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FROST TOLERANCE AND YIELD OF HEDGE PRUNED 'DELITE' RABBITEYE BLUEBERRIES

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INTRODUCTION

Routine pruning of blueberries is often neglected. A plant that is left unpruned will become too tall and dense for efficient production and harvest. Most of the fruit will be borne on the top and outer canopy of the bush leaving the majority of the plant unproductive. Hedging, the practice of nonselectively pruning off all canes at a given height, has been used as a method to prune mature blueberry plants. Although not the ideal pruning method, it may be one way to rejuvenate old, unthrifty plants. After a spring frost destroyed all blossoms on 6-year-old 'Delite' blueberries, plants were hedged at 4 heights. Subsequent frost tolerance, growth and yield were monitored to determine the effect of hedging height.

MATERIALS AND METHODS

A 28°F spring frost occurred 10 March 1989, destroying all blossoms on 'Delite' blueberry plants. On 26 April 1989 plants were hedged at either 9, 18 or 36 inches from ground level or left unpruned (approximately 6 feet). Four plants were hedged per treatment with 6 replications per treatment. Plants were given identical routine maintenance (fertilization and irrigation).

Frost tolerance. On 21 March 1990 a frost occurred with a minimum temperature of 28°F on 24 March. Shoots were sampled from the 36 inch hedging and the control plants. The 36 inch hedging was selected since it was the only treatment that had both new and old wood. Three wood types were collected: 1) spring-old, spring growth from old, weak wood; 2) spring-new, spring growth from 1-year-old vigorous wood or 3) fall-new, fall growth from 1-year-old vigorous wood. Two shoots per wood type were removed from each of 3 plants per rep. Buds were categorized as to stage of development and then examined for dead ovaries.

Growth and yield. Plants were harvested once weekly beginning 21 June 1990 through 19 July. Total yield and fruit quality parameters were evaluated. After the late summer growth flush, plant size was measured.

RESULTS AND DISCUSSION

Frost tolerance. Type of growth played an important role in frost tolerance. Buds on spring growth from weak wood had the highest percentage of dead ovaries at all stages of development (Table 1). Frost damage decreased as the vigor of the wood increased. Fall growth had the highest percentage of flower buds at stages 4 (individual flowers distinguishable, bud scales abscised) and 5 (flowers exposed, but not open) which were more tolerant of cold temperatures. Less than 20% of buds on fall wood were at full bloom (stage 6) or post bloom (stage 7), while spring-old wood had nearly 80% of buds in stages 6 and 7. Although equal amounts of each wood type were sampled from the plants, hedged plants were predominately spring-new and fall-new and unpruned plants were mainly weak, twiggy growth.

Growth and yield. Yield was inversely proportional to the hedging height, the more severe the treatment the greater the yield (Table 2). This correlates with the frost damage data. Hedged plants had a greater amount of new vigorous growth which was more frost tolerant. Most of the crop on the unpruned plants was destroyed by the spring frost. Pruning slightly delayed ripening (Figure 1). For all harvest dates severe hedging (9 and 18 inches) increased fruit size (Figure 2).

There was little difference in the height of hedged plants after 1-year's growth 4.5 to 5.2 feet (Table 2). The unpruned plants had an average height of nearly 7 feet. Plant efficiency or the amount of plant it takes to produce the fruit on that plant increased with the severity of hedging. Unpruned plants were the least efficient.

CONCLUSIONS

This study demonstrates a positive effect of hedging as a rejuvenation procedure. Yield data will be collected in subsequent years to determine the long term effects of hedging. When a total crop failure has occurred, it might be beneficial to severely hedge plants to encourage vigorous growth. It must be noted that these plants had been maintained for mechanical harvest and therefore had been regularly pruned and had not become completely unmanageable or unproductive. In order for this treatment to be most effective plants must be somewhat vigorous. Another advantage of hedging is frost tolerance of vigorous new growth. Further studies are to be initiated to determine if hedging can be used to reclaim abandoned, unmanageable or unproductive plantings.

Table 1. Frost damage by wood type across pruning treatments.

	% Dead Flowers				% Buds at Each Stage			
	Stage 4	Stage 5	Stage 6	Stage 7	Stage 4	Stage 5	Stage 6	Stage 7
Spring-Old	43.8	78.7 b[z]	98.4 b	99.6 b	8.8 b	11.9 b	59.9 a	20.4 a
Spring-New	24.4	54.0 b	93.6 b	99.1 b	20.8 b	23.7 ab	41.6 b	13.9 a
Fall-New	11.1	23.7 a	72.5 a	88.9 a	49.3 a	33.3 a	15.6 c	1.8 c

[z]Mean separation within columns by Duncan's Multiple Range Test.

Table 2. Effect of hedging height on blueberry yields.

Treatment	Yield (lb/bush)	Size (g/berry)	Plant Height (ft)	Vol (ft^3)	Plant Efficiency (yield/vol)
9	3.8	1.11	4.5 c[z]	16.1 c	0.061 a
18	3.2	1.23	4.6 bc	16.1 c	0.056 a
36	3.0	1.21	5.2 a	26.6 b	0.030 b
unpruned	2.5	1.08	6.9 a	55.6 a	0.012 c

[z]Mean separation within columns by Duncan's Multiple Range Test.

FIGURE 1: EFFECT OF HEDGING ON YIELD

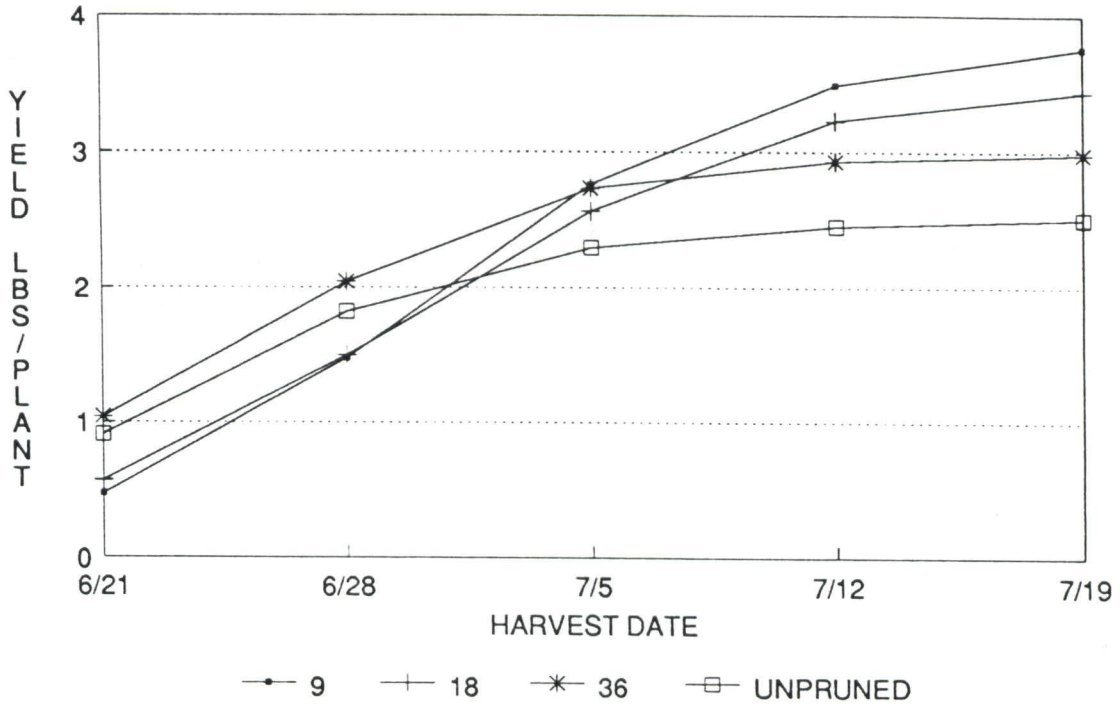

FIGURE 2: HEDGING EFFECT ON FRUIT SIZE