

Gibberellic Acid - 15 years on.

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Today is the day of the miracle cure, quick fix, or the silver bullet. Gibberellic Acid (GA) is seen to be the answer to the cherry grower's prayers for a cure for all problems.

There is no magic formula for using GA and unfortunately, there is always a down side to a quick fix or silver bullet and GA is no different in this respect.

Try some of these problems

- Reduced crop
- Fruit that will not colour
- Increased susceptibility to rain cracking
- Inconsistent results

These are all very real and we will come back to them.

But why GA?

- Increased fruit size
- Increased yield (as a result of fruit size)
- Increased fruit firmness
- Delay in maturity
- Improved storage
- Harvest management

However, GA is not a miracle cure to problems resulting from mismanagement. GA will not make 28, 30 mm or larger fruit grow on old weak spurs. GA will not make 28, 30 mm or larger fruit grow on weak trees and it will not give increased fruit size in those shady areas on poorly pruned 6 metre high trees. Nor will GA enhance fruit firmness or storage in these conditions.

However, GA will improve fruit size, firmness, yield, and storage from trees that are in good balance, with plenty of light, good leaf to fruit ratios and with well managed nutrition and irrigation programmes.

It can not be emphasised enough that the first step in building fruit quality is having the tree right. Using GA on a tree that is under stress by way of nutritional disorders, poor wood selection or whatever will only meet with disappointment and an increased spray bill.

As export producers, the benefits of GA are enormous. Fruit size is dollars in the bank both on return per kg as well as reduced handling costs per kg. In our export markets, returns lift on average by \$2/kg for each 2 mm size increment.

Last season's average return per kg at the freight forwarder was

24 and 26 mm	\$8.00/kg
28 mm	\$10.50/kg
30 mm	\$12.50/kg
32 mm	\$15.00/kg
34 mm	\$17.00/kg

Quite an incentive to produce larger fruit.

With GA we are able to lift fruit size without sacrificing yield compared to non GA treated trees. For sure, overall we are not able to do 20 tonne/ha of 28 to 32 mm fruit but we are producing 12 to 15 tonne of 28 to 32 mm and on the returns and cost structure that NZ has we are much better off per hectare.

Fruit firmness is a key to handling and storage as well as customer satisfaction. I have vivid pictures in my mind of buyers in Taipei, biting into the fruit (the crunch test) and showing absolute delight when the cherry eats with the crunch of an apple (NZ!). And also vivid memories of their abject disappointment when the fruit has no crunch.

Soft cherries have no home in either our domestic or export markets and by soft I mean anything off crunchy. "Firm" is not good enough and in the buyers view it is no more saleable than a rain cracked cherry.

Again in our situation late is great. Our aim is the late season market. GA when applied early and at rates of 15 ppm or greater will delay maturity by 5 to 7 days. The higher the rate the greater the delay. Very useful if the late market is the objective.

A further benefit from GA is the increase in the picking window. Fruit treated with GA can in fact fool the novice user, as the cherry appears to be maturing along the same time line as untreated fruit but then stops in its tracks often described as the "GA kicking in". The fruit will then slowly develop colour and maturity and will hang quite happily maintaining fruit firmness, increasing in size and brix levels.

So how do we manage the crop with GA.?

There are a number of issues to understand to receive the best results from GA and at the same time limiting the downside.

- Timing
- Number of applications
- Crop load
- Tree vigour
- Leaf to fruit ratio
- Cultivar
- Water rate
- Rates

Timing

Most recommendations have "straw colour" as the ideal time for application of GA. Early straw it should be and from experience it is better to be too early than too late.

If the desire is to increase firmness and size and not delay harvest, later applications will provide some benefit. However the benefit will be nowhere near the level achieved from early applications but will have less impact on maturity.

Number of Applications

The question of 1 or 2 applications is debated round the international cherry community with those using 1 application being as convinced as those using 2 applications that their regime is the best.

Having played around with both, best results have been with a split application. The first treatment being at very early straw and second approximately 1 week later. If for any reason the first application is delayed a better result is obtained with 1 application rather than have both applications delayed.

If using light rates such as 10 to 15 ppm there appears to be no benefit in split applications.

When using 2 applications the target rate of 25 ppm is the cumulative rate (say 15 ppm plus 10 ppm), not 2 times the target rate (50 ppm).

Crop Load

Crop load is a key to the successful use of GA. The results with GA can be disappointing if crop load is not taken into account.

If there is a 20 kg crop on the tree the amount of GA needs to be greater than if the crop load is 10 kg per tree however the required rate is not directly proportional to crop load. Experience will determine the rates to use.

Tree Health

As noted earlier inferior tree health can not be masked by the use of GA. For optimum results the tree needs to be "happy".

Cultivar

Cultivars reflect their own peculiarities in response to GA but in general early varieties appear not to react as well as mid and late season varieties.

A major difference in varieties is in how they respond to rain. Varieties like Bing that readily crack are even more prone to cracking with GA. However Bing itself responds very well to GA therefore for the same benefit as say Lapin, a reduced rate can be used.

Trial and error will quickly establish varietal differences for each grower's particular environment.

Water Rates

GA is absorbed through the fruit and leaf tissue. It will translocate within the tree, however the movement is understood to be very limited and fruit response will only be affected by treated foliage within the spur or local area in which the fruit is growing.

It is important that leaves and fruit through out the tree are well wetted. Dilute water rates are recommended. Generally water rates of 2000 l/ha or greater are being used in mature blocks of 600 to 1000 trees/ha.

A recommended surfactant must be used with GA and it is not recommended to add any pesticides or foliar nutrients to the mix as this may affect the uptake of the GA.

GA Rates?

The million dollar question and again there is no magic formula. All the issues noted above impact on the rate that should be applied. The higher the rate of gibberellic acid the greater the effect.

From experience, although often recommended, there is little benefit with a 10 ppm rate however some are using this rate if they want some benefit in size and firmness without delaying maturity. A rate of 15 ppm is good place to start to have an across the board effect. Stretch from there to 25 to 30 ppm and gauge the response. Only move to 35 ppm if you feel you need it and when you are comfortable that there are no downside problems.

Reduced Crop

An indication of the seriousness of this problem is the current work where GA is used as a thinning agent. GA works by depressing bud initiation and consequently the following year's crop. When using GA we need to understand that high rates will lead to a crop reduction.

There are many stories as to the threshold where the thinning effect kicks in but it can be assumed that there is an incremental effect and that this is also related to variety. In some cases this may even be a plus – say Sweetheart on Gisela.

Personally I have been comfortable at levels of 30 to 35 ppm on heavy cropped trees however some growers are adamant that at these levels there is a thinning effect.

Colour

One of the reactions from using GA is that it delays the development of the red/mahogany colour of the fruit. In cases where high rates are used the fruit may not fully develop tending to have white to light purple background colour. Fruit condition, brix and other quality indices will be OK, only the fruit colour is affected.

Rain Cracking

Interestingly Lars Seske of Norway made the claim at the recent Cherry Symposium in Turkey that GA will in fact reduce the level of cracking resulting from rain.

My observation and that of many others is that this is not correct. If you want to induce rain cracking, go with some heavy rates of GA.

It appears to me that the better quality that the cherry has on the tree -that is size, firmness, and brix level, the more prone that the fruit will be to cracking and hence the problem with GA.

As much as the market does not want a cracked cherry, it does not want soft or small cherries either therefore the upside is all with GA.

Inconsistent Results

This is often a complaint from those using GA. Generally inconsistent results are from a lack of understanding of how the tree reacts to the GA application.

Trees that are unhappy, low water rates, insufficient surfactant, and low GA rates will all lead to inconsistent results.

Conclusion

I have painted the picture of GA use from 15 years experience in using the product. You will note that it is not a one step silver bullet. However use the information to step through the issues, document your experiences and develop a programme where GA becomes another tool to assist you to produce top quality product for the consumer.