

USE OF SUSTÂNE FERTILIZER IN A WINE GRAPE VINEYARD 1991, 1992 AND 1994

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Objective

The objective of this research project was to compare the effect of Sustâne 5-2-4 Natural Organic fertilizer and standard 7-13-20 commercial fertilizer applications on grapevine nutrition, yield, berry chemistries and pruning weights. This project was conducted over a period of three years, 1991, 1992 and 1994. The experiment took place on the CSU, Fresno campus vineyards in a block of flood irrigated Chenin blanc wine grapes.

Methodology

Each fertilizer treatment was applied (broadcast) to provide 50 lb. actual N per acre per year; 25 lb. actual N at fruit set and 25 lb. actual N after harvest. After application, the materials were disced into the soil, followed by normal irrigation. Petiole samples were taken at bloom, and petiole and leaf blade samples were taken in mid-July. Cluster samples were taken at shoot elongation. *Phylloxera* populations were monitored in mid-July. At harvest, yield and berry chemistry were collected and analyzed.

Project Duration

This study was initiated in 1991. Recognizing the importance (to the grower) of long-term changes in soil fertility and plant health, the study was originally designed to span several years. A severe infestation of *Eutypa*, which caused extremely variable yields and general yield decline, gave cause to pull out the vineyard after the 1994 harvest which terminated the project. However, this study is one of the longest investigations that compares a granulated all Natural Organic fertilizer (“*Sustâne*”) to a granulated synthetic fertilizer (“*commercial*”), applied at matching actual N levels (50 lb./ac./yr.) over a four year period.

RESULTS AND DISCUSSION

Yield

- The Sustâne yields were consistently higher than the commercial fertilizer treatment every year, although this (13%) yield increase was never (statistically) significant.
- Cluster counts for Sustâne and commercial treatments in 1994 were not significantly different. Due to disease pressure, some clusters counted from this data may have remained immature and thus were not harvested.

Berry Chemistries

- Soluble solids (percent sugar) for Sustâne and commercial treatments were not significantly different in any year.

Plant Nutrition

- Nitrogen (N) levels in petioles at bloom and mid-July did not significantly vary between the two treatments in any year. Other nutrients analyzed included phosphorus and potassium over all years and zinc, boron and manganese in 1992 and 1994. P and K increased from 1991 to 1994 and all other nutrients increased from 1992 to 1994.
- It appeared that the consistent application of fertilizer at fruit set and at post-harvest contributed to total nutritional health.
- It is interesting that there were no significant differences in plant nutrient increase when comparing Sustâne to commercial fertilizer, despite the fact that the commercial (7-13-20) at 714 lb. per acre supplied nearly five times more phosphorus and 3.6 times more potassium than did Sustâne 5-2-4 Natural Organic. See table 1.

Phylloxera, Root Damage

- Observations from sampling for *phylloxera* performed in July 1992 and 1994 showed no indication of root damage and very few *phylloxera* in either treatment, although the vineyard was known to have a population of *phylloxera*.

CONCLUSIONS

- Sustâne fertilizer performed similarly to a synthetic fertilizer that provided an equivalent amount of nitrogen per acre, and a 4.7 time and 3.6 time greater amount per acre of phosphorus and potassium respectively.
- The Sustâne yields were consistently higher than the commercial fertilizer in an organic or sustainable vineyard. Sustâne would be a good replacement fertilizer in conventional vineyards as well.
- Sustâne fertilizer would be a good replacement for commercial synthetic fertilizer in an organic or sustainable vineyard. Sustâne would be a good replacement in conventional vineyards as well.

**TABLE 1. FERTILIZER TREATMENT, APPLICATION RATES AND TIMING
SUSTÂNE/CSU FRESNO, CALIFORNIA FERTILIZER TRIAL ON WINE GRAPES**

1991, 1992 AND 1994

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Table 1

Fertilizer Treatment	Rate lb. actual per acre per year			Total lb. actual per acre 3 years			Application Timing
	N	P	K	N	P	K	
Sustâne 5-2-4 Natural Organic (1000 lb. /acre)	50	20	40	150	60	120	50 % fruit set 50 % post harvest
Commercial 7-13-20 Synthetic (714 lb. / acre)	50	93	143	150	279	429	50 % fruit set 50 % post harvest

**TABLE 2. YIELD DATA ^Z
SUSTÂNE/CSUF FERTILIZER TRIAL ON WINE GRAPES
1991, 1992 AND 1994**

Yield

- The Sustâne yields were consistently higher than the commercial fertilizer treatment every year, although this (13 % average annual) yield increase was never (statistically) significant.
- It appeared that the consistent application of fertilizer at fruit set and at post-harvest contributed to total plant nutritional health.
- It is interesting that there were no significant differences in plant nutrient increase when comparing Sustâne to commercial fertilizer, as the 7-13-20 commercial treatment at 714 lb. per acre supplied nearly five times more phosphorus and 3.6 times more potassium than did Sustâne 5-2-4 Natural Organic. See table 2.

Table 2

Fertilizer Treatment	Yield lb. Vines			Yield Tons per acre			Yield Tons per acre/year Average
	1991	1992	1994	1991	1992	1994	
Sustâne 5-2-4 Natural Organic (1000 lb. /acre)	25.36	21.98	13.70	6.57	5.69	3.55	5.27
Commercial 7-13-20 Synthetic (714 lb. / acre)	22.61	20.30	11.50	5.85	5.26	2.98	4.69
Yield difference ton/acre				0.72	0.43	0.57	0.58
% Yield diff. / treatment				12 %	8 %	19 %	13 %
Significance (at 0.95)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.

^Z Average of five replications