

INTEGRATED CONTROL OF AVOCADO DISEASES

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We started the past season with five field trials. During the year we initiated one new trial and abandoned one trial for lack of response. Therefore, we currently still have five field trials (not counting the Vanoni trial which is being reported by Dr. Menge.) These trials are in cooperation with Dr. Menge's group and the emphasis is on integrated control to achieve the maximum value from our efforts. Our goal is to maximize the impact on the pathogen while minimizing environmental effects. Three of the trials are spinoffs on our previous trial in field 30 at South Coast Field Station and are combinations of resistant rootstocks, mulch, and chemicals. In these trials we are attempting to control root rot with available and affordable materials. The fourth trial contains two rootstocks and two chemical treatments. The fifth trial is a rootstock-chemical trial without mulch in a grove infested by *Phytophthora citricola*.

Miller's, Santa Barbara County

The two trials on the Miller ranch in Santa Barbara County were initiated in 1992. One trial is on 13 year old Hass with G755 rootstock and was designed to compare different methods of application of Aliette. Treatment methods used were foliar, chemigation, trunk injection and trunk paint with 16 replicates per treatment. Four visual ratings during the last three years has shown that in this trial only the trunk injection treatment appears to be consistently better than the control although not always significantly so. Because of the poor response, likely due to light disease pressure, and because of damage to the trunks due to the injections, we are dropping this trial.

Table 1. The effect of different methods of application of Aliette on root rot evaluation of Hass avocado on G755 rootstock.

Treatment	1993 (Spring)	1993 (Fall)	1994	1995
Control	0.89	1.1	0.4	1.6
Trunk paint	0.56	0.6	0.3	1.4
Chemigation	0.53	0.4	0.4	1.3
Foliar spray	0.39	0.3	0.3	1.1
Trunk inject	0.11	0.1	0.1	0.6

Trial two at Miller's is on trees that are now 4 years old. The trees are Hass scions on G755 or Thomas rootstocks. Treatments are Aliette chemigation or stem paint. The trial is designed to test the response of the two rootstocks to the two methods of chemical application. In this trial on the G755 rootstock there appears to be a trend of better control with chemigation. We plan to keep this trial a while longer with the thought of adding mulch to all trees.

Table 2. The effect of rootstock and Aliette application method on the response to Avocado Root Rot.

Rootstock	Treatment	1993	1994	1995
G755	Control	0.5	0.7	2.0
	Chemigation	0.6	0.7	0.8
	Trunk spray	1.3	0.5	1.3
Thomas	Control	0.3	0.7	1.3
	Chemigation	0.9	1.0	1.0
	Trunk spray	0.6	0.9	1.1

Sprinkling, Ventura County

Mr. Sprinkling's property is situated in the Somis area of Ventura County. We have two trials located there consisting of resistant rootstocks, mulches and chemical treatment. The first trial was established in June 1994 and includes 3 rootstocks (Duke 7, Thomas, G2011) with 15 replications of each rootstock for each treatment. Treatments are Aliette 1 X per year, mulch, Aliette 1 X per year + mulch, and the non-treated control. Application of the chemicals is by chemigation. The mulch is derived from city yard waste with added gypsum.

Table 3. The effect of rootstock, mulch, and chemical treatment on the response of avocado to avocado root rot.

Treatment	Thomas		Rootstock G2011		Duke 7	
	Trunk diameter	Visual rating	Trunk diameter	Visual rating	Trunk diameter	Visual rating
Control	21.35 a	0.70 a	14.35 a	1.57 a	11.60 c	1.57 a
Mulch	21.79 a	0.42 a	18.82 a	0.62 b	15.38 bc	1.04 ab
Fungicide	25.04 a	0.58 a	19.25 a	0.50 b	18.52 ab	0.86 bc
Mulch + Fungicide	21.67 a	0.53 a	19.28 a	0.15 b	21.84 a	0.29 c

Means within each column followed by the same letters are not different at P=0.05 according to the Duncan-Waller k-ratio / test.

In the above trial at Sprinklings it can be seen that the response to the mulch and chemical treatments depends upon the rootstock. The Thomas rootstock appears least affected no differences between treatments in trunk diameters and visual evaluations although the fungicide treatment shows a trend to larger trunk diameters. G2011 rootstock also appears to have no differences in trunk diameters (statistically) but shows a trend with all treatments. In visual evaluations, however, all treatments are better than the control with the mulch + fungicide combination being the best. Duke 7 shows the most response to the treatments with the combination treatment being the best followed by the fungicide alone and mulch alone. It must be emphasized that these are first year data and may change with time.

Trial 2 at Sprinklings is not yet a year old. This trial has G2011, G755A, Thomas, and Duke 7 rootstocks with Hass scions. All trees received mulch. Over this is Aliette 1 x/year or no Aliette. Due to a misunderstanding with the grower the trees were planted in a number of small plots rather than one large area. This effectively reduced the number of usable replications but the overall trial is still OK.

O.T. Rivers Rootstock *Phytophthora citricola* trial. San Diego County

This trial is a combination rootstock-chemical trial that was established in July, 1992 in an area infested with *Phytophthora citricola*. The trial utilizes Hass grafted to seedling, G755, Duke 7, and Thomas rootstocks with or without Aliette trunk spray treatment. Data collected are visual evaluations and a cumulative trunk diameter increase (1995 reading minus the 1993 reading). Although due to variability there are no significant differences between rootstocks or treatments the seedlings appear to be growing better. This is a validation of the absence of *P. cinnamomi* in the area. *Phytophthora citricola* does not appear to be affecting the growth of the trees at this time and no cankers have been detected.

Table 4. The effect of rootstock and chemical treatment on the growth of avocado in soil infested with the fungus *Phytophthora citricola*

Rootstock	Visual Evaluation		Diameter Increase	
	Control	Aliette	Control	Aliette
Seedling	1.4	1.1	37.9	38.2
G755	1.6	1.5	28.8	28.7
Duke 7	2.0	1.8	29.0	32.1
Thomas	0.8	1.5	32.2	28.9

Vanoni Trial

The Vanoni Trial in Ventura County is another cooperative trial with Dr. Menge. It is a rootstock, mulch, and fungicide trial being managed by Jim Downer, Dr. Menge's graduate student and the results are being reported by Dr. Menge.

SUMMARY

We currently have five trials in operation. Two of these trials are in Santa Barbara County, two in Ventura County and one in San Diego County. All of the trials are receiving chemical treatment. Two trials are mulched. Four of the trials are for *Phytophthora cinnamomi* and one is for *P. citricola*. While we get some response in root rot areas with chemicals alone or mulches alone our best response is still with the combination of mulch and a once a year chemical application. We must be doing something right because some of the farm advisors tell me that mulch is becoming hard to get because it is being used by farmers.