

EFFECTS OF FOLIAR APPLIED UREA ON % LEAF N AND FRUIT SIZE OF FRENCH PRUNE

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INTRODUCTION

Nitrogen (N) is the most important and universally applied essential element for optimum growth and production of French prunes in California. The fertilizer is annually or semi-annually applied to the soil in essentially all orchards to maximize prune production and quality.

Foliar applications of N would be a more effective and efficient method of applying N to prune orchards because: 1) Soil applied N is usually not absorbed by the tree immediately; the time required for absorption is dependent on N formulation applied and adequate bacterial oxidation to a usable form to be absorbed, presence and condition of transpiring leaf surface, and free soil moisture. Consequently, absorption often takes a period of several weeks following application mitigating attempts to apply this element in a timely manner; 2) N could be applied to effect a specific growth process; and 3) excess N is often applied based on anecdotal evidence that high rates maximize production and excess soil N applications have been implicated in N pollution of ground water. Currently, efficacy of foliar N applications for optimal production and quality of French prune is unknown. Here we report effects of a foliar applied urea on leaf uptake of N and effects of that application on fruit quality.

OBJECTIVE

Determine effects of foliar applied urea on leaf N, prune fruit size, and phytotoxicity.

PROCEDURE

A biuret free urea (Unocal Plus) containing 20% N (1.87 lb N per gallon) was applied at 1, 2, 3, 4, 5, and 6 gallons of product per acre at the beginning of the "stage 2" growth phase (6/3/91) to 7 year old, non N deficient French prune trees growing on Myrobalan 29c rootstock in a Foster Fine Sandy Loam soil in Tulare Ca. The urea treatments, including an untreated control, were replicated four times as single trees bordered by untreated trees configured into a randomized complete block design. Sufficient urea was mixed with 100 gallons of water and applied by handgun to each experimental tree in an amount that simulated a 400 gallon per acre spray application in each treatment.

Leaf samples were taken from each experimental tree just prior to treatment, and at 2, 7, 23, and 63 day intervals following treatment to determine extent of N uptake. At harvest,

47 fifty fruit were collected from each experimental tree, then dried, weighed, and the number of
48 fruit per lb (fruit size) calculated. Subjective observations of experimental trees were made
49 throughout the season to determine any phytotoxic effect of treatment.

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52 RESULTS AND DISCUSSION

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54 Leaf N: In this non N deficient orchard, significant increases in % dry weight of N in
55 leaves were detected with the higher urea rates at 2 and 7 day intervals following treatment.
56 N content of leaves generally declined as the season progressed and no significant differences
57 in N content remained after 23 and 63 days following treatment (see fig. 1 and table 1).
58 Higher sustained leaf levels may occur with multiple treatments and/or where deficient trees
59 are treated.

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61 Dry fruit size: Dry fruit size was not significantly effected by urea treatment.
62 However, with the exception of the untreated control and the 3 gallon per acre rate, a
63 pronounced trend toward larger sized fruit occurred as urea rate increased (see fig 2 and table
64 2). Possibly more replication in a similarly designed experiment would detect fruit size
65 benefits, if any, from foliar urea application.

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67 Phytotoxicity: No phytotoxic effect on foliage or fruit or any defoliation occurred due
68 to any experimental urea treatment.

Figure 1
**EFFECT OF FOLIAR APPLIED UREA
 ON LEAF N OF FRENCH PRUNE**
 D. Simonich, Tulare CA 1991
 Leaf n (% dry wt.)

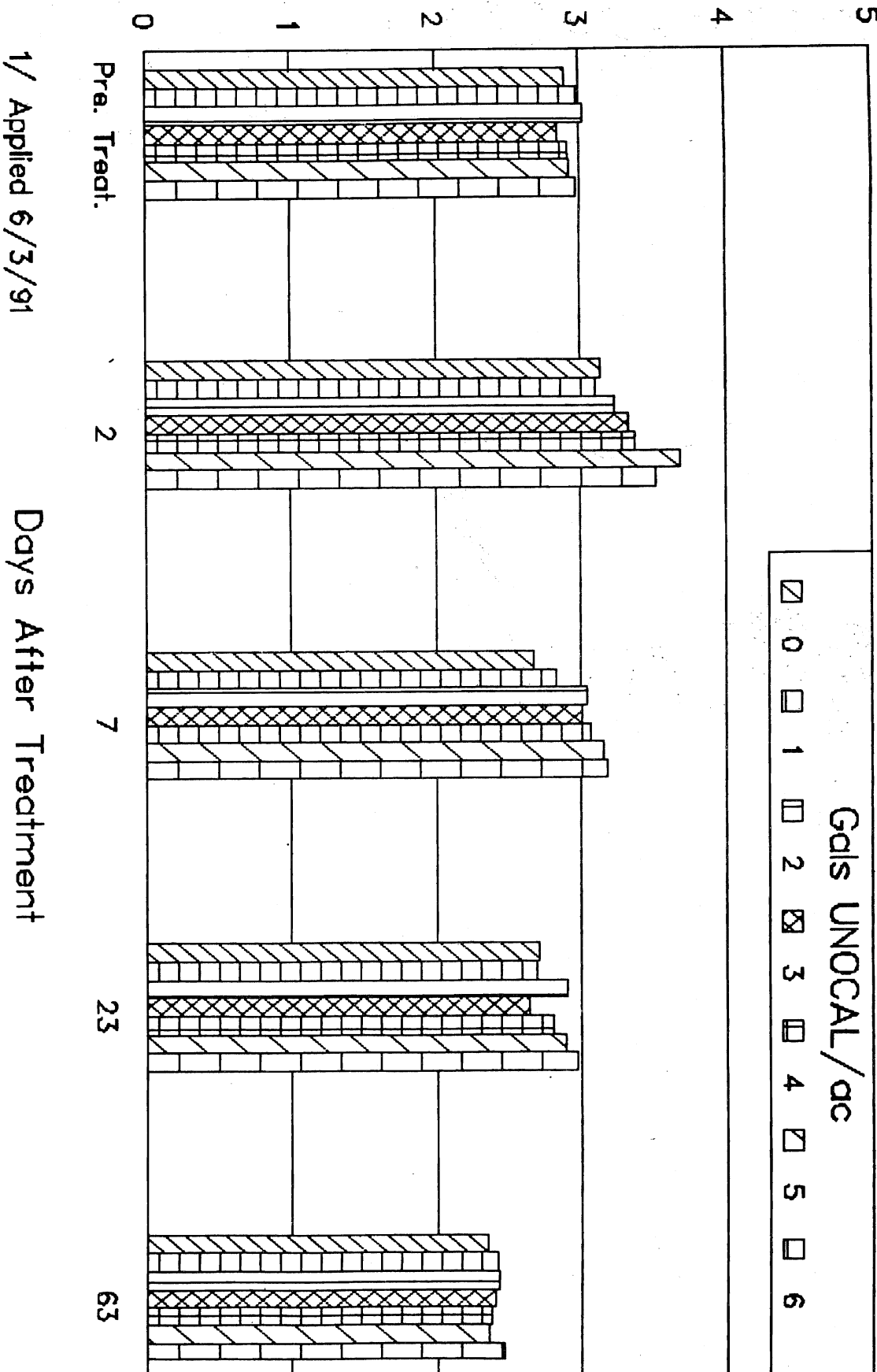


Figure 2
EFFECT OF FOLIAR APPLIED UREA
ON DRY FRUIT/LB-FRENCH PRUNE

D. Simonich, Tulare CA 1991

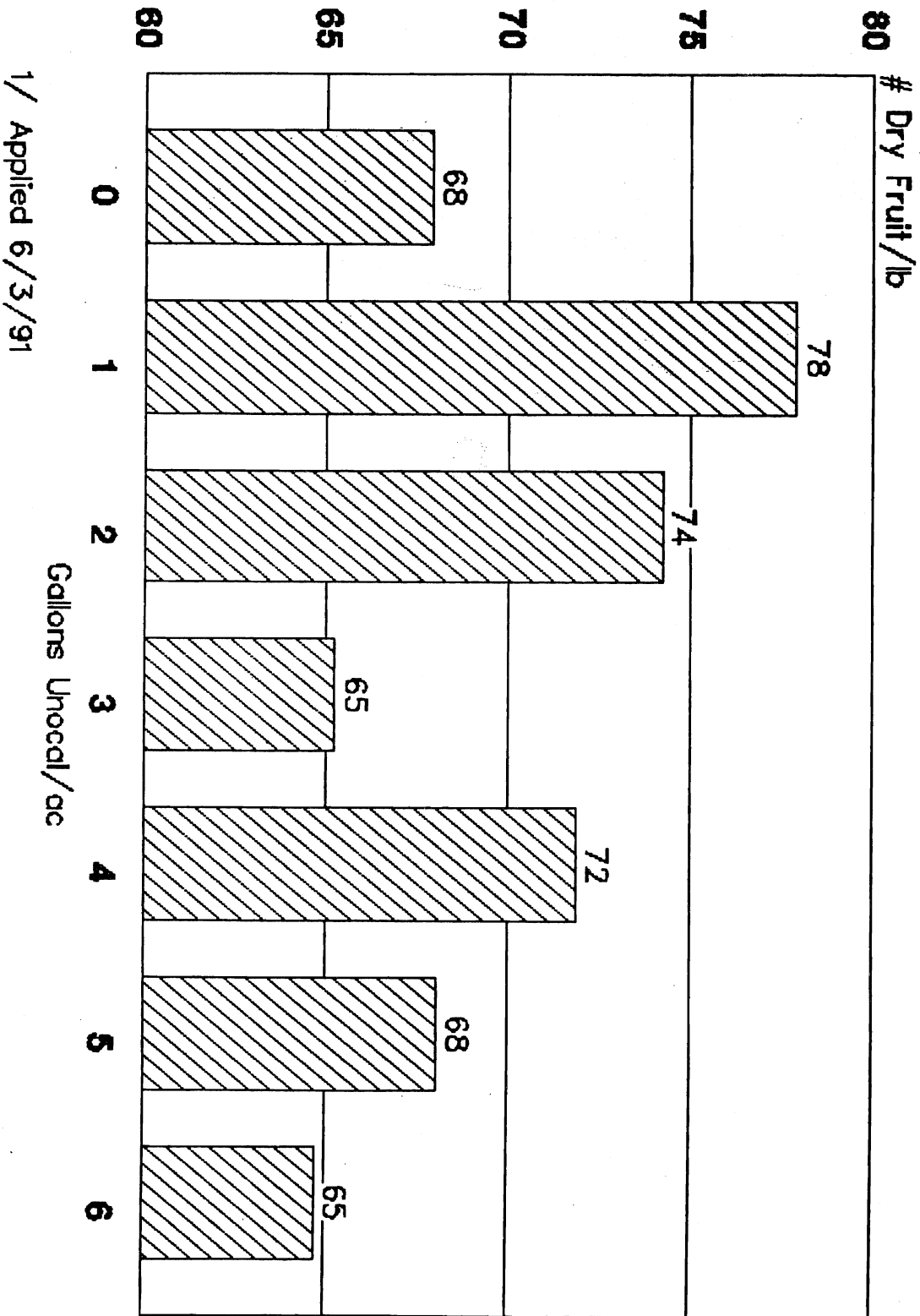


Table 1

EFFECT OF FOLIAR APPLIED UREA
ON LEAF N OF FRENCH PRUNE

D. Simonich, Tulare CA 1991

Treatment	Rep	Leaf n (% dry wt.)				
		Sample Date				
		6/3 (PT)	6/5 (2 days)	6/10 (7 days)	6/26 (23 days)	8/5 (63 days)
Control	1	2.68	2.88	2.26	2.45	2.49
	2	2.94	3.00	2.87	2.48	2.21
	3	2.99	3.27	2.73	2.84	2.23
	4	3.03	3.39	2.86	3.10	2.51
	Avg.	2.91	3.14	2.68	2.72	2.36
1 gal Unocal/ac	1	2.73	2.80	2.79	2.53	2.42
	2	2.94	3.15	2.87	2.58	2.39
	3	3.12	3.38	2.84	2.85	2.58
	4	3.17	3.07	2.86	2.80	2.31
	Avg.	2.99	3.10	2.84	2.69	2.43
2 gal Unocal/ac	1	2.88	3.04	2.90	2.78	2.55
	2	3.18	3.43	3.27	2.97	2.63
	3	2.97	3.28	2.91	2.99	2.45
	4	3.08	3.20	3.10	2.88	2.12
	Avg.	3.03	3.24	3.05	2.91	2.44
3 gal Unocal/ac	1	3.00	3.30	3.15	2.91	2.55
	2	2.83	3.26	3.09	2.43	2.33
	3	2.69	3.20	2.67	2.70	2.28
	4	2.91	3.55	3.15	2.55	2.49
	Avg.	2.86	3.33	3.02	2.65	2.41
4 gal Unocal/ac	1	2.77	3.28	2.95	2.47	2.35
	2	2.92	3.21	2.94	2.79	2.30
	3	3.07	3.56	3.14	3.00	2.36
	4	2.93	3.43	3.23	2.97	2.52
	Avg.	2.92	3.37	3.07	2.81	2.38
5 gal Unocal/ac	1	2.73	3.45	3.15	2.51	2.37
	2	2.89	3.66	3.13	2.80	2.28
	3	3.25	4.15	3.54	3.28	2.69
	4	2.87	3.47	2.82	3.00	2.14
	Avg.	2.94	3.68	3.16	2.90	2.37
6 gal Unocal/ac	1	3.03	3.47	3.14	3.00	2.26
	2	2.92	3.77	3.22	3.12	2.59
	3	3.17	3.52	3.20	3.18	2.57
	4	2.78	3.28	3.20	2.60	2.46
	Avg.	2.98	3.51	3.19	2.98	2.47

1/ Applied 6/3/91

Table 2
EFFECT OF FOLIAR APPLIED UREA
ON DRY FRUIT/LB - FRENCH PRUNE
D. Simonich, Tulare CA 1991

Treatment	# Dry Fruit/lb					AVG.
	1.0	2.0	3.0	4.0	Replication	
Control	56.5	77.2	65.8	72.1		67.9
1 gal Unocal/ac	68.4	58.5	89.0	95.8		77.9
2 gal Unocal/ac	51.6	78.8	79.4	87.3		74.3
3 gal Unocal/ac	61.4	64.5	54.3	80.8		65.3
4 gal Unocal/ac	81.4	60.7	88.0	57.5		71.9
5 gal Unocal/ac	69.6	59.9	79.6	63.1		68.1
6 gal Unocal/ac	62.0	73.0	72.1	51.9		64.8