

What's With All the Biostimulants?

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There seems to be a lot of new products in the turfgrass industry that are labeled "Biostimulant" and claim to have biostimulant properties. Why are so many companies jumping into this category with new products? Are manufacturers adding Biostimulant ingredients to their product lines because they see added benefits or because of the successful history of other Biostimulant products? Do the formulations even include any of the turfgrass hormones, which are the major properties of Biostimulant?

To answer these questions, let's review some of the University-proven facts of natural turfgrass hormones. I will also explain how the manipulation of plant hormones is used in other turfgrass products.

What is a plant hormone? It is an organic compound, synthesized in one part of the plant, and translocated to another part where, with interaction with other hormones, causes physiological responses. (2)

There are five known natural plant hormones. Three are considered to be associated with growth, Gibberellins, Auxins & Cytokinins. the other two of these are associated

with dormancy and death, Ethylene and Abscisic Acid. I will discuss only those hormones associated with growth.

Cytokinins can be considered the main hormone behind the first Biostimulant products. Researchers have found that seaweed that grew upwards of one foot per day were rich in Cytokinins. They concluded that if they could transfer this hormone to other plant life, growth would be that much healthier and consistent. that is why, to this day, some products list seaweed or seaweed extracts as a component of their product. It is very difficult to extract the hormones and the only hormone stable enough to be extracted from the seaweed is Cytokinins. Ground up seaweed is a good source of organic matter; however, sometimes salt comes with it. A popular product of this type, that was used for seed bed preparation in a sand based green, was tested for salt and came back with a salt content upwards of 8000 PPM.

Mother Nature insured that plants usually have adequate amounts of hormones under ideal conditions.

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Biostimulants--

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Researchers have found that when turf is under stress, it is the balance of these three growth hormones working together, which result in a healthier and more efficient plant. (2) Different grasses have different balances of hormones, and therefore may require different inputs of hormones at certain times of the year. By utilizing the main function of three different growth hormones and changing their ratios, we can somewhat direct growth laterally through Stolons and Rhizomes, rooting, or leaf growth. **There is a fine line of checks and balances between the hormones.**

Bluegrasses and Poa Annua are generally lower in hormonal content than other grasses. This is why over-applied TGRs can easily turn these grasses yellow, or possibly kill it while at the same time the surrounding bentgrass doesn't look affected. At this point, application of the right balance of plant hormones to the Poa Annua can be a lifesaver.

The main mode of action of the two most popular TGRs is restricting the Gibberellins natural cycle with the turfgrass.

These modes of action are:

- 1) Inhibits the production of Gibberellins.
- 2) Inhibits the movement of the Gibberellins within the turfgrass.

Either action would slow cell elongation and therefore slow leaf vertical growth to some degree.

Some of the TGRs claim to initiate root growth with the use of their products. I believe this can be true, to a point. When grass is mowed, the tips are cut, which leads to a decrease in Gibberellins

natural cycle. This action creates an unbalanced hormonal buildup in the root sections, and may initially grow more roots. At this point, cell division is happening more than cell elongation, and the grass may become thicker. This is why some TGRs may claim less disease, and Poa Annua can appear to be more durable. Add a little more TGR here and you have Poa Annua control.

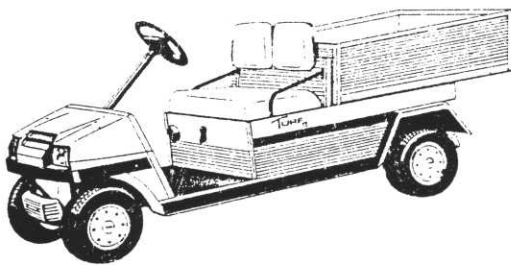
However, with the unbalance of the Gibberellins to this new growth area, there may come a point where the roots will go into a decline. (1) If disease hits at this point, the recovery can be very long. It is also at this point where, it may seem, more TGR has to be used to get the same result.

Plant hormones are similar to N.P.K. ratios because growing grass with either of them out of balance can be easy as long as the grass is not under stress. Some golfers may think that taking care of a green is like taking care of a yard. I would bet most superintendents would leave skid marks speeding out of the maintenance parking lot to change jobs, if a position opened up at a course whose turfgrass was magically not under stress. Chemicals, mechanical forces and even Mother Nature at her worst can upset the turfgrass hormonal balance in a golf green environment every-day.

Is there any one Biostimulant, or for that matter, any one product that is good for all situations? No, of course not. As those of us who utilize these products, or any other product in this industry know, any single product is only one part of a very big picture. As with turfgrass hormones, a successful turfgrass maintenance program is only as good as its complete balance.

- (1) Cornell University; Miller, Lawrence P. & Van Norstrand Reinhold
- (2) Salisbury, F.B. and C.W. Ross. Plant Physiology.

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