

# Plant Growth Stimulants

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Orchid growers are second only to marijuana growers in their search for that “magic ingredient” that will make their plants grow better. As an orchid grower for over 40 years, even though I recognize that good overall culture is truly the key to growing the best plants, I am no exception, and as someone who has worked in the chemical industry for 35 years, I am likely “programmed” to look first for that special chemical additive.

As a scientist, I like to sort out the facts from the falsehoods and lore, and there are a lot of misunderstandings about stimulant products, leading to confusion and debate about their effectiveness. Some products on the market appear to make outlandish claims, and rely on marketing and misconception to increase sales, but there are some good products out there with real benefits to the grower. However, even products based upon solid science can be rendered worthless if poorly prepared, shipped, or stored, or used improperly, and that too, leads to confusion. “The Myth of Curative Kelp” article in the last issue of this journal was, in my opinion, either based

upon outdated or incomplete information, or at a minimum, was focused on debunking the more extreme claims, while downplaying the real benefits of the use of such products.

Many of the internal biological processes of plants – just like us – are controlled by hormones. Two of the more important classes of phytohormones are auxins and cytokinins. Both play an ongoing role in plant growth. Auxins are naturally

produced at the apical meristem of a plant, that is, the “growth tip”. Those auxins flow down into the plant, where they play a variety of roles in plant growth, with the most significant to the orchid-grower being the initiation of new root tips, followed by their growth. As those root tips grow, they produce cytokinins that travel upward into the plant, inducing cell division and elongation – growth – among other aspects. That new growth, in turn, releases more auxins, and the process recycles again and again. Growth stimulants take advantage of



those processes, and by the proper application of the correct hormones, they temporarily “kick them into high gear”.

Studies have shown that the application of auxins is particularly advantageous, as the initiation of new root branching and subsequent growth better supports overall plant health. Application of cytokinins, or gibberellins, another powerful class of hormones, tends to lead to rapid top growth, often becoming “leggy” and weak, without the support of an improved root system. That is why synthetic formulations, such as Dyna-Gro™ K-L-N and SuperThrive® use synthetic auxins as their active ingredients.

Originating from living plants, natural, kelp-based products are quite variable, depending upon the species used, how they are harvested, and how the active ingredients are extracted from them. Among all kelps, as many as eight natural auxins and 16 natural cytokinins have been identified. Gibberellins are also often present, but are so unstable that they degrade rapidly no matter how the materials are handled. When selecting a kelp product, there are a number of criteria to consider to ensure the maximum effectiveness: the auxin content should be greater than that of the cytokinins, the product should be a liquid, as drying can degrade the active ingredients, and the hormones should not be extracted using any technique that employs heating, freezing, chemical digestion, or mechanical maceration of the kelp.

All phytohormone-based stimulants, whether synthetic or natural, should be fresh, and transported and stored away from heat and light. One manufacturer of synthetic stimulants advised that a fresh batch of their product, if kept refrigerated, will retain its effectiveness for about a year. If stored at room temperature, about six months, and if kept in the greenhouse, where the temperature and light levels tend to be elevated, that life-span can be as little as a few weeks.

I believe that chemical degradation is the source of much of the disagreement over the effectiveness of these stimulants. Scientifically, the application of the hormones should be effective. However, factors such as when was it manufactured, whether it was exposed to elevated temperature during transportation or storage, how long was it on the store shelf, and how long you have had that bottle and where you have kept it, can all result in an ineffective product. Fortunately, some manufacturers have taken steps to aid the consumer. Dyna-Gro, for example, now puts an expiration date on their K-L-N packages, and the liquid kelp extract, KelpMax™, utilizes a natural preservative to give the product a shelf life of well over two years at room temperature.

So if these products truly are effective, what can we expect to see from our plants? I believe my own experimentation will serve as a good example: I have several vandaceous

plants growing in slat baskets in my greenhouse here in southeastern Pennsylvania. In the spring, as temperatures warm and the sunlight increases, in addition to resumed growth of existing roots, on average I typically see those plants begin to sprout about a half-dozen new roots. Upon receiving a sample of KelpMax kelp extract, and adding it to my fertilizer solution a single time at a rate of one tablespoon per gallon (1:256), those same plants averaged more than 40 new root tips, emerging from the plant as well as branching from existing roots. The included photo shows a small portion of a *Vascostylis* root system, showing 13 emerging root tips.

Despite the negative conclusions in the “Myth” article, to me, it stands to reason that any plant that has a more extensive root system will have a greater capability to absorb water and nutrients, resulting in a healthier plant that will grow and bloom better. I prefer kelp over synthetics, as in addition to the hormones, they naturally contain a variety of other nutrient minerals, amino acids, and vitamins. While I cannot strictly attribute it to the regular application of kelp extract, since I have added it monthly to my regular feeding and watering regimen (30 ppm N MSU or K-Lite™ fertilizer in RO) all of my plants appear to be growing and blooming more reliably, and sympodial plants routinely put out multiple new growths, rather than the one-or-two I’m used to seeing. ❁

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