AGRICULTURAL EXTENSION
UNIVERSITY OF CALIFORNIA

HARRY L. ANDRIS

To: Bill Peacock, Don Luvisi,
Fred Swanson, Pete Christensen
Date: June 7, 1974

Fred

From: Frederik L. Jensen
Title: Extension Viticulturist
Re: GA on Emperors

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Enclosed is a copy of the GA write-up in the 1971 Table Grape Seminar summary. The use of GA on Emperors is in the U. C. Pest and Disease Control Program on page 15 (XI Postbloom B). One company, Merck, has a label, a copy of which is enclosed.

You may also recall that I discussed and gave you a copy of the preliminary evidence that GA produces firmer berries. It appears that GA increases the firmness about as much as ethephon decreases it. This will be investigated during this season.

As I see the development of Emeprors now, I believe tha treatment time will come in the period, June 15-20. Emperors I measured yesterday (June 6) were: 1) Delano vineyard, 8-10 mm; 2) Exeter vineyard, 7-9 mm. These ranges are those normally encountered when shatter is completed on virtually all the clusters. One week later the predominant berry size is usually 10-13 mm, and two weeks after shatter the predominant berry diameter is usually 12-15 mm.

To determine diameter, I take shoulder pieces from 25 to 30 clusters walking down the row. I measure the diameter on 3 berries on each stem piece. This is how one sample came out.

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Predominant Diameter
8-10 mm

There is usually a 3 or 4 mm spread in the predominant diameter such as 8-10, 3 mm spread, or 12-15, 4 mm spread.

While the Merck label calls only for dilute spray, growers have used concentrate with good results. Twenty ppm in 200 gallons amounts to 16 grams per acre. Do not use spray adjuvants. They do not scar the fruit but may alter the bloom appearance.

The interest in GA on Emperors this year apparently stems from the expected use of ethephon this fall. If you have any questions, please call me.

FLJ:sf

Encl.

REDUCING BERRY SHRIVEL IN EMPERORS WITH GIBBERELLIN SPRAYS

Fred Jensen, Farm Advisor, Tulare County

Fruit loss due to berry shrivel in Emperors can be greatly reduced with gibberellin sprays. Three trials have showed 50 to 70 percent fewer clusters discarded due to berry shrivel when a 20 ppm gibberellin treatment was applied in 200-250 gallons per acre between one and two weeks following the completion of shatter. This period comes about the middle of June in most years. The predominant berry size measures from 10 to 15 millimeters (about 3/8" to 9/16") during the one to two weeks after shatter period.

Berry shrivel particularly affects Emperors grown on resistant rootstock. A few vineyards have been so seriously affected as to result in their removal. More usually, the owners accept a certain loss which varies from year to year. Sometimes own-rooted vines may also be affected, especially the older vineyards.

Berry shrivel shows up in two forms. In the first and most usual form, a few berries begin to show a slight water loss in late August or early September. These berries continue to lose moisture until about half normal size. The numbers of berries involved continue to increase up until about mid-October. Typically the shriveled but colored berries are interspersed with normal berries although occasionally the tip of the cluster or shoulder may show a number of shriveled berries. The second manifestation shows up as berries which fail to color, again typically interspersed with normally colored fruit. This manifestation, called "speckling" by some growers, results in only very little water loss. Although the berries feel slightly soft. Either type of berry shrivel causes loss since clusters with more than a few affected berries are discarded as culls. Vineyards may show either the shrivel or speckling or both but tend toward either one or the other on a fairly consistent basis. The amount of loss varies greatly from year to year.

The trials with gibberellin started in 1967 with a small observation plot which unexpectedly showed that control of berry shrivel might be possible. Comprehensive trials were established in 1968 and 1969 using concentration of gibberellin of 10, 20 and 40 ppm applied from the time shatter was completed, usually about June 4, and for intervals up to eight weeks later.

The trials showed that 10 ppm was too weak and that 40 ppm, while effective, was harmful to the vine. Twenty ppm gave good reduction of berry shrivel and was tolerated by the vine.

Treatments at the time the shatter was completed were quite effective but many of the berries did not develop a normal brush so that loose berries would be found in the bottom of the box. Also in cold storage, increased bleaching was noted around the capstem. Delaying the treatment until a week after shatter avoided this problem. Treatments up to two weeks after shatter were effective. This period for treatment, between one to two weeks after shatter, normally comes about mid-June.

The gibberellin treatment will also increase berry size in many cases. Emperors have a potential of four seeds per berry. Examination of several hundred berries showed that most contain either one or two seeds. The size of the berry depends upon the number of seeds. A "shot" berry, containing no seeds, is the smallest. Each seed stimulates berry development so that four-seeded berries are the largest. However, each seed above one gives a decreasing amount of growth stimulus. A one-seeded berry is roughly twice as large as a shot berry, but a two-seeded berry isn't twice as large as a one-seeded berry.

The gibberellin increases both the size of the shot berries and the one-seeded berries. We're not too concerned with the increases in the size of the shot berries but the increase in one-seeded berries is an important factor since from 30 to 50 percent of the berries contain one seed. The one-seeded berries sprayed with gibberellin weighed about 1/2 gram more than those not treated. They are still not as large as two-seeded berries but the bunches look more uniform than those not treated with gibberellin.

The gibberellin treatments affect the growth of the vine considerably. Among the effects noted are: Larger diameter capstems, increased intranodal length, longer tendrils, smaller leaves, petioles held at an angle more acute to the cane, leaves not as dark green, yellower of basal leaves, and slightly slower bud break the following spring. The degree Balling of the fruit was not decreased nor was there any apparent decrease in color based on observation.

Gibberellin can reduce the crop the following year on many varieties of seeded grapes. The Emperor vines tolerated 20 ppm but the cluster counts the following year were reduced in some treatments with 40 ppm.

There are as yet no University of California recommendation for the use of gibberellin on Emperors nor are there any labels giving directions for its use on this variety.

The cause of berry shrivel is unknown although the condition has been recognized for many years. Also unknown is the reason that gibberellin relieves this condition. No cultural practice has every been known to relieve the symptoms of berry shrivel.

MERCK AGRICULTURAL PRODUCTS

GIBREL®

(Brand GIBBERELLIN PLANT GROWTH SUBSTANCE)

A plant growth substance that effectively regulates the growing pattern of many crops. Allows the grower to control size, offset the effects of disease, hold back harvest date, up-grade quality, and increase yield.

FOR USE ON:

GRAPES	To improve set, size, and loosen clusters
LEMONS	To control fruit maturity by delaying development of yellow color in fruit
NAVEL ORANGES	To delay aging of the rind
SOUR CHERRIES	To counteract the effect of cherry yellows virus
HOPS	To increase cone set and yield
RHUBARB	To increase yield of forced rhubarb
CELERY	To increase plant height, yields
ARTICHOKES	To accelerate maturity and shift harvest to earlier date
ITALIAN PRUNES	To increase size and firmness
ORLANDO TANGELOS	To increase fruit set and yield
SWEET CHERRIES	To produce firmer and larger fruit
SEED POTATOES	To "break dormancy" and stimulate sprouting
LETTUCE FOR SEED	To induce uniform bolting

GIBREL®

(Brand GIBBERELLIN PLANT GROWTH SUBSTANCE)

2% Liquid

Active ingredient:
Potassium gibberellate 2%*
Inert ingredients 98%
*equivalent to 54.1 g gibberellic acid per gallon

Product 35733
1 gallon
EPA Reg. No. 618-56-AA

Powder

Active ingredient:
Gibberellic acid 5%
Inert ingredients 95%

Product 35734
320 Grams
EPA Reg. No. 618-70-AA

0.5% Liquid

Active ingredient:
Potassium gibberellate 0.5%*
Inert ingredients 99.5%
*equivalent to 13.4 g gibberellic acid per gallon

Product 35732
1 gallon
EPA Reg. No. 618-55

WARNING! Keep out of reach of children.

FLAMMABLE
HARMFUL IF SWALLOWED

Keep away from heat and open flame. Keep container closed when not in use. Use with adequate ventilation. Avoid breathing vapor. Powder may cause eye irritation. If powder gets in eyes, flush thoroughly with water. Do not reuse container, destroy it.

MIXING DIRECTIONS

GIBREL FORMULATION	10 PPM		20 PPM		40 PPM	
	Amount	Water	Amount	Water	Amount	Water
2% Liquid	½ pt	100 gal	1 pt	100 gal	1 qt	100 gal
Powder	320 g	400 gal	320 g	200 gal	320 g	100 gal
0.5% Liquid	1 qt	100 gal	2 qt	100 gal	1 gal	100 gal

Add the GIBREL when the mixing tank is nearly full.
Do not use wetting or spreading agents.
Do not combine with pesticides.

DIRECTIONS FOR USE

Use only as directed. Spray thoroughly.
When a range is indicated, use the concentration recommended locally to obtain desired results. Consult Extension Service Specialists.
Caution: Contains surfactant. Do not use spray tank additives with GIBREL. Do not combine with pesticides.

GRAPES Thoroughly spray cluster area.

Pre-bloom . . . To loosen compact bunches of seeded varieties, spray when clusters average 3—4 inches in length and may range from 2—5 inches, and shoots are about 15—20 inches long.
USE 1—2½ PPM for **Tinta Madeira** and **Palomino**
USE 2½—5 PPM for **Carignane, Valdepennas,** and **Aleatico**
USE 5—10 PPM for **Zinfandel, Petite Sirah, Chenin blanc**
USE 50—75 gallons of spray per acre.

In-bloom . . . To decrease set resulting in less compact clusters, also to increase the berry size of **Thompson Seedless,** apply one spray when 30—80% of the caps have fallen.
USE 2½—20 PPM; 100—200 gallons of spray per acre.
Caution: Higher concentrations may cause shot berries.

Late-bloom . . . To improve berry size, spray **Black Corinth (Zante currant)** during the interval between 95% cap-fall and 3 days after.
USE 2½—5 PPM; 100—150 gallons of spray per acre.

After-shatter . . . To increase the berry size of seedless varieties for table use, spray within two weeks after shatter following bloom (normal girdling time). For more uniform results, use in conjunction with girdling. Use both in-bloom and after-shatter sprays to obtain the largest **Thompson Seedless** berries.
USE 20—40 PPM; 200 gallons of spray per acre.

To reduce berry shrivel of **Emperors,** apply one spray from one to two weeks after shatter following bloom when berries are about ½ inch in diameter.
USE 20 PPM; 200—250 gallons of spray per acre.

CITRUS Apply an outside coverage spray. Do not apply within one month of harvest.

Navel Oranges . . . To delay aging of the rind when the crop is to be held for late season harvest, spray in October, November or December.
USE 5—20 PPM; 500 gallons of spray per acre.
Caution: Do not spray between January 1 and August 1. Do not apply in white-wash spray. Early sprays, on occasion, may cause some non-detrimental leaf drop.

Lemons . . . To delay the development of yellow color in the fruit, spray in November or December, prior to appreciable development of yellow fruit.
USE 10 PPM; 500 gallons of spray per acre.

Tangerine Hybrids . . . To increase fruit set and yield of Tangerine Hybrids (Orlando, Robinson, and Minneola) spray during full bloom.
USE 15 PPM; 500 gallons of spray per acre.

CHERRIES Apply a coverage spray.

Sour . . . To counteract the effect of cherry yellows virus, improve vegetative growth, and increase yield, spray infected trees each year 10—14 days after bloom. Do not apply within one month of harvest.
USE 10—25 PPM; 200—300 gallons of spray per acre.

Sweet . . . To delay harvest 3—5 days and increase size and firmness, spray 14—21 days before harvest when fruit is straw colored. May reduce bloom the following year.
USE 7½—10 PPM; 500—600 gallons of spray per acre.

EARLY ITALIAN PRUNES . . . To increase size and firmness, spray 3—4 weeks before harvest. May reduce bloom the following year.
USE 50 PPM; 200—300 gallons of spray per acre.

HOPS . . . To increase cone set and yield, spray when vine growth is 5—8 feet in length, at least three weeks before flowering.
USE 7—10 PPM; 100—150 gallons of spray per acre.

RHUBARB . . . To increase yield of forced crop, apply 2 fl. oz. of 500 PPM solution to each crown within 24 hrs. after bringing into houses.

VEGETABLES Do not spray within one week of harvest.

Artichokes . . . To hasten maturity, spray in Fall before November.
USE 25 PPM; 30—50 gallons of spray per acre.

Celery . . . To increase height and yield, spray one to four weeks before harvest. Harvest as soon as mature.
USE 50 PPM; 25—50 gallons of spray per acre.

SEED CROPS and SEED POTATOES (Non-food uses).

Cucumbers . . . To develop staminate flowers on gynoecious inbred lines, spray three times at 5-day intervals beginning when the first true leaf has reached one inch in diameter.
USE 50 PPM.

Lettuce . . . To obtain uniform bolting, spray at 4- and 10-leaf stages. Do not feed crop wastes to livestock.
USE 10 PPM; 10 and 100 gallons of spray per acre for the respective applications.

Potatoes . . . To stimulate sprouting of dormant seed, DIP in 1 PPM solution.

NOTICE TO USER

Buyer assumes all risks of use and handling which are at variance in any way with the directions hereon. There are no warranties which extend beyond the description on this label.

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