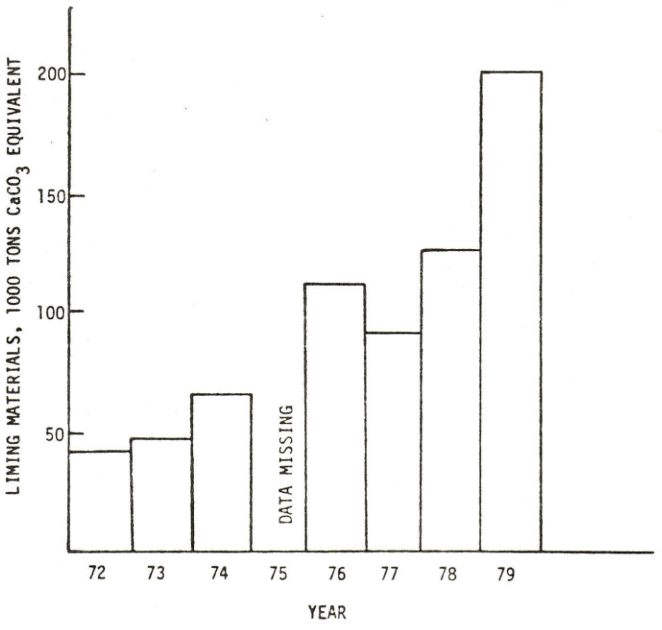


FIGURE 1. Tonnage of agricultural liming minerals sold in California (Data source: Fertilizing Materials Tonnage Report, California Dept. of Food & Agriculture.)

spring.

- Jewell L. Meyer

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LOW PRESSURE SPRINKLER HEADS

The cost of energy has been increasing rapidly in the past few years. The sprinkler irrigation industry has been redesigning equipment so that sprinkler systems can be operated efficiently at lower pressures, requiring less energy use. Alfalfa growers in Mono County expressed an interest in the use of new low pressure sprinklers on wheel roll equipment.

In July 1980, low pressure sprinklers (Rainbird® 30 WSH with 1/16" nozzle and Rainbird® 30A with 1/16" nozzle) were installed 30 feet apart on two separate 660' wheelroll lines in Hammil Valley, Mono County. Three can catchment tests were made on July 15, 1980 to evaluate the uniformity of 30 WSH (standard angle) sprinklers at 30 P.S.I. Three catchment tests were made on July 24, 1980 to evaluate the 30 A (low angle) sprinkler at 25 P.S.I. With this catchment data the coefficient of uniformity (C.U.) and extra water factor (E.W.F.) were calculated for each test comparing 50 ft. and 60 ft. lateral moves.

The results in Table 1 show that the low pressure sprinklers have quite acceptable C.U. and E.W.F. values for the 50 ft. move and non-acceptable uniformity for the 60 ft. move. C.U. and E.W.F. values shown for the 30 x 50 spacing are sufficient to consider the need for shorter lateral moves when using low pressure sprinklers. The trade off in this series of tests indicates an extra sprinkler move per 40 acre field is needed.

Additional catchment tests will be conducted to compare high pressure sprinklers (standard in Hammil Valley) and other low pressure sprinklers.

-Jewell L. Meyer, Ralph Strohman, Staff Research Associate and P. Dean Smith, Cooperative Extension County Director, Mono County

See Table 1 for this article on Page 7.

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"UP TO DATE ON 208": SAN FRANCISCO BAY SHELLFISHING AND NORTH COAST ACTIVITIES

REGIONAL WATER QUALITY CONTROL BOARD ACTIVITIES

Two Regional Boards in the northern part of the state have been particularly active this last year in developing programs to manage wastewater disposal and the effects of these waters on the environment.

The San Francisco Bay Regional Board has been involved in a program to open San Francisco Bay shellfish beds for direct recreational use. The Bay has a large shellfish resource which is not considered safe to use as food because of existing or potential contamination from wastewater discharges. Also, the productive growing waters of the Bay could potentially be used to reestablish a commercial oyster industry, which would require planting and culturing activities.

Some years ago the Regional Board adopted a resolution to commit clean water grant funds to construct wastewater treatment facilities specifically needed to protect shellfishing in the Bay. The Board now feels there is a need to assess what has been accomplished in protecting shellfish

TABLE 1. Low pressure sprinkler results Hammil Valley, Mono County.

Sprinklers	Test	#/P.S.I.	60 ft. Move		50 ft. Move	
			C.U.	E.W.F.	C.U.	E.W.F.
30 WSH 3/16"	1	30	46	3.23	82	1.30
	2	30	65	1.82	78	1.40
	3	30	69	1.65	86	1.21
30A 3/16"	4	25	60	2.06	70	1.10
	5	25	58	2.18	73	1.27
	6	25	68	1.73	74	1.26

C.U. = coefficient of uniformity
E.W.F. = extra water factor

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from contamination and what more may need to be accomplished to open the Bay shellfish beds for recreational use. This new program, which was initiated by the Regional Board, involves a larger area of the Bay and includes an evaluation of the Bay's potential for commercial oyster culture and an updated assessment of shellfish resources in the Bay. The primary objective of the program over the next two years is to determine if and under what conditions Bay shellfish are safe to eat. If they are safe to eat, the Regional Board will implement a program to manage their recreational use. Also, the study will serve as a model for the recreational use of other shellfish beds in the state.

The North Coast Regional Board is in the process of amending its basin plans to improve the control of water quality throughout the north coast region. The proposed amendments include the following provisions:

- to incorporate new policy on the utilization of the "mound design" as an alternative on-site sewage disposal method. In recent years there has been active interest and research in the development of alternative means of on-site sewage disposal techniques to overcome adverse soil and groundwater conditions. One such alternative is the "mound design" by the University of Wisconsin.

- to consider addition of a water conservation element into the policy and guidelines related to individual wastewater treatment and disposal systems. It is evident that water conservation practices prolong the life of the individual wastewater disposal system.

- to amend the Action Plan for point source discharges to Humboldt Bay and Mad River as originally proposed by the Humboldt Bay Wastewater Authority Plan. The purpose of the proposed amendment is to provide wastewater treatment and disposal alternatives which are locally acceptable and in conformance with all applicable water quality control plans and other laws.

The Regional Board will be conducting public workshops and hearings, with action on the amendments anticipated in January, 1981.

- Stephen Carlson

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CURRENT LEGAL STATUS OF AGRICULTURAL BURNING GUIDELINES

Agricultural burning guidelines were last amended on October 12, 1979, and there are no plans by the Air Resources Board (ARB) to change the guidelines at this time. The legislature will convene again in January, 1981, and although a bill on agricultural burning from a legislator is always a possibility, no guideline changes are anticipated. An Assembly bill introduced in 1979 would have tightened criteria for issuing permits to burn on no-burn days. The bill also would have required the ARB to phase out burning as alternatives became feasible. The bill was killed in committee in January 1980.

Current guidelines are set by the ARB and are used by air pollution control districts. Agricultural burning guidelines can be obtained from designated agencies within each air pollution control district. These designated agencies not only issue burning permits, but also disseminate information on state laws, district rules and regulations, and other pertinent information. In the past, burning guideline revisions have not been made on a regular basis, but the designated agencies in each district should have the latest information if changes do occur.

-Richard L. Snyder

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NOAA WEATHER RADIO

The National Oceanic and Atmospheric Administration (NOAA) currently has 17 NOAA Weather Radio (NWR) stations operating in California (Table 1). These stations provide continuous broadcasts of the latest weather information, most for 24 hours a day, directly from the National Weather Service Offices. Weather messages are repeated every four to six minutes and are normally revised every one to three hours, or more frequently when necessary. This offers the agriculturalist the opportunity to keep abreast of weather developments for planning at any convenient time of the day or night.

During severe weather or natural disaster emergencies, regular programming is interrupted to provide direct warnings. These disaster warnings include: floods, severe storms, nuclear attacks, or any other natural disasters which might arise. Regular program broadcasts are tailored to meet the needs of clientele in the region of each NWR station. Stations along the coast give information which is useful for boaters, fishers, and those involved in marine activities. In agricultural areas, forecasts are tailored to meet agricultural needs, e.g., freeze warnings and livestock alerts. Because NWR stations were designed to offer a service to the public, suggestions for additional agricultural forecasting needs should be brought to their attention. This can be done by writing directly to NOAA or by con-

tacting the Cooperative Extension Biometeorologist. Personnel in NOAA have expressed a keen interest in offering the best possible services to the public.

NWR boradcasts are made on three high-band frequencies--162.40, 162.475, or megahertz (MHz). The band frequencies for California stations are given in Table 1. These frequencies cannot be found on the average home radio although some newer models have a frequency band which will pick up the NWR frequencies.

Radios specifically built to operate on NWR frequencies are commercially available from radio and specialty shops. The price of a radio to pick up NWR broadcasts ranges from about $12 for a simple 9 volt transister radio to around $40 for a radio which has both AC and DC and has a disaster or weather alert alarm.

Broadcasts from NWR stations can usually be heard within 40 miles of the station, depending on the broadcast antenna height, topography, quality of the receiver, and the receiver antenna. A good quality receiver should be used on the fringes of the 40-mile area.

The broadcast schedule as of July, 1980, for the Sacramento NWR station is given in Table 2. This schedule is subject to change and not all stations follow the same schedule, but it serves as an example of the services available through the NWR.

Questions concerning NOAA weather radio should be addressed to:

National Weather Service (Attn: W112)
National Oceanic and Atmospheric Administration
Silver Springs, MD 20910

-Richard L. Snyder

See Tables 1 and 2 on Page 10.

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Stuart Pettygrove
Editor

TABLE 1. NOAA Weather Radio Stations in or near California.

Location	Frequency**
Bakersfield*	1
Barstow	2
Coachella*	2
Crescent City/Brookings, Oregon	1
Eureka	2
Fresno	2
Los Angeles	1
Merced	1
Monterey	2
Point Arena	2
Redding*	1
Reno, Nevada	1
Sacramento	2
San Diego	2
San Francisco	1
San Luis Obispo*	1
Santa Barbara	2

* Operates less than 24 hours a day.

** Frequency legend: 1 - 162.550 MHz
2 - 162.400 MHz
3 - 162.475 MHz

TABLE 2. Sacramento, CA, NWS Continuous VHF-FM Weather Broadcast, KEC-57, 162.4 megahertz weather updating schedule.

By time	Type of information
12:30 A.M.	Midnight weather reports; selected California stations.
3:00 A.M.	Marine forecasts (Pt. Arena-Pt. Pinos; Pt. Pinos-Pt. Conception; San Francisco, San Pablo, Suisun Bays, West Delta).
3:20 A.M.	3 A.M. weather reports from selected stations.
4:45 A.M.	California weather summary (SFO 4 A.M. release).
6:00 A.M.	Weather forecasts for: Lower Sacramento Valley; Northern Half Sierra Nevada; Northern San Joaquin Valley.
6:20 A.M.	6 A.M. weather reports from selected stations.
6:30 A.M.	Weather summary (locally prepared).
8:00 A.M.	River conditions (summary and forecasts).
8:20 A.M.	8 A.M. weather reports from selected stations.
9:00 A.M.	Marine forecasts (same as at 3 A.M.).
10:20 A.M.	10 A.M. weather reports from selected stations.
11:30 A.M.	Weather forecasts (same as at 6 A.M.).
11:35 A.M.	Weather summary (locally prepared).
12:20 P.M.	Noon weather reports from selected stations.
14:20 P.M.	2 P.M. weather reports from selected stations.
14:30 P.M.	Marine forecasts (same as at 3 A.M.).
15:30 P.M.	Weather forecasts (same as at 6 A.M.).
16:20 P.M.	4 P.M. weather reports from selected stations.
16:30 P.M.	Weather summary, locally prepared (not in frost season).
16:35 P.M.	Extended outlook, Northern and Central California (3-5 and 6-10 day).
18:20 P.M.	6 P.M. weather reports from selected stations.
19:00 P.M.	Frost bulletin and summary (Feb.-May).
21:00 P.M.	Marine forecasts (same as 3 A.M.).
21:20 P.M.	9 P.M. weather reports from selected stations.
23:00 P.M.	California weather summary (SFO 9 P.M. release).
WED	Warning Alarm Test between 11:00 and Noon.

NOTE: Update whenever: 1) forecasts amended; 2) warnings issued.

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