RECOMMENDATIONS TO REDUCE HEAT DELAY IN KALANCHOES

1. Maintain temperatures as low as possible.

2. Avoid high temperature buildup under black cloth. Pull cooled air under black cloth.

3. Use a 15 hour night length for floral initiation.

4. Alter shade cloth schedule (on at 7:00 P.M. and remove at 10:00 A.M.).

5. Place plants at the pad (coolest) end of the greenhouse for the first 4 to 6 weeks for initiation; then move to a warmer area for finishing.

6. Continue short day treatment until flower buds are visible on all cultivars.

7. Do not reduce light levels below 3,000 ft.c.

8. Grow high temperature tolerant cultivars.

RESEARCH UPDATE

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PHOTOPERIOD AND CORM AGE AFFECT *LIATRIS* GROWTH

The effect of corm age and photoperiod on *Liatrus* growth was studied at the University of Maryland One year old corms produced from seed and 2 year old corms were placed under natural daylight plus 0, 4, 6 or 8 hours of 'mum' lighting as a day continuation. Plants were grown under these treatments for 35 days after emergence. Plants were then grown under a second photoperiod of 8, 12, 14 or 16 hours until harvest. Plants were, therefore, exposed to 16 different photoperiod treatments. The results are as follows:

Two year old corms flowered 10 days earlier than 1 year old corms. However, 1 year old corms produced twice as many vegetative shoots and 15% more flowers than 2 year old corms.

1. Two year old corms flowered 10 days earlier than 1 year old corms. However, 1 year old corms produced twice as many vegetative shoots and 15% more flowers than 2 year old corms.

2. An initial photoperiod after emergence of 14 or 16 hours reduced the days to flower by 8 days and increased flower shoot length by 7.9 inches compared to plants grown with no daylight extension (8 hour photoperiod).

3. However, giving long days at emergence resulted in a 50% reduction in flowering shoots compared to plants grown under short days (8 or 12 hours daylight) for the first 35 days after emergence.

A short day treatment followed by a long day treatment did not reduce flowering shoot number and increased shoot length.

4. A short day treatment followed by a long day treatment did not reduce flowering shoot number and increased shoot length.

Espinosa, I. & W. Healy. 1990. Influence of photoperiod on Liatrus spicata generative shoot growth. Hortscience 25:764-766.

L-TRYPTOPHAN DRENCH INCREASES YIELD IN WATERMELON AND MUSKMELON

The application of 2.67 x 10^{-5} mg/pound of L-tryptophan as a soil drench to seedlings increased 'Royal Sweet' watermelon yield 58%, 'Royal Windsor' watermelon yield 80%, and 'Top Score' muskmelon yield 42%.

Researchers at the University of California studied the effect of L-tryptophan drenches on watermelon and muskmelon seedlings in the greenhouse 2 weeks prior to transplanting into the field. Seedlings were grown for a total of 3 weeks in the greenhouse. The application of 2.67 x 10^{-5} mg/pound of L-tryptophan as a soil drench to seedlings increased 'Royal Sweet' watermelon yield 58%, 'Royal Windsor' watermelon yield 80%, and 'Top Score' muskmelon yield 42%.

Authors note: *L-tryptophan is a precursor to auxin, a natural plant growth regulator. This material may have application in our industry in the future if it is approved for application to vegetable seedlings in the greenhouse.*

Frankenberger, W.T. Jr. & M. Arshad. 1991. Yield response of watermelon & muskmelon to L-tryptophan applied to soil. Hortscience 26(1):35-37.

CAN BOTTOM WATERING BE USED TO LEACH SALTS FROM THE UPPER SOIL LAYER OF SUBIRRIGATED CROPS?

There was no practical benefit to attempt to leach salts out of the upper media layer by using bottom watering.

Salts tend to accumulate in the upper layer of media in subirrigated pot plants. Researchers at the Horticulture Research Institute of Ontario studied the potential for leaching salts out of the upper media layer by placing pots in a shallow layer of clear water for an extended period of time (<1 hour). They found that there was no practical benefit to attempt to leach salts out of the upper media layer by using bottom watering. Plants had to be immersed for several days to see any effect. Submersion of pots for such an extended period of time could cause root rot.

Blom, T.J. & B.D. Piott. 1991. Leaching subirrigated plants! Research from Horticultural Research Institute of Ontario, Vineland Station, Ontario, Canada.

PLUG OR PACK SIZE AFFECTS LANDSCAPE PERFORMACE OF ANNUALS

As the cell size which seed were sown into increased, so did the landscape performance.

Researchers at the Georgia Experiment Station studied the effects of container size and shape in plug production phase on the landscape performance of marigolds. Seedlings were transplanted 5-7 weeks after being sown. They found that as the cell size which seed were sown into increased, so did the landscape performance. Leaf area of seedlings grown in plugs with a 7 cubic centimeter (cm^3) volume was 60% less than the leaf area of seedlings grown in a 44 cm^3 volume prior to planting. Plants from 7 and 24 cm^3 volume plugs did not perform as well in the landscape as plants grown in 44 cm^3 volume plugs. Flower cover in the landscape decreased as plug size seedlings were grown in decreased even after plants were grown for 6-7 weeks in the landscape. Container shape had no effect on landscape performance.

Latimer, J.G. 1991. Container size & shape influence growth & landscape performance of marigold seedlings. Hortscience 26:124-126.

CAN PLANTS FEEL CROWDED?

Plant stem elongation increases 3 days after 2 plants are placed close to each other before they start shading each other!

Researchers in Argentina have been studying if plants can 'feel' if they are getting crowded before they actually start shading each other. They have found that plant stem elongation increases 3 days after 2 plants are placed close to each other before they start shading each other! Their results show that plants start competing with each other long before they may actually be competing for light.

Bailer, C.L., A.L. Scope & R.A. Cinches. 1990. Far-red radiation reflected from adjacent leaves: an early sign of competition in plant canopies. Science 247:329-332.

APPLICATION OF GIBBERILLIC ACID RESERVES EFFECTS OF PACLOBUTRAZOL ON GERANIUM

Researchers at the University of Massachusetts studied the potential for application of gibberellic acid to overcome excessive inhibition of plants grown due to over-application of paclobutrazol at a rate of 0.06 mg a.i./pot or were sprayed with 100 ppm paclobutrazol at the 3-4 leaf stage (34 days after sowing). At these rates of paclobutrazol application, growth was severely depressed. A single spray of 100 ppm gibberellic acid (commercially distributed as 'ProGib' or Gibrel') applied 0-21 days after the paclobutrazol application reversed the severe growth suppression by overapplication of paclobutrozol. Plants sprayed with gibberellic acid 7 days after the paclobutrazol application were less desirable than those treated 14-21 days after the paclobutrazol application when marketed.

Cox, D.A. 1991. Gibberellic acid reverses effects of excess paclobutrazol on geranium. Hortscience 26(1):39-40.

STS CONTROLS 'SHATTERING OF NEW GUINEA IMPATIENS FLOWERS DURING AND AFTER SHIPPING

Researchers at Iowa State University studied the effects of silver thiosulfate (STS) and ethylene on corolla abscission (flower shattering) of New Guinea impatiens. Simulated shipping caused 55% shattering. Exposure of plants to 1 millionth of a liter of ethylene per liter air caused 80-100% flower shatter. Plants pretreated with 1.0 mM STS only lost 20% of the flowers after the simulated shipping treatment. Pretreatment of plants with STS before exposing plants to ethylene eliminated flower shatter entirely.

Dostal, D.L., N.H. Agnew, R.J. Gladon & J.L. Weigle. 1991. Ethylene, simulated shipping, STS & AOA affect corolla abscission of New Guinea impatiens. Hortscience 26(1):47-49.

FILTERING LIGHT WITH COPPER SULFATE CONTROLS PLANT GROWTH

Researchers at Clemson University are studying the potential for light filtration using copper sulfate in a commercial greenhouse. The copper sulfate is circulated through chambered acrylic panels in the greenhouse roof. By filtering out far red light using copper sulfate, plant stem elongation is reduced. Chrysanthemums grown in the greenhouse were 40-46% shorter than plants grown under other filters or natural sunlight. In addition to height reduction benefits, the copper sulfate filters out light which tends to heat the greenhouse. Therefore, less cooling is required. In addition, less pesticides may need to be used, as well as high carbon dioxide levels can be maintained for longer periods of time due to less need for ventilating.

Clifton, S. 1990. Copper sulfate filtering system controls growth on green house plants. Agriculture News, The South Carolina Agriculture Experiment Station, Clemson University.

POTENTIAL IRRIGATION OF BEDDING PLANTS WITH POOR QUALITY IRRIGATION WATER SHOWS PROMISE

Researchers at Texas A & M University are evaluating the potential for irrigating bedding plants with water high in salts. They found that both impatiens and periwinkle suffered salt damage when leachate electrical conductivity (EC or soluble salts) exceeded 2 mmhos/cm. Periwinkle was more salt tolerant than impatiens. They are currently evaluating the potential for intermittently watering with saline water and/or diluting saline water for use as irrigation water on bedding plants.

Hipp, B.W. 1990. Use of poor quality irrigation water for production of bedding plants. Bedding Plants Foundation, Inc. Research Report, No. 045.

A single spray of 100 ppm gibberellic acid applied 0-21 days after the paclobutrozol application reversed the severe growth suppresion by overapplication of paclobutrozol.

Plants pretreated with 1.0 mM STS only lost 20% of the flowers after the simulated shipping treatment. Pretreatment of plants with STS before exposing plants to ethylene eliminated flower shatter entirely.

Periwinkle was more salt tolerant than impatiens.

HYDROGEN CYANIDE CAN DAMAGE ON TROPICAL CUT FLOWERS AND FOLIAGE

All foliage and most heliconia were undamaged at 5500 ppm HCN levels.

Researchers at the Hawaii Institute of Tropical Agriculture and Human Resources studied the use of hydrogen cyanide (HCN) as a potential disinfestation treatment on Hawaiian cut flowers and foliage (Zingiberaceae, Heliconia, Orchidaceae, Marantaceae, Lycopodiaceae, Agavaceae and Proteaceae). They tested 30 minute treatments of 2500, 3700, 4600 and 5500 ppm HCN on flower and foliage damage and disinfestation. Hydrogen cyanide is highly toxic to insects. The following effects on the various cut flowers were noticed:

1) All foliage and most heliconia were undamaged at 5500 ppm HCN levels.

2) Most protea and 'Midori' anthuriums were uninjured at 4600 ppm HCN.

3) Pink ginger were uninjured at 3700 ppm HCN.

4) All pincushion protea showed damage after HCN exposure.

5) Red ginger was damaged after exposure to sunlight following exposure to 2500 ppm HCN but not after simulated shipping.

6) Wet red ginger flowers longer than 6 cm were damaged following exposure to 2500 ppm HCN but shorter flowers were not.

7) Wet treated lycopodium and bamboo orchid foliage was not injured by HCN.

Hansen, J.D., H.T. Chan Jr., A.H. Hara & V.L. Tenbrink. 1991. Phytotoxic reaction of Hawaiian cut flowers & foliage to hydrogen cyanide fumigation. Hortscience 26(1):53-56.

DOES 'PRIMING' SEED INCREASE PERENNIAL SEED GERMINATION?

Priming with either a salt or distilled water for 3-6 days for tickseed or 6-12 days for purple coneflower resulted in more uniform and rapid germination of seed.

Researchers at Texas A & M University studied the effects of priming perennial seed on subsequent germination and growth of tickseed (*Coreopsis lanceolata* L.) and purple coneflower (*Echinacea purpurea* (L.) Moench). Seed were 'primed' in aerated solutions of distilled water or 50 or 100 mM salt solutions (potassiumphosphate, pH 7.0) at 61°F for 3, 6, 9 and 12 days. They found that priming with either a salt or distilled water for 3-6 days for tickseed or 6-12 days for purple coneflower resulted in more uniform and rapid germination of seed. Percent germination was not affected by seed priming.

Samfield, D.M., J.M. Zajicek & B.G. Cobb. 1991. Rate & uniformity of herbaceous perennial seed germination & emergence as affected by priming. J. Amer. Soc. Hort. Sci., 116:10-13.

UNICONAZOLE AFFECTS *LISIANTHUS* GROWTH AND FLOWERING

Researchers at Southern Illinois University studied the effects of spray and drench application of uniconazole to *Eustoma grandiflorum* 'Yodel Blue' (lisianthus) for potential as a growth retardant in *Lisianthus* pot plant production. A single uniconazole spray at 10 ppm applied 2 weeks after pinching, two 5 ppm uniconazole spray applications 2 and 3 weeks after pinching, or a 1.6 ppm/pot drench application 2 weeks after pinching controlled stem elongation similarly. The level of height control of *Lisianthus* stem elongation was similar to that seen after an application of a single 7500 ppm B-Nine application or two 2500 ppm B-Nine applications. Spray applications increased the time to flower. Drench applications did not increase the time to flower. In addition, a 1.6 ppm/pot drench application of uniconazole increased flower number from 2.4 to 5.3. Application of A-Rest as a drench or spray and B-Nine as a spray did not increase flower number.

Starman, T.W. 1991. *Lisianthus* growth & flowering responses to uniconazole. Hortscience, 26:150-152.

CHECK MEDIA pH BEFORE SOWING SEED!

The effect of pH on seed germination of 8 bedding plants species was studied by researchers at Michigan State University. The pH values ranged from 4.5 to 7.5 at 0.5 increments. Tests were done in petri dishes on either filter paper or in a medium containing 50% sphagnum peat and 50% coarse vermiculite. The pH affected germination of all species except salvia. Total germination was better on filter paper than on the peat based media. A summary of the results for each of the species tested on the peatlite media is shown below.

Look for Xanthomonas.

Table 1. The effect of media pH on the percent seed germination of ageratum (*Ageratum houstonianum*), begonia (*Begonia x semperflorens*), impatiens (*Impatiens wallerana*), alyssum (*Lobularia maritima*), petunia (*Petunia x hybrida*), geranium (*Pelargonium hortorum*), salvia (*Salvia splendens*), and marigold (*Tagetes patula*) grown on a 50% sphagnum peat, 50% coarse vermiculite medium.

	pH value						
Species	4.5	5.0	5.5	6.0	6.5	7.0	7.5
ageratum	87	60	-	77	67	57	60
fibrous begonia	80	87	-	80	87	77	87
impatiens	0	60	-	90	80	83	87
alyssum	50	47	-	60	60	47	63
petunia	33	80	-	80	87	80	93
geranium	37	43	-	77	-	77	83
salvia	67	67	-	77	83	60	77
marigold	60	63	-	40	83	83	93

Shoemaker, C.A. & W.H. Carlson. 1990. pH affects seed germination of eight bedding plant species. Hortscience 25:762-764.

Control your thrips populations!

REMEMBER!

1. Look for *Xanthomonas* this year. Last year we had an outbreak on zonal geraniums.

2. April and May are the months that we seem to see the most tomato spotted wilt virus. Control your thrips populations! Isolate new shipments to insure that you are not introducing thrips into your greenhouses. Look for spotting of leaves on cineraria and gloxinia. Tip die back and stunted growth may occur on impatiens. New Guinea impatiens may show tip dieback as well as a blackening of the mid-vein on variegated cultivars.

3. Apply fungicide drenches to your geranium crops! Most root rot problems we have during the spring are on geranium crops.

4. Because of increased watering, those of you who do not regularly alter your water pH may have to keep a closer eye on your pH levels. Buy yourself a meter and/or have more soil tests done.

Apply fungicide drenches to your geranium crops!

5. Fuchsia is a long day plant. In other words, it will be induced to flower when the day is longer than the night. The day and night length are equal on March 21st. After this day, the day is longer than the night and fuchsia will initiate flowers. 'Mum lighting', i.e. night break lighting from 2200 to 0200 hr, the 2 weeks after March 21 will tend to insure early flowering and increase flower number.

6. Graphically track mum crops. The spring is the toughest time to control stem elongation.

Remember to do soil tests!

7. Remember to do soil tests!