Chemical Blossom Thinning of Plums
2001 CTFA Report

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Chemical thinning of plums could be particularly valuable to growers, especially in years with heavy fruit set. Some have reported spending over $1,000 per acre to hand thin their plum orchards. In 2001, we continued our research with Entry as a thinning agent in a Royal Diamond plum orchard at the Kearney Ag Center. Entry is a surfactant material currently registered for thinning of various fruit crops. We have experimented with it for many years under its original name of Armothin. Even though it is far from perfect, it is probably the most consistent chemical we have used in recent years. It is applied during bloom and basically "burns" off a certain number of the flowers.

Procedure

The orchard of Royal Diamond plums was divided into 12 blocks of 26 trees each. Three treatments with four reps each were imposed as follows: 1 -Unsprayed control; 2 -Entry at a rate of2 gallons per 100 gallons (2%) per acre applied on March 7, and again on March 12 to just the top third of the canopy; and 3 -Entry at a rate of 3 gallons per 100 gallons (3%) per acre applied on March 7. The second spray of 2% Entry was included in 2001 because a single application was ineffective in 2000. The first spray of both treatments (March 7) was applied when the trees were estimated to be about 70 to 80% full bloom. Thinning effectiveness was determined by estimating the total fruit per tree from thinning and harvest fruit counts. Hand thinning was carried out on May 11 and harvest on July 26 and 31.

From the results of the 3% spray in 2000, it was clear that some trees were thinned more effectively than others. In an attempt to find out why this occurred, 32 individual trees were tagged in 2001. The following parameters were measured for each of these trees: yield in 2000, percent open bloom at the time of Entry application in 2001, and leaf nitrogen content in July, 2001.

Results and Discussion

Thinning Effectiveness. Fruit set on the control trees was heavy in 2001, nearly double the level of 2000. A level of 2362 fruit per tree in 2001 (Table 1) was estimated, compared to1299 from the year before. At hand thinning time, the fruit load was reduced to 1008 fruit per tree. The double spray of 2% Entry reduced the initial fruit load to 1531 fruit while the 3% treatment reduced it to 1138. About one third and one half of the crop load was removed by these two treatments, respectively. Substantially less hand thinning was required in the two Entry sprayed treatments.

Table 1. The effect of Entry on thinning of Royal Diamond plums in 2001. Applications were made in 100 gals/acre at 70-80% bloom.

	Number of Fruit/Tree (% of Control)	
Treatment	Before Hand Thinning	After Hand Thinning
Unsprayed Control	2362	1008
2% Entry (2x)	1531 (65%)	1260 (125%)
3% Entry	1138 (48%)	906 (90%)

Variability from Tree to Tree. Even though the 3% Entry application reduced the average fruit load to 1138 fruit per tree, some individual trees had as few as 400 and others had over 1800 fruit. By measuring various parameters on these trees, we were able to determine the source of some of this variability. The strongest relationship was due to the leaf nitrogen content of the tree (Fig. 1). Trees with 1.9% N generally had less than 800 fruit per tree, while trees with 2.3% N had over 1200 fruit. This relationship supports observations we have made in other orchards where weaker trees (due to low N or other stresses) tend to be thinned more by a given rate of Entry than stronger trees. It also suggests a higher rate of Entry, or multiple applications may be necessary to achieve effective thinning in a healthy, vigorous orchard. This one factor accounted for about one third (R^2=.34) of the total tree-to-tree variability.

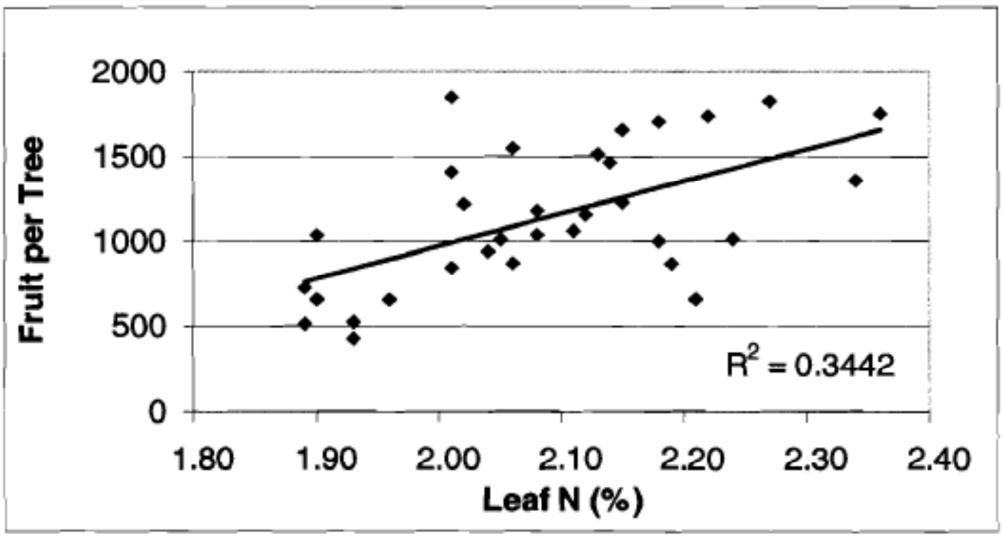

Figure1. The relationship between Royal Diamond tree nitrogen status as measured by July leaf N, and fruit load left on the trees after a bloom treatment of 3% Entry.

A second factor that accounted for some additional variability was the percent open blossoms at the time of Entry application. Some trees had less than 50% open flowers while others were closer to 90%. The trees with more open blossoms tended to have lower fruit loads (Fig. 2), suggesting the chemical thinner was more effective. Again, this agrees well with observations from other orchards -trees that are closer to full bloom tend to respond better to the Entry application. This factor accounted for another 14% of the total tree-to-tree variability (R^2=.14). Together, these two factors accounted for almost 50% of the total variability.

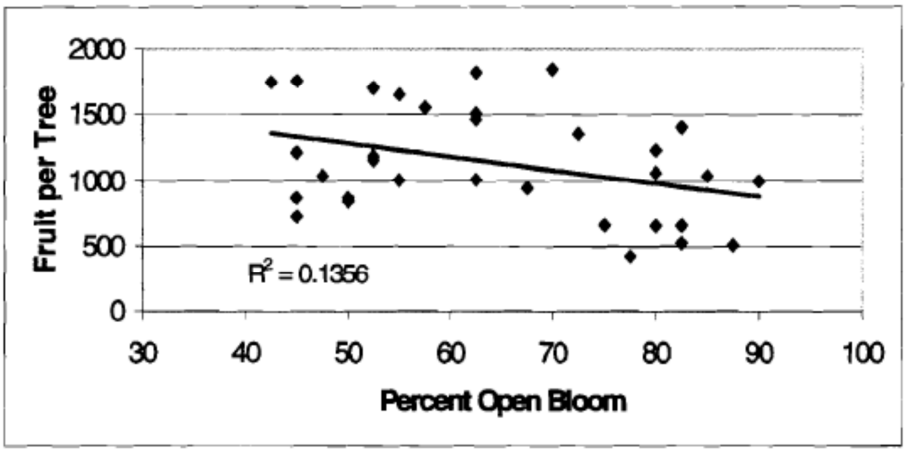

Figure 2. The relationship between percent open bloom at the time of 3% Entry application, and the fruit load left on these Royal Diamond trees by the chemical thinning treatment.

Summary

For two years in a row, a 3% Entry application at 70 to 80% full bloom has been effective at reducing the initial crop load to about 50% of unsprayed Royal Diamond plum trees. A 2% Entry treatment also appears to be effective if two applications are made. Although there is a fair amount of tree-to-tree variability, about 50% of it can be explained by two factors, the nitrogen status of the tree and the percent open flowers at the time of application. This provides some useful tools for growers who are interested in experimenting with chemical thinners in their own orchards.