Evaluating and Demonstrating the Effectiveness of In-Field Nitrate Testing in Drip and Sprinkler Irrigated Vegetables

FREP Contract # 99-0756

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SUMMARY
In cooperation with Frances Brewster of the Santa Clara Valley Water District (SCVWD) a project kick-off meeting was held in late December of 1999. The meeting was held at the Live Oak High School in Morgan Hill and in attendance was Frances Brewster, Nancy Richardson (Director Santa Clara Farm Bureau), Hossein Ashktorab (Water Conservation Program Unit, SCVWD), Dr. Marc Los Huertos (Buchanan Associates), and Vera S. (Live Oak High Agricultural Program and SC Farm Bureau). Preliminary planning was developed for additional farm monitoring projects, development of cooperative evaluation program with the SCVWD's Mobile Irrigation Lab, and potential scheduling for a workshop for students at Live Oak High School. Nancy Richardson provided additional grower names as potential demonstration program cooperators.
The following summary of activities by task is based on the original proposal as a final work plan and contract are not available at this time.

Year 1 – First Quarter Project Tasks

Evaluate and Demonstrate In-field Nitrate Test in Drip and Sprinkler Irrigated Fields

Select appropriate grower fields [Jan.-Feb. 2000]

Contact was made with the following growers who will comprise the core group, providing small field pots for N fertilizer manipulations

C&E Farms, Steve Maletesa (Farm Manager), Lettuce, celery, baby leaf greens, spinach, peppers

El Camino Packing, Ralph Santos (Owner), Lettuce, peppers, sweet corn, garlic, cherries

Uesugi Farms, Joe Aiello (Owner) & Mark Humphreys (Manager), Peppers, cabbage, strawberries

Additional contact has been made with the following growers, who are interested in field monitoring of soil nitrate and plant tissue for 2000 and would like to participate in field trials in 2001.

Chiala Farms, Ian Theresi (Manager), Peppers, sweet corn

LJB Farms, Russ Bonino (Partner), Peppers, sweet corn, fava beans, tomatoes, pumpkins

The core growers will allow detailed, bi-weekly and weekly monitoring of soil nitrate with quick test and other analytical technologies. Small plots will be provided to allow N fertilizer manipulations (e.g. reductions or elimination) based on weekly in-field monitoring. Lettuce crops will be grown on drip and sprinkler irrigation. Pepper crops will be produced from seed and transplants with seed crop germinated and developed on sprinklers, then shifted to drip, while transplants will be produced entirely on buried drip. Celery transplants will be set with sprinkler, then shifted to drip. Grower cooperators producing peppers are also very interested in the potential efficacy of in-field quick petiole tests as an alternative to traditional, and often delayed, laboratory testing procedures.

Additional fields (all grower cooperators) will be monitored. This will include peppers on 40 and 60 inch beds (plastic mulch and no mulch), sweet corn (following peppers and fava beans) on drip and sprinkler irrigation. A total of up to 10 fields may be monitored with soil nitrate and, where appropriate petiole nitrate-N budgets developed.

Sample total inorganic N in plots within each field to a depth of one meter prior to crop planting. [Feb. - Mar. 2000]

At this time only two fields in lettuce (C&E and El Camino) and one pepper field have had the initial sampling. Pepper fields (transplants) are not scheduled for planting until mid-April. Field extractions are to be compared to laboratory extractions and analyses. At this time only a partial data set is available.

Table 1. Soil nitrate-N at three depths on Pacheco loam to clay loam prior to lettuce thinning (3/13/00)

Soil Depth	Rep #	Nitrate-N* ($\mu g\ g^{-1}$ dry soil)
0 – 12”	1	17
	2	13
	3	10
12 – 24	1	25
	2	28
	3	18
24 – 36	1	55
	2	41
	3	43

* Based on laboratory analysis of as-is moisture samples

Establish crops, carry out cultural practices and harvest crop[s

[Dependent on crop to November 2000]

Lettuce was planted at C&E Farms under very wet conditions on 1/27/00, while lettuce was planted (two blocks) at El Camino on 3/15 and 3/22/00. Peppers were seeded on 3/31/00 on a 15 acre block farmed by El Camino Packing. Weekly plantings of 15 acres will be made for a total of 90 acres. We will focus on detailed monitoring on this first block.

Install tensiometers [Mar. 2000]

Tensiometers have been installed (3 reps at 6, 12, and 18 inches) in drip irrigated lettuce at C&E Farms. Tensiometers will be installed at El Camino sprinkler-irrigated lettuce after thinning (approximately 4/15)

During each crop sequence sample soil and plant tissue
[Dependent on to November 2000]

Bi-weekly soil samples have been taken prior to thinning and application of sidedress N at C&E and El Camino in three lettuce fields. Bi-weekly samples will be collected from the first El Camino seed pepper block prior to first N application.

Conduct Seminars, Workshops, and Field Days

Organize kick-off workshop event with SCVWD to provide summary of project objectives, additional discussion concerning N management issues within the region [Feb. 2000]

Two workshops were offered in January and February 2000 as part of the SCVWD's annual series. The first was titled, Nutrient, Irrigation and Pesticide Management for Lettuce Growers and the second titled, Nutrient, Irrigation and Pesticide Management for Vegetable Growers (see attached fliers).

The first had a relatively small attendance while the second was very well attended. Frances Brewster had thought that a workshop targeting lettuce (largest acreage in County) would be appropriate, however in hindsight it appeared to be too specific, thus limited the potential audience at this time. The second allowed for recruitment of additional interested growers (LJB and Chiala Farms).