Effects Of Nitrogen On Plant Growth

High Levels	Low Levels
High Chlorophyll content	Low chlorophyll content
Enhanced shoot growth	Reduced shoot growth
Reduced root growth	Enhanced root growth
Increased leaf area	Decreased leaf area
Reduced carbohydrate content	Increased carbohydrate content
Increased need for growth retardants	Decreased need for growth retardants
Decreased postharvest life	Increased postharvest life
Increased water loss	Decreased water loss

Research Update

by

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The Effects Of Kinetin, STS, and Sugar On Carnation Postharvest Life

Researchers in Poland studied the effects of a 24 hour or constant application of kinetin (a cytokinin), STS (silver thiosulfate), and/or sucrose (table sugar) through the holding solution on carnation postharvest life. Materials were applied at the following rates: kinetin (0.025 mM), STS (0.1 mM in 24 hour treatment and 0.2 mM in continuous treatment, sugar (5000 ppm). HQS (8-hydroxyquinoline (0.65 mM)) was added to any solution which contained sugar. They found that:

1) A 24 hour treatment with either kinetin or STS increased carnation postharvest life (Table 1). Kinetin increased postharvest life from 6.3 to 10.3 days. STS increased postharvest life from 6.3 to 13.2 days. Addition of sugar to either kinetin or STS did not increase postharvest life. When STS and kinetin were combined, postharvest life increased an additional 1.5 days.

2) When stems were treated for more than 24 hours, sugar had a pronounced effect on flower longevity (Table 1). Sugar alone increased flower longevity from 6.4 to 14.4 days. Flower longevity was greatest when sugar, STS, and kinetin were added to the holding solution.

Table 1. The effect of kinetin, STS, and sugar on carnation postharvest life.

Treatment	24 hr treatment (days)	Continuous (days)
Control	6.3	6.4
Sugar	7.8	14.4
Kinetin	10.3	10.2
Kinetin + Sugar	11.4	17.3
STS	13.2	14.4
STS + Sugar	13.4	17.6
STS + Kinetin	14.6	15.3
STS+Kinetin+Sugar	15.0	18.0

Piskornik, Z. 1987. The effect of kinetin, silver thiosulfate, and sucrose on the longevity of cut carnations (Dianthus caryophyllus L.) and ethylene production by flowers. Experimental work of the institute of pomology and floriculture, Skierniewice-Poland, Series B. pp. 159-167.

Is The Future Of Floriculture Breeding In Biotechnology Only?

Practical benefits from plant biotechnology have not met the expectations we had a decade ago. Perhaps the main reason for this is the fact that the insertion of a gene or a few genes may not necessarily produce a superior variety of broad application. The successful plant breeder must provide varieties and/or hybrids which can withstand the great variety of environments which we subject our plant material to throughout the U.S.

An example of the tremendous improvements which plant breeders have been able to make over the years can be seen in the corn industry. Corn yield is 5 times as great per acre as it was in 1928. At least half of that increase is due to new cultivars and hybrids. The other half is due to cultural procedures. The creation of a new improved corn hybrid takes approximately 10 to 15 years. The introduction of biotechnology was expected to hasten corn breeding considerably. The impact of biotechnology on corn breeding have been limited to date. Part of the reason for this is the strict monitoring and release limitations imposed on the industry by federal regulators.

Two molecular biology techniques are increasingly useful in plant breeding: PCR (polymerase chain reaction), and RFLP (restriction fragment length polymorphism. Of the 2, perhaps RFLP's will speed the improvement of plants the most. Although biotechnology may speed plant breeding in the future, it will not outmode many of the classical procedures of traditional plant breeders.

Authors note: Commercial breeding programs have made tremendous improvements in floriculture. However, the dramatic move of most universities from classical to molecular methods for breeding may be somewhat premature.

Abelson, P. 1990. Hybrid corn. Science, 249:837.

Planting Date Affects Yield Of Some Field Cut Flower Crops

The effect of planting date on harvest date and yield of a variety of field cut flowers was studied at The University Of Georgia. Bulbous roots of liatrus (Liatrus spicata), tuberose (Polianthes tuberosa), and Dutch iris (Iris x hollandica) were planted between Nov. 1986 and Mar. 1987. Late planting extended the harvest time resulted in higher yields longer stems on liatrus and tuberose. The response of iris was cultivar dependent. Late planting of iris extended harvest time but decreased yield for all Dutch iris cultivars except 'White Wedgwood'.

Yield and stem length were optimal 10-15 days after first harvest for liatrus, 4-5 weeks for single-flowered tuberose, and 5-6 weeks after harvest for double-flowered tuberose. Tuberose stem length increased over seasons regardless or cultivar.

Armitage, A.M., and J.M. Laushman. 1990. Planting date and in- ground time affect cut flowers of Liatrus, Polianthes, and Iris. Hortscience, 25(10):1239-1241.

Bonzai Can be used to Control Growth Of Tibouchina and Fuchsia Trees.

The effects of Bonzai on plant form and pruning frequency on Tibouchina and fuchsia trees was studied by researchers at The University of British Columbia. Paclobutrazol (Bonzai) treatments of 0, 0.125, 0.250, and 0.500 mg/plant eliminated the need for pruning during the display season and improved the form of Tibouchina. Paclobutrazol did not show any benefit for fuchsia tree production. Trunk calibre was reduced on both species on plants which received a paclobutrazol treatment.

Roberts, C.M., G.W. Eaton, and F.M. Seyward. 1990. Production of Fuchsia and Tibouchina standards using Paclobutrazol or Chlormequat, Hortscience, 25(10): 1242-1243.

Calcium Nitrate May Reduce Fluoride Injury On Cut Roses.

Researchers at Washington State University studied the potential for short term treatment of cut roses with calcium nitrate to reduce fluoride injury (Table 2). Cut rose 'Samantha' were placed in deionized water or a solution of deionized water containing 20 mM calcium nitrate for 72 hours. Flowers were then placed in a solution containing 0 or 4 mg fluoride/liter.

Fresh weight gain, solution uptake, flower opening, and flower longevity were all reduced by the presence of fluoride in the holding solution. Pulsing with calcium nitrate improved fresh weight gain and flower opening in solutions containing fluoride. Flower longevity was increased in all treatments which received a calcium nitrate pulse.

Table 2. The effect of calcium nitrate pulses and/ or fluoride in a holding solution on cut rose 'Samantha' flower opening and longevity. Bud opening was on a scale from 1, a bud slightly open at the apex, to 7, an open flowers with stamens visible.

Treatment	Opening	Longevity (days)
Control Treatment	4.2	6.8
Pulse Alone	4.3	7.8
Fluoride Alone	3.6	3.4
Pulse Plus Fluoride	4.0	4.4

Pearson-Mims, C.H., and V.I. Lohr. 1990. Fluoride injury to cut 'Samantha' roses may be reduced by pulsing with calcium nitrate. Hortscience, 25(10):1270-1271.

Colchicine induced Polyploidy May Result in Superior Lisianthus

The effects of colchicine treatments on lisianthus were studied at Beltsville Agriculture Research Station. Applications of 1 drop of 0.05% colchicine on the apical meristem daily for 0, 3, or 5 days. The 5 days treatment resulted in 1 tetraploid lisianthus in 216 replicates. The tetraploid lisianthus was shorter in height, had a thicker calibre stem, and had similar flower size compared to normal diploid plants. Overall, the tetraploid had more desirable characteristics than the diploid.

Griesbach, R.J. 1990. Colchicine-induced polyploidy in Eustoma grandiflorum. Hortscience, 25(10):1284-1286.

Increase Postharvest Life Of Brodiaea

Researchers at the University Of California studied the effects of various compounds of the vase life of Brodiaea. The typical vase life of an individual flower of

Brodiaea is 4 days. Best vase life was achieved by harvesting inflorescence 1 to 2 days before pollen shed of the first flower and holding them in a solution containing 2% sucrose and 200 ppm 8-hydroxyquinoline (HQC). Display life was increased to 12 days when inflorescence were treated in this manner. Decreasing pH, pulsing with 10% sucrose solutions, or addition of silver nitrate did not increase vase life.

Han, S.S., A.H. Halevy, and M.S. Reid. 1990. Postharvest handling of Brodiaea flowers. Hortscience, 25(10):1268-1270.

Lighting Affects Rose Leaf Appearance

Cut rose growers commonly light their crop using high pressure sodium lamps. Researchers at the Research Station for Floriculture in The Netherlands studied the effect of supplemental lighting on rose leaf morphology. They found that:

1) Internode length of the 10 uppermost internodes was not affected by supplemental lighting.

2) Leaves of lighted plants had less leaflets. This was especially true of the uppermost leaves.

3) Chlorophyll content was higher on lighted plants.

4) Leaf weight was greater on plants which received supplemental lighting.

Blacquiere, T., and G. van D. Berg. 1990. Morphogenetic effects of assimilation lighting. Abstract 1781 presented at the ISHS conference in Italy.

Temperature and Light Affect Ranunculus Seed Germination

Researchers in Germany studied the effect of light and temperature on ranunculus seed germination. They found that seed germination was greatest and most rapid when:

1) Seeds were germinated under red light as opposed to darkness.

2) Seeds were grown for 10 days at 43°F followed by a temperature increase to 59°F.

Roeber, R., B. Plenkers, and G. Ohmayer. 1990. Germination of Ranunculus-hybrids (F1) 'Bloomingdale' as influenced by temperature treatments. Abstract 1422 at ISHS conference in Italy.

Courtesy Of The U.S.

Researchers in Tuscany are studying the life cycle of the thrip. Apparently the thrip (Frankliniella occidentalis) was introduced from the southwest region of the U.S. to Holland in 1983. Since 1983, the thrip has spread throughout Europe. Along with the spread of thrips has come an increase in tomato spotted wilt virus. A table of the effects of temperatures of the various stages of thrip development is shown below.

The effect of temperature on the length in days of various stages of Frankliniella occidentalis development.

	Temperature		
Stage	77° F	64°F	54°F
Egg	2	9	15
I larva	2	4	5
II larva	4	8	16
Pre-pupa	2	3	11
Pupa	2	3	10
Total (egg to adult)	12	27	57

Del Bene, G., and E. Gargani. 1990. Notes on the biology of Frankliniella occidentlis (Pergande) (Thys. Thripidae), a new pest for greenhouse crops in Tuscany. Abstract 2192 at the ISHS conference in Italy.

Biocontrol Of Soil-Borne Fungi is in The Future

Researchers at the Hombolt-University in Berlin are studying the use of various bacterial antagonists for control of soil-borne fungal diseases of vegetable and ornamental plants produced in greenhouses. They found that Bacillus subtilis T 99 showed great promise for controlling soil borne fungal diseases especially in combination with low doses of fungicides. Addition of Bacillus subtilis T 99 was found to help control Fusarium in carnation, 'Die-back' disease in gerbera, corky root disease in tomato, and Phomopsis root rot in cucumber.

Bochow, H. 1990. Biocontrol of soil-borne fungal diseases in greenhouse crops. Abstract 2186 at ISHS conference in Italy.

Promalin Increases Break Number In Bougainvillea

The effects of an application of Promalin or 6-benzyl-adenine (6BA) on Bougainvillea branching and flowering was studied by researchers at North Carolina Agricultural and Technical State University. Plants were potted and grown for 1 month. After 1 month all plants were pinched and sprayed with either 50, 100, or 200 ppm of promalin or 6BA to run-off. A second application of growth regulator was made 1 month later.

Bougainvillea break and flower number increased with application of either chemical over all concentrations. Flower number increase was greatest with application of benzyladenine. For example, flower number increased from 25 flowers per plant on untreated controls to 96 flowers per plant on plants which received two 50 ppm applications of 6BA 1 month apart. They concluded that 2 applications of 6BA 1 month apart at a concentration of 50 ppm will significantly increase both break and flower number in commercial Bougainvillea production.

Kamp-Glass, M., and M.A. Odgen. 1990. The effects of 6-benzyl-adenine and ^Promalin (6-benzyl-adenine and 3-gibberellic acid) on branching and flowering of Bougainvillea glabra, Chois. Abstract 1955 at ISHS conference in Italy.

Bonzai Reduces By-Pass Shoots In Azalea

Researchers at the University Of California, Davis, compared the effects of Bonzai and B-9 on azalea development. Azalea 'Rosaperle' was sprayed on September 30 with either 50 or 75 ppm Bonzai or 2500 ppm B-9. Height retardation, effects on flowering, by-pass shoot number and leaf scorch were compared among the treatments. They found that:

1) Application of Bonzai 5-6 weeks before low-temperature storage (45°F) substituted for the low light requirement to prevent leaf drop during cooling on some cultivars.

2) Application of 50 ppm of Bonzai resulted in moderate height retardation, earliest flowering, no by-pass shoot development, and no leaf scorch compared to other Bonzai and B-9 applications.

Kofranek, A.M., and G. Linson. 1990. The influence of triazole derivatives on the reduction of shoot size and flowering of evergreen azaleas. Abstract 1945 at ISHS conference in Italy.