II. Pome Fruits
a. Chemical control
1. Pear psylla, Bartlett pear

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To learn the effects of lowering tree height and summer suckering on pesticide deposition and pest control, a trial was initiated in 1992 in a 9′ X 14′ hedgerow planting in Kelseyville, California. Height lowering treatments were replicated 4 times in a randomized complete block to 4 row x 26 tree plots. They included: dormant topping from 14′ to 12′, post-harvest topping to 12′ and no topping. Half of each plot (4 rows x 13 trees) was summer-suckered in both 1992 (late June) and 1993 (early July).

In 1993, droplet deposition and pear psylla (PP) were measured in conjunction with two pesticide applications in May (1st cover azinphosmethyl) and July (avermectin). In addition, a final shoot sample was taken in October to evaluate PP status going into the fall.

Pesticide deposition - Samples of leaves and twigs were taken following two pesticide applications, May 20 and July 15. Samples were taken at approximately 1.2m and 3m above ground from the edges of the tree at the points closest to the "middles" between rows and in the center of the rows. Opposite sides were then combined into one sample per tree with two trees sampled per block. The two heights by two sides, designated N and W for North-South middles and East-West in-row samples respectively, were taken for each treatment. They were placed into glass jars in the field, returned to the Davis Campus and frozen until analysis. Surface area of the leaves and twigs was measured and used to convert results to a mass per total surface area basis.

The May 20 application showed statistically significant differences at the 5% level (LSD). Of the 24 treatments, 11, all from the 3m location, showed significantly higher deposits (Table 1).

TABLE 1: DROPLET DEPOSITION - (PARTIAL DATA SET) 5/20/93

Treatment	Deposit ug/cm^2
APHN	0.55 a
APHW	0.41
AYHN	0.53 a
AYHW	0.51 a
BPHN	0.56 a
BPHW	0.52 a
BYHN	0.52 a
BYHW	0.48 a
CPHN	0.62 a
CPHW	0.53 a
CYHN	0.52 a
CYHW	0.51 a

A = post harvest machine top to 12 feet
B = grower dormant prune to 14 feet
C = dormant machine top to 12 feet
P = summer suckered
Y = not summer suckered
H = sample taken from approximately 3m high
L = sample taken from approximately 1.2m high
N = North and south sides of the trees (rows ran east-west)
W = West and east sides of the trees

Treatment differences were also found when combining all four locations at each height into one sample and when combining all pruning strategies and looking at PH vs. PL vs. YH vs. YL values. At this stage of the season, with this sprayer setup, operated in this manner, a significant difference in pesticide deposit could be found across the pruning strategies.

July 15 data differed from May 20. Of all sample locations on July 15, three locations had a significantly lower deposit: AYHN, AYLN AND AYLW. All other sample differences were insignificant. No differences were found among heights or location. Thus, variation in deposition found May 20 was not found July 15.

In conclusion, there can be statistically significant variations in pesticide deposit depending on pruning strategy for a given sprayer setup and the distribution of pesticide deposits within a pear tree can change over the season as the target tree changes shape and density.

PP distribution - Only top shoot samples are reported. There was no significant difference among treatments or blocks in the pre-treatment sample (5 shoots per plot) taken May 4 (0 infested shoots per plot in all cases except one). There were also no differences either before (20 shoots) or after (5 shoots) the July avermectin spray. In October, there were no differences among topping treatments, but there were between the summer suckered (SS) plots. Because results were consistent through the entire block, data was analyzed by paired t-test (Table 2).

Table 2. PP Levels - 10/8/93

	no. PP on 20 shoots (p = .03)	**no. PP on 60 leaves (p = .04)**
SS(P)	115	17
NSS(V)	71	8

Results indicate a large late season build up of PP in August and September. Suckered trees, despite many less current-season shoots, harbored 62% more PP nymphs than non-suckered(NSS) shoots, regardless of improved droplet deposition. This increase may be due to an equal number of late season adults in each plot forced to utilize less succulent leaf surface area in the July-suckered plots. Also, plot size, though adequate for coverage tests, may have been too small to affect adult movement. Although few overall, there were also more European red mites present in the suckered plots.