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Chemical growth retardants (8 families) block cell elongation of stems without affecting leaf formation, resulting in compact, stress-resistant plants. With many woody plants the treated plants initiate flowers earlier than typical for the species. Chemical growth retardants are one of the reasons for the house plant boom in America. They have permitted the sizing of plants to fit any space. [The *SCI*® indicates that this paper was cited 258 times in the period 1965-1977.]

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"A research project dealing with small (plants) in an age of super (plants) has become a standard cultural procedure for many growers of horticultural plants. Horticulturists in the later '50's worked on the growth-regulating effects of a chemical named gibberellin (GA), which accelerated stem elongation and early flowering, and overcame various kinds of dormancies in plants. The plants had pale-colored foliage, required elaborate staking, and aged rapidly. As a counter activity, I looked for chemicals which would make the plants into compact, dark green, and long-lived ones. The first two (nicotinium, quaternary ammonium compounds) had already been reported by J.W. Mitchell and P.C. Marth at Beltsville. The chemicals retarded the stem growth of snapbeans and chrysanthemums. From the horticultural viewpoint, this permitted us to use the very best cultivars, regardless of their natural growth habits, as compact, flowering container-grown plants.

"The house plant boom was just beginning in the US in the early 1960's and many new types of plants were needed to meet the consumer interests. Agricultural chemical companies at that time did not have screening programs to find these types of growth responses. They were looking primarily for chemicals which inhibited plant or shoot growth. I thus faced a situation where we had only two chemicals, a very limited plant response range, and no new chemicals in sight.

"During the next years, the concepts became a reality. We found eight families of chemicals (nicotiniums, quaternary ammonium carbonate derivatives synthesized from thymol or carvacrol, hydrazines, phosphoniums, substituted cholines, succinamic acids, pyrimidine-methanol, and piperidinium bromide) which produce compact growth characteristics in a wide range of plants. Only conifers were nonresponsive. Most container-grown and bedding plants are now treated to help them retain their deep green foliage color and compact growth.

"As a result of the regulation of cell division in the subapical meristems, Malus and Rhododendron plants form flower buds, and this is the basis for controlling their flowering and improved storage. Also, the intercellular spaces in the leaves were reduced in response to the chemicals; also water loss and sensitivity to air pollution decreased. This side effect has become extremely important in the '70's when urban areas are experiencing air pollution. How the chemical retardants work remains a mystery. They counteract the action, not only of gibberellin but also auxins, cytokinins, and a whole range of synthetic growth regulators.

"Many analogs have been made to test alternative metabolic pathways, giving evidence that many routes are involved in stem extension and leaf development. However they exert their effects, the plants treated with chemical growth retardants are better and last longer than those grown without them "