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Integrated Control of Avocado Diseases

Howard D. Ohr
Plant Pathology-Cooperative Extension Specialist

Cooperating Personnel: N. Greek., S. Campbell, B. Faber, G. Bender, J. A. Menge

We started the past season with five field trials and, for various reasons, wound up with two. The two existing trials are at Sprinklings in Ventura County. One of the trials at Miller's in Santa Barbara County was discontinued because injected trees were dying. The smaller trial there was, due to a lack of communication, not treated on schedule and will be evaluated to determine if it is salvageable. The trial at River's in San Diego County was compromised due to poor growing practices. 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. The two Sprinkling 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.

Sprinkling, Ventura County (Trial 1)

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 1. The effect of rootstock, mulch, and chemical treatment on the visual rating of avocados growing in soil infested by avocado root rot.

	Rootstock					
	Thomas		G2011		Duke 7	
	Visual rating		Visual rating		Visual rating	
Treatment	1996	1997	1996	1997	1996	1997
Control	0.70	0.6	1.57 a	1.7	1.57 a	1.3
Mulch	0.42	0.1	0.62 b	1.3	1.04 ab	0.6
Fungicide	0.58	0.5	0.50 b	0.8	0.86 bc	1.3
Mulch + Fungicide	0.53	0.7	0.15 b	0.6	0.29 c	0.5

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

Table 2. The effect of mulch and Aliette treatments on trunk diameter increase of three avocado rootstocks from 1994 to 1997

Treatment	Increase (mm)
Thomas-mulch	44.4 a
Thomas-Aliette	40.2 ab
Thomas-mulch-Aliette	38.8 ab
Thomas control	38.8 ab
G2011-mulch-Aliette	38.4 abc
Duke 7-mulch-Aliette	36.3 abc
G2011-Aliette	35.7 abc
G2011-mulch	31.4 bc
Duke 7-mulch	30.1 bc
Duke 7-Aliette	28.4 bc
G2011 control	26.0 cd
Duke 7 control	22.2 d

Means within each column followed by the same letters are not different at P=<0.05 according to the Newman-Keuls 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 (Table 2) and visual evaluations (Table 1) although their appears to be a treatment effect. G2011 and Duke 7 are both affected by treatment with the mulch-Aliette combination being the most effective for both rootstocks. In visual evaluations there are no statistical differences for this year and few differences from 1996. It must be noted that in Table 1 above the differences within each rootstock are evaluated. In tables comparing all rootstocks and treatments differences between rootstocks are evaluated and the rankings will change and differences will appear.

Trial 2 at Sprinklings is now about two years old. This trial has G2011, G755A, Thomas, and Duke 7 rootstocks with Hass scions. All trees received mulch. Overlaying this are combinations of Aliette and gypsum. 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 and numbers of trees in any one treatment but the trial is still valuable.

Table 3. The effect of combinations of Aliette and gypsum on trunk diameter increase of four mulched avocado rootstocks

Treatment	Increase (mm)
G755-Aliette	30.2
Thomas-gypsum-Aliette	29.9
G2011-Aliette	29.6
Thomas-Aliette	25.4
Thomas-gypsum	24.9
Thomas control	23.1
G2011-Aliette-gypsum	22.3
G2011 control	22.0
G755-Aliette-gypsum	21.5
G755 control	21.4
G755-gypsum	19.4
G2011-gypsum	17.4
Duke 7-Aliette	15.5
Duke 7-Aliette-gypsum	14.6
Duke 7 control	11.8
Duke 7-gypsum	10.6

Statistics not yet available on these data

Table 4. The effect of combinations of Aliette and gypsum on four mulched avocado rootstocks (Visual rating)

Treatment	Visual rating
G755 control	1.5
G755-Aliette	0.5
G755-gypsum	1.5
G755-Aliette-gypsum	1.9
Thomas control	1.1
Thomas-Aliette	0.6
Thomas-gypsum	0.7
Thomas-Aliette-gypsum	0.3
Duke 7 control	1.4
Duke 7-Aliette	1.6
Duke 7-gypsum	1.8
Duke 7-Aliette-gypsum	1.8
G2011 control	0.9
G2011-Aliette	0.3
G2011-gypsum	1.8
G2011-Aliette-gypsum	0.4

Statistics not yet available on these data

In this second trial, while we do not yet have statistical analyses of the data, there are still differences between rootstocks and treatments. In Table 3 Thomas appears to be the best rootstock with G2011 and G755 in the middle and Duke 7 last. With treatments Aliette appears to be best with Aliette-gypsum combinations and some gypsum next. The rootstock variety appears to have the most effect on the tree with amendments adding to that performance.

Summary

Although we have lost several trials, the two trials in Ventura County are confirming the data from Field 30 at South Coast Field Station. Avocado root stocks benefit from the application of mulches and chemical treatment.