PRELIMINARY DATA REGARDING THE EFFECTS OF GIRDLING FRENCH PRUNE ON FRUIT QUALITY AND TREE NUTRITION

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Introduction

Prune growers make money by producing the most dry tonnage of large sized, highest value fruit possible. Light crops are unprofitable regardless of the large valuable fruit that occur because the higher price for quality does not offset the revenue lost from poor tonnage. Excessively heavy crops are unprofitable because fruit sizes are small and value is minimal - harvest and processing costs are incurred on fresh tonnage thus the value of the dry crop must be high to offset costs.

Girdling, removal of a ring of bark during the growing season to concentrate carbohydrates above the girdle, is a technique used in other tree and vine crops to improve fruit size. Such a technique may provide utility for improving fruit size of existing French Prune crops. In 1992 we initiated a preliminary study to evaluate the potential of girdling as a technique to improve French Prune size.

Methods

The study was conducted in a heavily cropped, mature French Prune orchard in the Woodville area of Tulare County. At the ''tip hardening'' stage of seed development, April 29, 1992, we selected five typical healthy trees in the orchard. On each tree we selected three main scaffold limbs and applied one of the following treatments: Complete 3/16" girdle (i.e. a connecting ring of bark removal); a ''spiral'' 3/16" girdle (i.e. a non-connecting ring of bark removal); and a scaffold left non-girdled. Thus, on each of five experimental trees all three treatments existed. Care was taken not to girdle into the xylem tissue but to only remove bark and cambium.

On July 22, 1992 leaves from each treated limb on each experimental tree were sampled above the girdle for nutritional analyses. These were submitted to the University if California Diagnostic laboratory for analyses of N, P, K, Mg, B, Zn, Mn, and Cu.

At the time of treatment, 10 fruits were tagged and fruit diameters measured on each experimental limb. Additional fruit diameter measurements were made on the tagged fruits June 3 and July 21 to determine if fruit size was being influenced by the girdling treatments. At harvest, July 30, 1992, 100 fruits were sampled from each treated limb of each experimental tree. These were weighed, dried and reweighed to determine wet to dry ratio and the number of dried fruit per pound. An additional 10 fruit sample was taken at harvest from each treated limb on each experimental tree for soluble solids and flesh pressure determination.

Results

Seasonal increase in fruit size: Seasonal fruit size development is presented in Fig. 1. By 83 days following the girdling treatment, a 4%-5% increase in fruit diameter occurred between treated and untreated fruits.

Dry count per pound: At harvest, fruit from girdled treatments were significantly larger than those untreated (see Fig 2). Fruit from untreated treatments averaged 85.6 fruit per pound whereas fruits from spiral girdled trees averaged 69.8 fruit per pound and 75.6 fruit per pound from limbs treated with a complete girdle.

Soluble solids: Fruits from girdled treatments were significantly higher in soluble solids than those ungirdled (see Fig 3). The small difference in fresh fruit size between treatments (Fig. 1) and the large difference in dry size (Fig 2) can be accounted for due to increases in soluble solids content of treated fruit.

Tree nutrition: No significant differences existed in common nutritional elements analysed from leaves between treatments (see Table 1). Girdling did not disrupt tree nutrition in this test.

SUMMARY

These preliminary data suggest girdling can have a positive effect on dried French prune size. Additional experimental work is needed to further establish the economic effect of girdling on fruit size. In addition, the effect of annual girdling at the tip hardening stage of fruit development on yield needs to be determined. Other experiments should be designed to determine feasibility for girdling as a technique to alter fruit maturity and color.

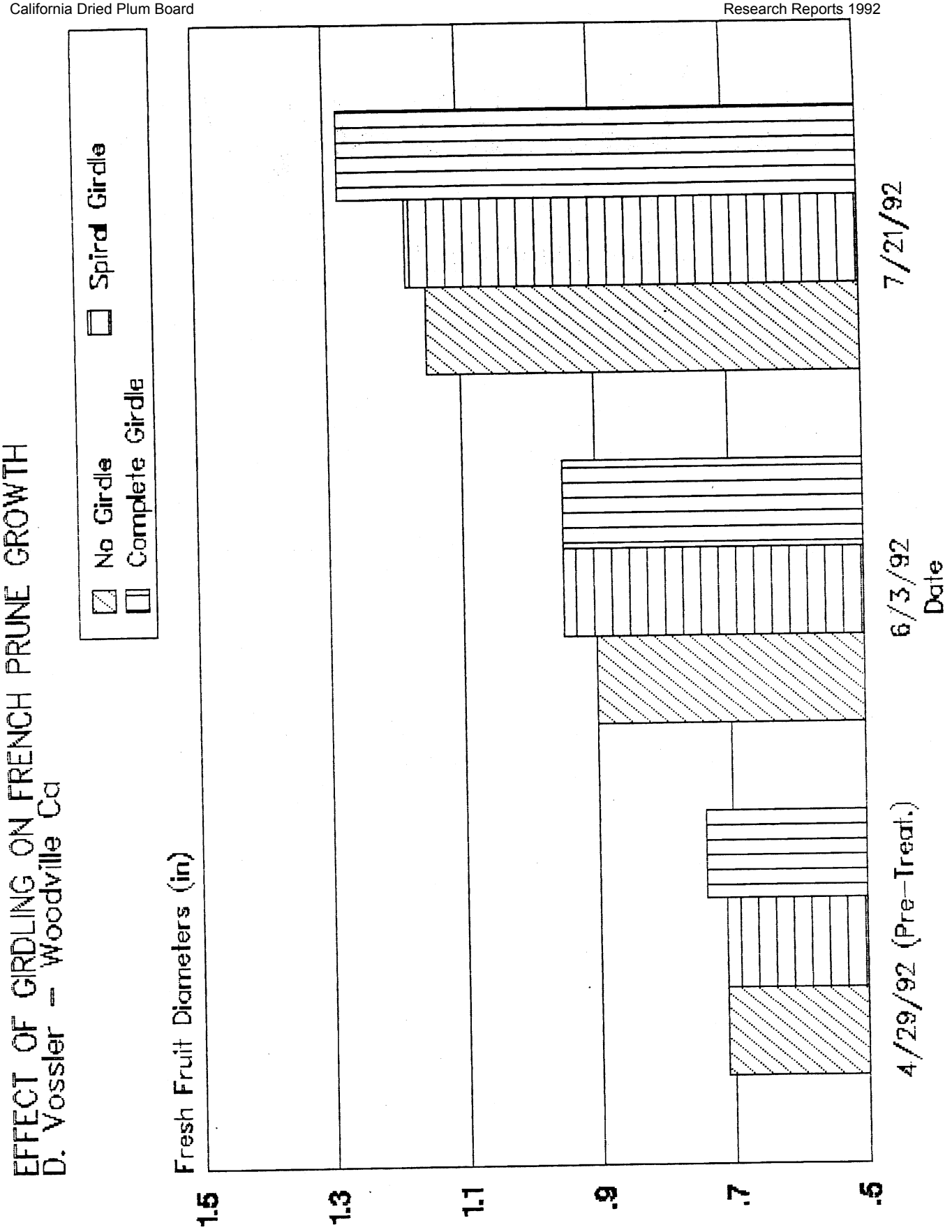
Table 1. Effect of Girdling on French Prune Tree Nutrition

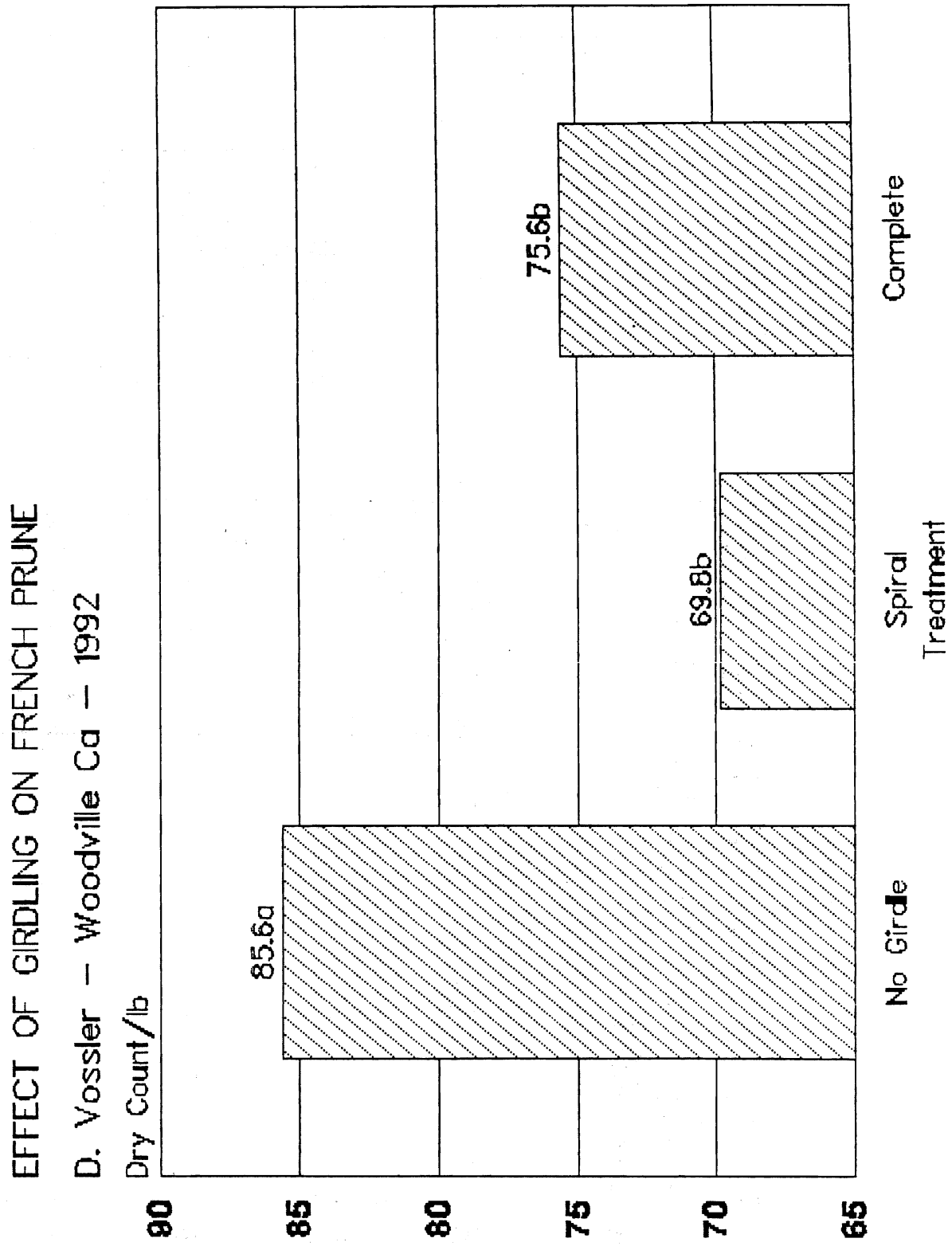
Treatment	% N (Dry Wt) Rep. 1	2	3	4	Avg.
No Girdle	2.43	2.28	2.64	2.36	2.43
Sprial Girdle	2.45	2.12	2.49	2.38	2.36
Complete Girdle	2.28	2.43	2.25	2.31	2.32

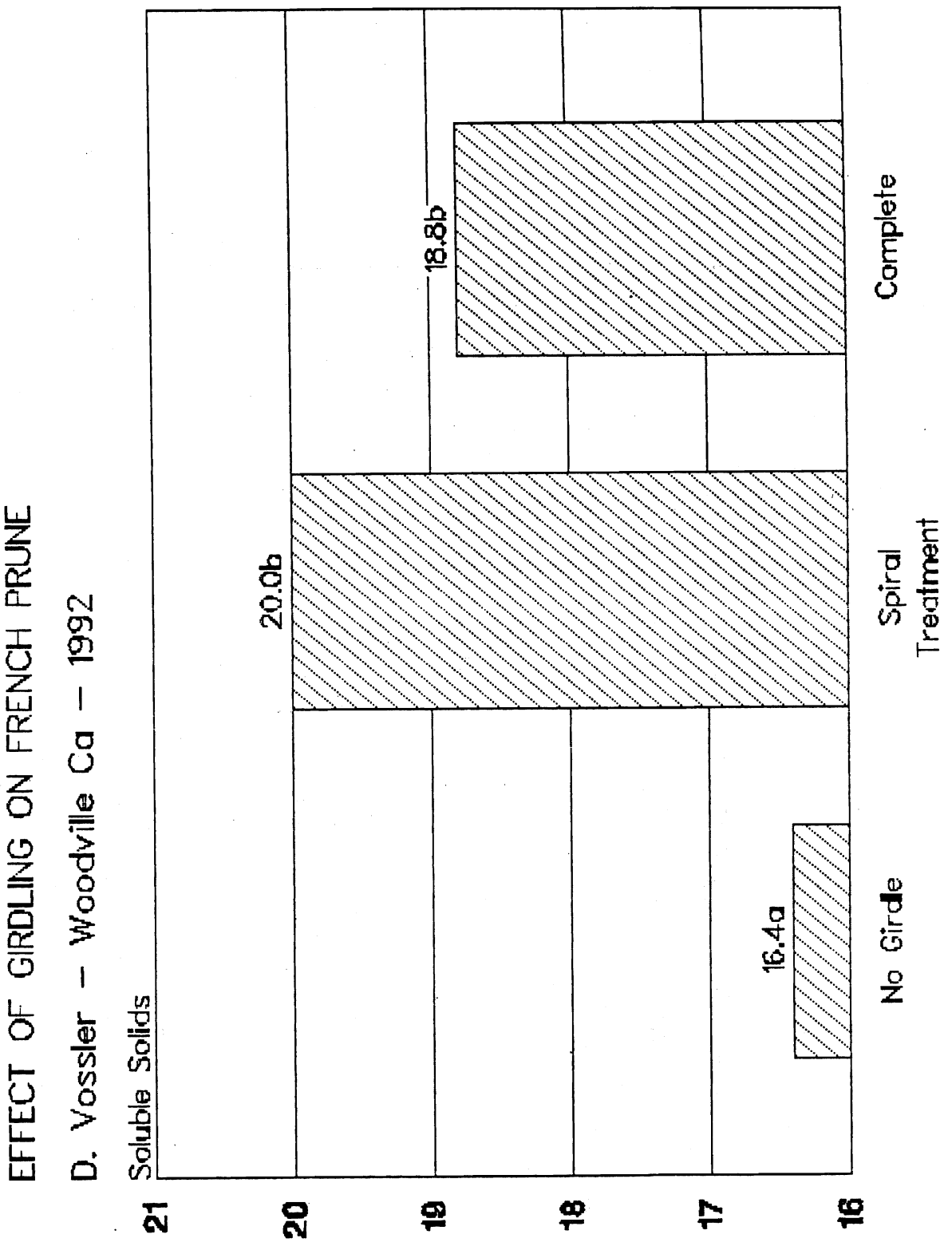
Treatment	% K (Dry Wt) Rep. 1	2	3	4	Avg.
No Girdle	2.90	2.94	3.33	3.09	3.07
Spiral Girdle	2.44	3.01	3.72	2.97	3.04
Complete Girdle	2.84	3.41	2.79	2.51	2.89

Treatment	% Zn (ppm) Rep. 1	2	3	4	Avg.
No Girdle	22	25	25	25	24
Spiral Girdle	19	39	26	28	28
Complete Girdle	21	23	23	24	23

C:SSGIRD2.TBL


EFFECT OF GIRDLING ON FRENCH PRUNE GROWTH
D. Vossler - Woodville Ca
No Girdle
Complete Girdle
Spird Girdle
Fresh Fruit Diameters (in)
1.5
1.3
1.1
.9
.7
.5
4/29/92 (Pre-Treat.)
6/3/92
7/21/92
Date


EFFECT OF GIRDLING ON FRENCH PRUNE
D. Vossler - Woodville Ca - 1992
Dry Count/lb
90
85
80
75
70
65
85.6a
69.8b
75.6b
No Girdle
Spiral
Complete
Treatment


EFFECT OF GIRDLING ON FRENCH PRUNE
D. Vossler - Woodville Ca - 1992
Soluble Solids
21
20
19
18
17
16
20.0b
18.8b
16.4a
No Girdle
Spiral
Complete
Treatment