Gibberellic Acid (GA)

Gibberellic Acid is a hormone that's formed by fermentation (enzyme) activity inside of the plant. This is an ongoing process inside the plant. During temperatures that favor plant growth, the formation of Gibberellic acid appears to be at its maximum. Every plant forms Gibberellic acid.

One of the major functions of Gibberellic acid is to reverse seed dormancy and cause seed germination. It does so by inhibiting the effects of ABA in the seed.

The second greatest effect of Gibberellic acid is for cell sizing. If available in moderate amounts, cell sizing is normal. If available in over abundant amounts, cell sizing can be negative. It can increase disease problems and cell structure problems, which result in poor storage and shelf life.

It appears that the major hormones that a plant must produce in order to have normal growth are Auxins and cytokinins, which are responsible for cell division. Ethylene is responsible for controlling IAA transport so all plant cells can get food from leaf cells. ABA is only necessary during times when plants are under stress and to cause cell maturity.

Gibberellic acid is more or less an artifact of the above processes. Following are my observations:

1. GA will dominate a cell only if IAA is present and less than adequate amounts.
2. GA will dominate cells if Cytokinin is not present in adequate amounts.

One can readily see that the effect of GA can be controlled if adequate amounts of Auxins and cytokinins are continually present in the plant. The presence of these two hormones will delay the activity of GA in causing rapid cell expansion. I do not believe that these two hormones inhibit the production of GA; they only inhibit the activity of GA dominance over the cell.

3. When abundant amount of nitrates are applied to a crop, they automatically inhibit IAA production in the plant. This allows GA to regain dominance over cell structure.

When temperatures are continually in the normal range of 70ºF (21ºC), or above, GA is always produced at its maximum level. Under these conditions, GA will tend to dominate the cell structure. If temperatures dip below 70ºF (21ºC), the fermentation process in order to form GA is greatly slowed down. The same is true for any fermentation process. Therefore, IAA tends to have a better chance to dominate cell structure at the expense of GA.

If the above is true, growing plants under weather conditions that have warm days and cool nights will tend to control the activity and dominance of GA in the plant cell. These weather conditions will also inhibit disease attacks on the plants.

Conversely, under Midwest growing conditions and Southern growing conditions, where the nighttime temperatures stay above 70ºF (21ºC), the fermentation of GA continues both day and night. GA will then have a more dominant effect upon how the cell sizes.

It appears to me that GA inhibitors are only necessary when the nighttime temperatures continue to stay above 70ºF (21ºC). Under climatic conditions (such as desert growing conditions) where temperatures dip down below 70ºF (21ºC) during the nighttime hours, GA inhibitors are not necessary. Plant cell sizing is more normal. Potentially yield increases will always be greater.

<u>If the above assumptions are true, the most detrimental conditions from GA will appear in areas where:</u>

A. High rates of nitrogen are used on the crop
B. Where nighttime temperatures during the growing season seldom go below 70ºF (21ºC)

Under these growing conditions, it appears that the only way that the activity of GA can be controlled is by providing abundant amounts of Auxins and Cytokinin. From a practical standpoint, these two hormones should be applied through the root system. If applied to the top of the plant, it may interfere with cell division in the roots.