# GROWTH OF TWO BEGONIA SPECIES AS INFLUENCED BY HAND PINCHING AND TWO GROWTH REGULATORS

by

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B.S., Kansas State University, 1978

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A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Horticulture

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1980

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# LITERATURE REVIEW

## Dikegulac

Sodium 2,3:4,6-di-O-isopropylidene-2-keto-gulonate, is a derivative of gulose, a diastereomer of an aldohexose (21). Gulose, a six carbon aldehyde sugar, is treated with a mild oxidizing agent to form gulonic acid (12). Since the acid form is unstable, the sodium salt is used (2). This sugar derivative called dikegulac is the first synthetic growth regulant to be formed from a monosaccaride (5). Monosaccarides are important components in plant metabolism.

### Use of Dikegulac on Woody and Herbacious Ornamentals

Dikegulac, the active ingredient of the growth regulator Atrinal®, has been an effective pinching agent and growth retardant of woody and herbaceous ornamentals. Prevention of shoot elongation on several trees and shrubs for more than three months has been achieved with dikegulac (24). Foliar applications of dikegulac reduced growth in Fraxinus uhdei, Ulmus pumila, Schinus molle, Alnus rombifolia, Morus alba, Ceratonia seliqua, and Acacia longifolia (10). Growth reduction of Ulmus parvifolia was observed after trunk banding with dikegulac n-pentyl ester (10). Also dikegulac has been shown to delay bud break and induce lateral shoot production on 5 year old pecan trees (17). Inhibition of flower and fruit set of ornamentals is possible with dikegulac (2). Conversly, a single application was reported to induce parthenocarpic fruit developement in Pyrus communis 'Williams' (5). Unlike $GA_3$, dikegulac induced

parthenocarpic fruit were not deformed.

Dikegulac has growth regulatory effects on turfgrass. In the greenhouse Poa pratensis, Lolium perenne, and Festuca rubra growth rates were inhibited by dikegulac (22). However, stimulation of tillering has been observed on Poa pratensis and Lolium perenne (5).

Under commercial growing conditions dikegulac inhibited apical dominance and promoted axillary shoot production of several azalea cultivars (8). Bocion et al. (6) reported increased flower production in Gerbera jamesonii, and Cyclamen persicum and axillary shoots in Begonia X hiemalis, and Fuchia X hybrida. On branching poinsettias (Euphorbia pulcherrima), dikegulac used as a pinching agent, produced a more rounded top plant (26). Apparently, the rounded effect was a result of the terminal flower and bract not being killed and becoming the largest on the plant. Foliar sprays on Chrysanthemum X morifolium reduced fresh and dry weights, stem lengths, and were phytotoxic at 100-5000ppm concentrations (18). Dikegulac treatments also resulted in production of more uniform Ficus elastica robusta plants with an 18% increase in leaf production (11). In comparison, a 20% increase in leaf production was observed after a manual pinch.

Physiological Effects of Dikegulac on Plants

Arzee et. al. (3) investigated the physiological effects of dikegulac on plants and found inhibition of DNA synthesis in the apical meristem but not in the axillary buds. When placed on a leaf surface, it is readily translocated to the apex. Studies indicate that dikegulac is moved through the phloem tissue (5). Tissues most