

NUE Auxi-Cal

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Bio-Gro, Inc. has been making some important practical discoveries on the effect of calcium in relation to plant growth and energy partition, namely the management of calcium status and its influence on auxin transport.

First, some very general information on auxins and their role in plant growth:

Predominately produced in a newly forming leave tip.

Phototropism – Auxins are “heat sensitive” as they are translocated down the shady side of the plant, causing cell elongation and the plant to bend towards the sun.

Gravitropism – Auxins are sent to the root where an interaction with a starch granule causes the concentration of auxin towards the bottom of the root, inhibiting growth and causing the root to growth downward.

Apical Dominance – the tip of the plant grows, producing auxins and the energy flow is maintained to the apex, this causes lack of lateral growth. If the tip is pruned, lateral growth starts, even if an auxin (IAA) is supplied to the tip, lateral growth slows.

Others – Auxins suppress abscission and help leaves and fruit stay on and also helps in adventitious root formation.

There are dozens of papers and discussions available on the translocation of auxins and calcium in plants. Generally speaking, the greatest proportion of auxins is produced in the growing tips of the plant. It is thought that their downward translocation is partly due to exchanging sites with calcium. As calcium moves up, auxins move down. For example, it is known that an “auxin transport inhibitor” TIBA, blocks the movement of auxin and also stops the translocation of calcium. Plants tend to send energy (photosynthates) to the part of the plant with a high level of auxin (apical dominance).

Furthermore, auxins help with both cell division and cell expansion, whereas gibberellins tend to cause cell elongation. In tuber development an “auxin dominant” tuber growth will tend to produce shorter but blocky tubers (cell expansion), whereas a “gibberellin dominant” tuber will tend to be long and skinny (cell elongation). Gibberellin dominance tends to happen in heat stress periods or extended cloudy days with warm air temperature.

Therefore, it is of practical importance to help with the “management” of not only the supply of plant hormones, but also the translocation, partition, and balance of these important plant growth regulating compounds. Calcium is known to play an important role in this process.

At Bio-Gro, Inc., we observed that the level of calcium in certain plants (chipper potatoes, melons, tomatoes) can be increase by 2-3 times. This causes a root flush, which we attribute to the translocation of auxins downward. In chipper potatoes we have used this as a tool to get a last season flush of new roots, resulting in better vine health. However, we have not been able to copy this on certain russet varieties such as Burbank and Norkotah. Interestingly, we can not get the late season increase in sap calcium in these varieties.

Tools of the Trade

Premium 6 – In season applications of CHB Premium 6 will increase levels of nutrients, especially calcium on certain varieties.

NUE Auxi-Cal – Supplies a good form of foliar calcium and specific auxin transport facilitators. Both increased sap calcium and specific compounds can help in the translocation of auxins.

Amino 21 – Supplies root promoting compounds for newly growing root tips and calcium uptake.

NUE Cal-8 – Supplies foliar calcium plus specific photosynthesis stimulators. It also contains about 35% by weigh organic acids which help in the translocation and uptake of calcium. Drip applications of NUE Cal-8 have shown significant increases in sap calcium with Cal-Mate.

