bp news

JULY, 1981

PUBLISHED BY: bedding plants, inc.
2043 HAMILTON RD. • P. O. BOX 286 • OKEMOS, MICH. 48864 517/349-3924

Application of Chemical Growth Regulators to Plants

"The first and foremost item to consider in applying a chemical to control plant growth is whether or not you are using the correct chemical for the job at hand. No matter how good the application methods and intentions, without the proper chemical, the desired results will not be achieved." Dr. Harold Wilkins, University of Minnesota professor of horticulture and speaker at the **Ornamentals Northwest Seminars in Portland, told the audience.**

Wilkins continued to state that once the appropriate chemical is prepared for application, "an understanding of leaf stomates is the key to getting consistent results with growth regulators."

Most growth regulators are absorbed through the stomates in the leaves. Thus, an understanding of the factors that affect stomatal absorption is vital to achieving the desired results. Even if the growth regulator is applied as a soil drench rather than a foliar spray, for uptake to occur the plant must be actively transpiring through open stomates. Factors affecting stomatal opening and absorption of the growth regulator include the following:

1) In many plants, stomates are located only on the underside of the leaf. Wilkins said, "Too often we just apply a regulator to the upper surface of the leaf." Instead, **uniform and total spray coverage of both upper and lower surfaces must be obtained.**

2) Spray the plants at the correct stage of development so as to obtain the desired result. When a person takes into account that the complete growth regulation resulting from the application will not be seen until a week to ten days after the application, it may be difficult to descern at what time in the plant's development a chemical should be applied. "This is where the "art" of horticulture becomes a factor."

3) Applications to "soft" plants are more effective than those to "hard" plants: young, nondormant plants that have had good nutrition and adequate moisture are most responsive.

4) General weather conditions that maximize stomate opening and reduce the rate at which the applied chemical might evaporate from the leaf surface prior to absorption are important. "Ideally we want the material to be on the leaf surface for as long as possible so as to enter the stomates slowly; high humidity is desirable, and the optimum temperature range is 60-65 degrees F," according to Wilkins.

5) Optimum time for application is about one to two hours after sunrise, since this is when the stomate opening is maximum. Since plants operate on a sun up to sun down clock, the grower must adjust to that; the material will not be equally effective if applied at 8 a.m. throughout the year. "Unfortunately, the time of maximum stomate aperture varies throughout the year, but is consistently one to two hours after sun up; this may not always coincide with the grower's desired work schedule."

6) The foliage should have a dry surface at time of application: if leaves are wet when the regulator is applied, the material will be immediately diluted by the excess moisture on the leaf surface.

7) However, the plant should always be turgid and under no moisture stress when the regulator is applied. The first thing a plant does when short on moisture, even before wilting is to close down the stomates.

8) Additional factors in the effectiveness of growth regulators are the type of root medium and distribution of the plant roots in the medium. The medium should be thoroughly watered; if one area is dry and another wet, this will cause nonuniform distribution of the applied material. Also, if there are five plants in the pot, make sure the soil around each is wet and that each is sprayed or drenched. The more uniformly the plants' roots are distributed in the root medium, especially in the case of drench applications, the more uniform will be the chemical uptake and results. The pH of the growing medium has also been determined to affect activity and absorption of drenched material. When using bark, the large pieces of bark can absorb the growth regulator and effectively inactivate it by binding it to the bark's surface. The pH of the medium and/or the water will also affect the effectiveness of the growth regulator; alkaline conditions reduce the regulator activity.

The size of the spray droplets, and thus the type and condition of the sprayer nozzle, is another item to keep in mind. According to Wilkins, "The typical brass nozzle will begin wearing out after only 40 hours of spraying; the holes will gradually become larger and larger." Droplets need to remain small for maximum stomatal penetration and retention on the leaf surface; smaller particles will also provide more uniform coverage of the leaf surfaces. It is also important to use wetting agents; regulators will not work if large drops form and roll off the leaf.

Wilkins stressed that "many times we are not accurate in terms of measurements made or concentrations used." He stressed the importance of being cautious, re-calculating and keeping the calculations and notations regarding plant condition, weather conditions, etc. in a notebook, or other safe place for future reference if strange plant responses occur.

Also, be aware that each cultivar may respond differently, and take these individual characteristics into consideration.

Wilkins concluded, "With proper application and proper equipment, chemical growth regulators could do much of the grower's work."