CHEMICAL THINNING OF PLUMS
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Having chemical blossom thinner for plums would be particularly valuable because they can set such a large crop of fruit in some years. Growers spend large sums of money, sometimes more than $1,000 per acre, to hand thin plum orchards. Of the various chemical thinners evaluated in recent years, Armothin has been one of the most consistent on stone fruit. This material is now available commercially under the name of Entry. Preliminary studies have indicated Entry has some thinning activity on plums, but at higher rates than generally recommended by the company that distributes the product. Therefore; this study was initiated to evaluate the thinning effectiveness of Entry at the highest labeled rate on some plum varieties that tend to set heavy crops every year.

In 2000, Entry was applied in three locations: two Friar orchards and one block of Royal Diamond. The two Friar orchards were both commercial fields and in each case individual trees were treated with a backpack mist blower to simulate an airblast sprayer. Entry was applied as a 2% and a 3% solution and trees were sprayed to runoff (equivalent to about 100 gal/acre). There were eight single-tree replications of these two treatments and an unsprayed control. The Royal Diamond orchard was a field at the Kearney Agricultural Center. Blocks of 26 trees were treated with an orchard airblast sprayer using the same rates as in the Friar orchards and were replicated four times. All orchards were treated at about 80% bloom. Data was collected at the time of hand thinning to determine numbers of fruit removed and thinning times, and at harvest to measure the various components of yield and fruit size.

In both Friar orchards, there was not much of a thinning response to Entry. In the Dinuba orchard, both the 2% and 3% rates showed some reduction in fruit load but the Reedley orchard only showed nonsignificant trends (Table 1). At harvest in the Reedley orchard, there was a tendency towards larger fruit size with 3% Entry, but again the increase was not statistically significant.

The Royal Diamond orchard showed a much more substantial thinning response. The 2% rate did not thin but the 3% rate was very effective. At the time of hand thinning there were nearly 1300 fruit/tree on the untreated control. This was reduced to about 750 by the 3% Entry spray (Figure 1). In the process of hand thinning, fruit loads on the control trees were reduced to about 700 fruit/tree, so, theoretically, the 3% Entry treatment needed no hand thinning. However, fruit distribution throughout the tree was not very uniform and there was substantial fruit clumping in the tops of the trees. Therefore, minor hand thinning was required to break up these clusters. This took less than 4 minutes per tree compared to 14 minutes for the control trees so significant savings in hand thinning costs were achieved.

Table 1. The response of Friar plum trees to blossom sprays of the chemical thinner Entry.

	Concentration of Entry			Statistical
	Control	2%	3%	Significance
Dinuba Orchard				
Fruit removed by hand thinning (#/2 ft^2 on ground	52.7	31.6	39.3	N.S.
Reedley Orchard				
Original fruit load (#/tree)	1433	1533	1311	N.S.
Fruit removed by hand thinning (#/tree)	858	952	746	N.S.
Time for hand thinning (min/tree)	24.0	23.8	22.8	N.S.
Harvest				
Fruit load (#/tree)	575	581	564	N.S.
Yield (kg/tree)	68.3	70.5	71.1	N.S.
Average fruit weight (g/fruit)	118.6	123.3	126.7	N.S.

There were several problems with the chemical spray treatment that will need to be resolved in order to maximize its effectiveness. First, there tended to be over thinning in the bottom part of the tree, thus reducing overall yield. One approach to overcoming this problem might be to direct all of the spray towards the tops of the trees. Some spray will drift down onto lower flowers but it shouldn't cause over thinning. Second, there tended to be a lot of tree-to-tree variability. Some trees were thinned so heavily that their total yield was reduced to less than half of the control trees (Figure 2). It is not clear why some trees appear to be much more responsive to chemical thinning than others, but we will continue to monitor these individual trees to see if time of bloom, fruit load in the previous year or tree nutritional status can explain the differences. Finally, there was not much of a fruit size response to the thinning treatment (Figure 3). Often, when we have applied chemical thinners to peach and nectarine trees, the reduction in fruit load has stimulated an increase in fruit size. Since larger fruit are substantially more valuable, the loss in yield is often compensated by these larger fruit. However, with the Royal Diamond plums in this experiment, there was no noticeable increase in larger fruit sizes, so the loss of yield resulted in a substantial loss of profit. Perhaps other plum varieties that have a larger genetic size potential will respond better to chemical thinning treatments.

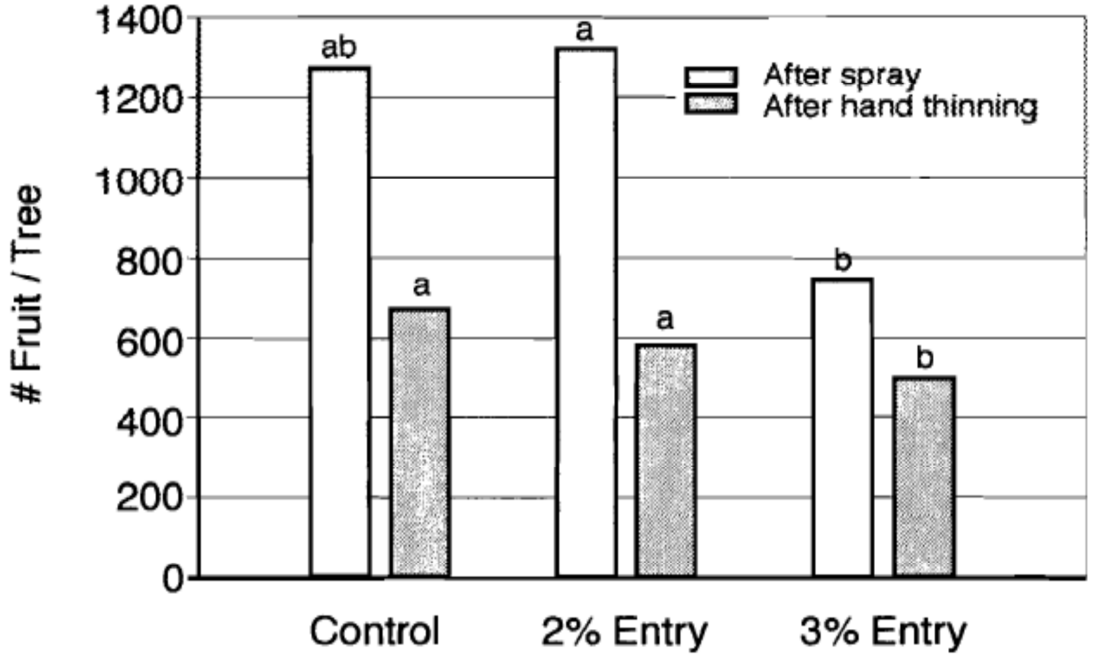

Figure 1. The response of Royal Diamond plum trees to blossom sprays of the chemical thinner Entry. Left bar indicates the fruit load after chemical spray applications but before hand thinning. Right bar indicates fruit load after hand thinning. Bars with different letters indicate significant differences by Duncan's multiple range test *(P* = 0.05).

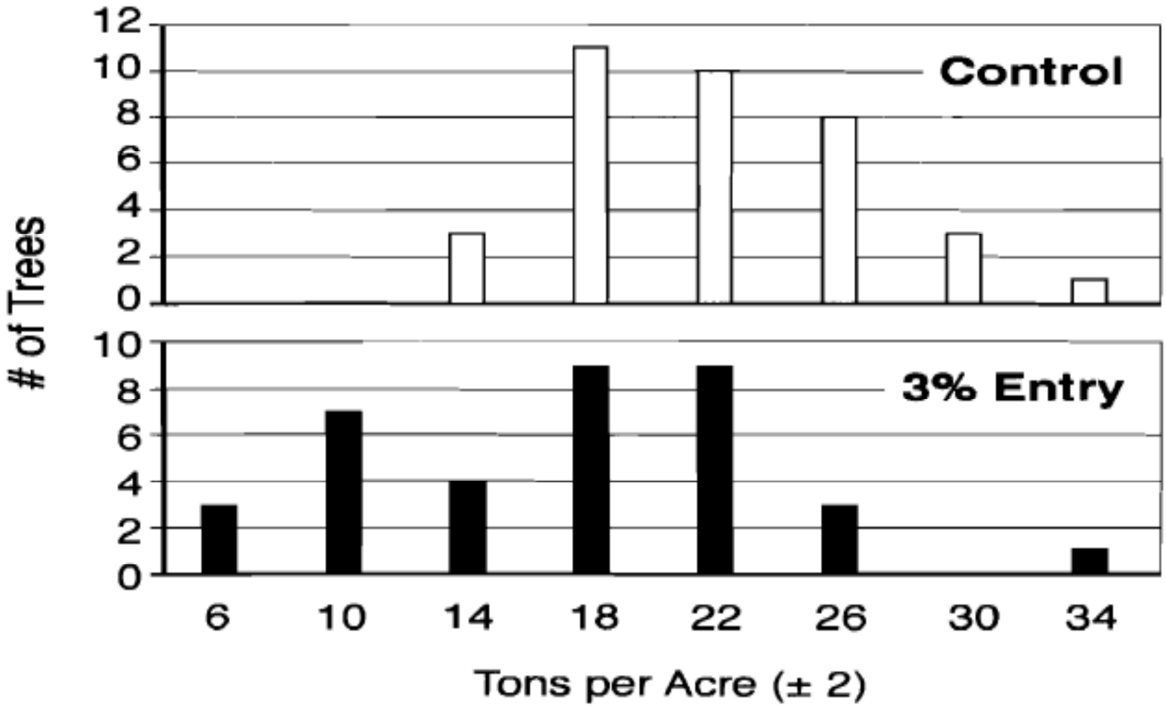

Figure 2. The distribution of individual tree yields in the unsprayed control (top) and in the 3% Entry treatment (bottom). Each treatment consisted of 36 trees.

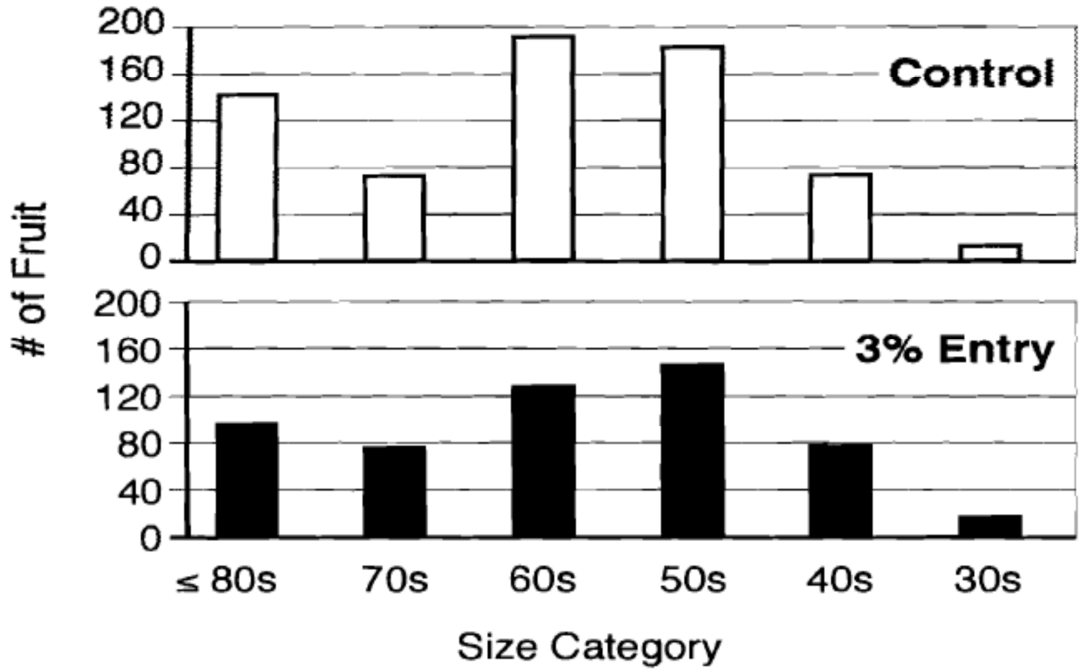

Figure 3. The distribution of fruit sizes within the control trees (top) and the 3% Entry treatment (bottom). The smallest size (80) is about 55 grams and the largest size (30) is about 140 grams.

In summary, Entry appears to have the ability to chemically thin plums but more research is needed to figure out differences among varieties and how to reduce the variability of the thinning response within the tree and among individual trees within an orchard.