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Effect of time of thinning on berry size of girdled, gibberellin-treated 'Thompson Seedless' grapes

by

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Der Einfluß des Ausdünnungstermins auf die Beerengröße von geringelten, gibberellinbehandelten „Thompson Seedless“-Trauben

Zusammenfassung. — Gibberellin-behandelte „Thompson-Seedless“-Trauben wurden bei Beginn des Durchrieselns oder 1—6 Wochen danach ausgedünnt. Die Ergebnisse zeigen, daß für einen maximalen Zuwachs der Beerengröße das Ausdünnen während des Fruchtansatzes oder sobald wie möglich danach erfolgen sollte.

Introduction

In California, 'Thompson Seedless' grapes for table use are girdled at fruit-set and sprayed with gibberellin at both bloom and fruit-set to obtain loose clusters with large berries. The crop is also thinned, but no studies known to authors concern the effect of time of thinning on such vines. This report describes an experiment designed to obtain such information.

Materials and Methods

The vines used were 'Thompson Seedless' in the University of California vineyard at Davis. They were pruned to 4 canes per vine, and, except for the variable of time of cluster thinning (4), received routine vineyard care.

On May 18, 1970, when about 40% of the calyxtras had fallen, the vines were sprayed with potassium gibberellate at 15 ppm. The same vines were sprayed again on May 27, when the shatter of berries that follows bloom was just beginning. On June 2, when shatter was at its maximum and berry diameter was 5 to 6 mm, all vines were trunk girdled (2). The slow development of the clusters was a result of unusually low temperatures during May and June. Each vine was cluster thinned (4) on one of the 7 dates listed in Table 1. A block design with 1 vine per treatment, replicated 5 times, was used.

At harvest, on August 16, 1 lateral branch was taken at random from each cluster. Berries were removed and the weight of 100 obtained in duplicate. The berries were crushed, and total soluble solids were determined with a hand refractometer. Total acid in the juice was determined by diluting 10 ml of juice to 50 ml with distilled water and titrating with 0.133N NaOH, using phenolphthalein as an indicator. Results are expressed as g tartaric acid per 100 ml juice.

Results and Discussion

The weight of fruits removed during thinning generally increased with successive dates of thinning (Table 1). The beginning of stage 3 of growth is evidenced by the significant increase in weight of fruits removed in the July 7 sampling, and by the beginning of berry softening at that time.

Table 1

Fruit development and weight of fruits removed at various thinning dates*)
Entwicklung und Gewicht der zu verschiedenen Ausdünnungszeitpunkten entfernten
Beeren

Date of thinning	Stage of fruit development at time of thinning	Berry diameter at time of thinning mm	Weight of fruits removed per cane at time of thinning g
May 26	Initiation of berry shatter	3—4	79 ^a
June 2	Late berry shatter	5—6	233 ^{a,b}
June 9	Fruit-set stage	7—9	584 ^{b,c}
June 16	Mid-stage I of growth	9—10	808 ^{c,d}
June 23	Near end of stage I of growth	10—11	1664 ^e
June 30	Mid-stage 2 of growth	12—13	1655 ^e
July 7	Some berries softened, beginning of stage 3 of growth	13—14	2440 ^f

*) Within a column, data with the same superscript do not differ at the 5% level.

The heaviest berries at harvest were on vines thinned on the first 4 dates (Table 2). Thinning after June 9, fruit-set stage, resulted in a decreased response in berry weight, although reductions in weight were not statistically significant unless thinning was delayed for 2 weeks until June 23. WINKLER (5), working with non-gibberellin-treated 'Thompson Seedless', was unable to demonstrate a difference in berry size between fruits of vines thinned at the fruit-set stage and those of vines thinned 3 weeks later. In reports of work with seeded grapes, however, WINKLER (3, 4) stated that when thinning was delayed until 10 days after fruit-set, the gain in berry size was reduced one-third. He also stated that a delay of 15 days resulted in a two-thirds reduction in response, and that with further delay there was no increase in berry size at all.

The pattern of response we obtained was more like that of the non-gibberellin-treated seeded vine than that of an untreated seedless. This is not surprising, since

Table 2

Data at harvest for 'Thompson Seedless' berries cluster-thinned on various dates*)
Bei der Lese gemessene Werte von „Thompson Seedless“-Beeren aus zu verschiedenen
Zeitpunkten ausgedünnten Trauben

Dates of thinning	Av. berry weight g	Soluble solids %	Total acid tartaric/100 ml
May 26	3.32 ^{a,b}	19.5 ^{a,b}	0.90 ^a
June 2	3.49 ^a	19.9 ^{a,b}	0.85 ^a
June 9	3.34 ^a	20.3 ^{a,b}	0.84 ^a
June 16	3.10 ^{a,b,c}	20.0 ^{a,b}	0.81 ^a
June 23	2.94 ^{b,c}	20.7 ^{a,b}	0.84 ^a
June 30	2.69 ^{b,c}	20.5 ^{a,b}	0.88 ^a
July 7	2.45 ^{b,c}	21.5 ^a	0.83 ^a

*) Within a column, data with the same superscript do not differ at the 5% level.

application of gibberellin has been reported to serve as a replacement for the endogenous gibberellin normally produced in grapes in association with formation of seeds (1).

As indicated by our data, when gibberellin is used on 'Thompson Seedless' the thinning operation becomes critical. It should be done by fruit-set or as soon after as possible.

Summary

Gibberellin-treated 'Thompson Seedless' grapes were thinned at initiation of berry shatter following bloom or at 1 to 6 weeks thereafter. The results indicate that for maximum increase in berry size, thinning should be done during fruit-set or as soon after as possible.

Literature Cited

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