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Fertilizer Trials on the Fuerte Avocado - A Progress Report

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Horticultural crops, in general, show a growth and a fruiting response to plant food applications, if the element or elements applied make up deficiencies existing in the soils on which these crops are grown. The fertilizer trials on the Fuerte avocado were conducted with the idea of measuring the fruiting response in relation to applications of nitrogen and organic matter.

In the summer of 1930 four plots of ten trees each were selected in a terrace-planted grove. The trees were five years old at the beginning of the experiment and growing on a residual medium clay loam soil. Irrigation water was applied by overhead sprinklers, the average yearly application (5th to 9th years) being 16 acre inches per acre. The plots received two diskings a year, one in the spring to cut down the natural cover crop of burr clover and mustard, the other in the fall to cut under the manure and any weeds that had accumulated. The summer weed growth was cut with a scythe. All the trees were pruned uniformly once a year.

The treatment of the plots was as follows: Plot No. 1—Two pounds of nitrogen per tree per year plus ten tons of stable manure per acre. Plot No. 2— Two pounds of nitrogen per tree per year. Plot No. 3—Ten tons of stable manure per acre per year. Plot No. 4—Control. (No treatment.) Ammonium phosphate was used as the source of inorganic nitrogen, a pound of nitrogen (6.3 pounds Ammonium phosphate) being applied in February and a pound in July. A medium grade of stable manure was used as the bulky organic material and applied in the fall.

The crop was harvested in three equal picks during the heavy crop years and one pick in the light crop years. No fruit was picked until the oil content had reached the Calavo standard of 14 per cent or better.

The following table gives the average yield in fruits per tree as picked from the four plots over a five-year period. The fruit picked in 1930-31 was not included in computing the average yield, as this crop was set before the treatments started.

TABLE 1.

	1930-31	1931-32	1932-33	1933-34	1934-35	Ave. 4 Yrs.
Plot No. 1—2 lbs. N. and Manure	100	48.0	314.8	10.8	603.5	244
Plot No. 2—2 lbs. N.	144	83.6	292.4	18.7	696.6	272
Plot No. 3—10 tons Manure	52	102.0	106.5	17.3	223.0	112
Plot No. 4—No treatment	129	54.0	72.5	12.3	145.5	71

The above yield data shows the characteristic alternate bearing habit of the Fuerte

avocado. The difference in yield between the on crop years and the off crop years is very marked. Over 90 per cent of the trees had their big crops the same year, and a correspondingly small one the next year. There has been no significant influence on the alternate bearing habit of these trees in any of the plots. Plots 1 and 2 are outstanding in that the four year average production per tree is more than double that of Plot 3, and three times that of Plot 4. Plot No. 2 produced more fruit than No. 1 in all years except 1932-33.

This increase in total average production is due mainly to the difference in size and vigor of the trees at the beginning of the experiment. Plot No. 2 produced 44 per cent more fruit than Plot No. 1 in 1930-31. In 1932-33 thieves took considerable fruit from Plot No. 2. The approximate number of fruit stolen was arrived at by counting and removing the recently cut stems.

The data obtained thus far would indicate that there has been a favorable fruiting response to the application of two pounds of nitrogen (10 Ibs. ammonium sulphate or 13 Ibs. ammonium phosphate) per tree per year in addition to the bulky organic manure and cover crops. Excellent cover crops were produced on Plots 1 and 2, fair cover crops on Plot 3, and very poor cover crops on Plot 4. The tree growth and vigor has been in direct relation to the cover crops grown on these plots.

This experiment will be continued. Plots 1 and 2 will be treated as they have been. Plots 3 and 4 will receive two pounds of nitrogen per tree per year in the form of ammonium sulphate, the idea being to increase the production on these plots by the addition of nitrogen alone.

Table 2, computed on an acre basis (70 trees), shows the return after the cost of materials and application have been deducted. The returns are figured for the sake of comparisons at 6 cents, 4 cents, and 2 cents, per pound, orchard run, using 8 ounces per fruit as an average weight.

TABLE 2.

	4 Yr. Ave. prod. per acre—lbs.	Cost of fertilizer and application	Return per acre less cost of fertilizer		
			6c	4c	2c
Plot No. 1—2 lbs. N. and Manure	8540	$73.50	$438.90	$268.10	$ 97.30
Plot No. 2—2 lbs. N.	9520	46.90	524.30	333.90	143.50
Plot No. 3—10 tons Manure	3920	26.60	208.60	130.20	51.80
Plot No. 4—Control	2485	0.0	149.10	99.40	49.70

(Editors' Note): These experiments were carried on for the benefit of the industry as a whole. Mr. Weisel and Mr. Marsh deserve the appreciation of growers generally.