IN COOPERATION WITH COLORADO A & M
Secretary, Ray App
Bulletin 28 4434 Lowell Blvd., Denver, Colorado February 1952

PROGRAM FOR COLORADO'S TWELFTH ANNUAL SHORT COURSE

The TIME---March 4, 5, and 6, 1952
The PLACES---March 4 at Fort Collins
March 5 and 6 at the Shirley-Savoy Hotel in Denver

March 4, 1:00 P.M. - Inspection and discussion of current research at the Colorado A & M Research Greenhouses, 500 W. Lake Street, Fort Collins and at the Botany and Plant Pathology Building on the main campus.

6:30 P.M. - Bull session and question period in Room 100 of the Horticulture Building on Laurel Street. Topics to be covered in this session will be confined to those not to be covered in later meetings at Denver.

All sessions at Denver will be held in the Centennial and Colorado rooms of the Shirley-Savoy Hotel.

March 5 - Afternoon Session--Timing of Carnation Production, W. D. Holley, Chairman.
1:00 P.M. The Future of Carnation Growing - by Dr. Gustav A. L. Mehlquist, Missouri Botanical Garden, St. Louis.
2:00 P.M. Recent results from carnation cropping systems - by David L. Wagner, CFGA Research Fellow.
3:00 P.M. The problem and some of the factors which influence timing - by W. D. Holley.
4:00 P.M. General discussion of carnation timing.

March 5 - Evening Session--Soils and Plant Nutrition, William Gunesch, Chairman.
7:00 P.M. Know your soil to be able to handle it - by Dr. Robert S. Whitney, Associate Prof. of Soils, Colorado A & M.
8:00 P.M. How we handle our soils for bench crops and pot plants - by Hans Zoerb, LaCrosse, Wis., Grower.
8:40 P.M. Liquid feeding and soluble fertilizers - by W. D. Holley.
9:10 P.M. General discussion on soils and plant nutrition.

March 6 - Morning Session for Owners and Operators, Robert Alenius, Chairman.
10:00 A.M. How we have solved our labor problem - Hans Zoerb.

IN THIS ISSUE

March 6 - Morning Session (continued)

10:45 A.M. Notes to the editors, unpublished - by Dr. Gus Mehlquist.

11:30 A.M. Discussion of management problems.

March 6 - Afternoon Session - Larry Taylor, Chairman.

1:00 P.M. Positive control for rust, blights, and other surface diseases - by Dr. W. D. Thomas, Colorado A & M

2:00 P.M. Recent advances in the knowledge of bacterial wilt - by Oliver Holtzmann, CFGA Research Fellow.

2:30 P.M. Some causes of rose malformation - by William H. Hubbard, Roses Inc. Research Fellow.

3:00 P.M. A better understanding of carnation splitting - by David L. Wagner.

3:15 P.M. General discussion period on plant troubles.

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6:00 P.M. Cocktail hour.

7:00 P.M. Dinner and dance

Registration - $5.00 Dinner-dance tickets - $4.00 each.
Carnation and rose variety exhibits will be staged in the Silver Spruce and Blue Spruce rooms which adjoin the rooms in which the meetings will be held.

General short course chairman Vince Quinn has almost everyone working. We do not have a complete list of committees at this time but will publish the list with a report of the short course in the next bulletin.

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THE EFFECT OF MOSAIC ON THE YIELD AND QUALITY OF CARNATIONS

by
W. D. Thomas, Jr., R. R. Baker, Joseph G. Zoril,
and Oliver V. Holtzmann

Viruses of the mosaic type have often been found to decrease the productivity of perennial crop plants below the level of economic production. This has been shown to be the case with such virus diseases as the mosaic of tomato, tobacco, potato, peach, and tulip. These diseases are often responsible for the "running out" of a variety. The "running out" of carnation varieties might possibly be attributed, in part, to such a factor.

Viruses compete heavily with their host plants for nitrogen and phosphorous, draining these nutrients from the host cells almost as rapidly as they can be assimilated. By the very nature of viruses, therefore, it may follow that there would be a definite effect on yield and quality of such crops as the carnation, where quality is at a premium. By virtue of continual vegetative propagation of the carnation, the concentrations of the mosaic virus is usually very great. In the following tests only small concentrations of the virus were used. Since it usually requires more than six months for this virus to reach a concentration comparable to that normally encountered in commercial ranges, it will be borne in mind that the effects produced by the virus in these tests may not be as severe as are sometimes observed in commercial production.

The following study was undertaken to determine what response occurs in carnations infected with the mosaic virus, and to determine whether or not intensive research on this problem may be justified.

The investigation was continued for two years, from 1949 to 1951. In 1949 two benches were planted with rooted indexed cuttings of White Patrician carnations. One month after the second pinch which was made August 15, inoculations were made. One bench was inoculated twice, at a two-week interval, with centrifuged extracts from infected plants, using carborundum as the abrasive. The second bench remained uninoculated. Each bench had two buffer rows at each end to prevent undue contamination.

Separate benches were used to avoid possible contamination through the roots. There were five replications of 28 plants each in each test.

In 1950 a second test was conducted with the Donna Lee variety. The cuttings were stuck on April 6; taken out of sand on May 4; pinched on May 29; benched on July 7, and the second pinch (not over one per plant) was made on July 15, July 31, and August 15. The entire test was in one bench, with each treatment in 5 alternate replications of 28 plants separated by double boards dividing the soil from the surface to the bottom of the bench.

In 1949 inoculations were made on September 14 and September 28. The 1950 inoculations were made monthly, starting on August 24, using the same technique as that used in the 1949 test.

Data were collected each year on the number of flowers, individual flower weights, and number of splits. In addition, in 1950 data were obtained on the length of flower stems. These data were analyzed on the basis of grade. Readings in each test were started the first of November and continued to the end of April the following year, providing data for a six-month period. No data were obtained for the summer cut, due to space limitations.

Cuts were always taken from the healthy, uninoculated plots prior to cutting the inoculated plots to prevent undue dissemination of the virus. Nevertheless, some evidence of scattered contamination was evident by the end of each test. This was unavoidable due to movement of workers through the greenhouse. Nevertheless, it was apparent by the rate of spread of the disease that indexed, mosaic-free stock can be kept reasonably clean for at least two years.

The Effect of Mosaic on Total Production

In table 1 are given the average total production per plot for the two varieties as influenced by the presence or absence of infection by the mosaic virus. Each figure is an average production over six months of production.

Table 1.--The effect of mosaic infection on carnation production - six months.

Year	Variety	Treatment	Total production	Flowers per sq. ft.
1949-50	White Patrician	Healthy	97.2	11.6
		Mosaic	101.0	12.0
1950-51	Donna Lee	Healthy	133.0	15.8
		Mosaic	156.4	18.6

There were no significant differences between the yield of flowers either year. The increase in number of flowers in the second year's test may have been due to the location of the test in a part of the greenhouse more favorable for production. The tendency of mosaic-infected plants to produce more blossoms, although not significant, is neutralized by reductions in quality. This characteristic will be discussed later. The infected plots started producing earlier, and reached the peak cut two weeks earlier than did the uninfected plots. This could be highly important in the timing of production.

The Effect of Mosaic on Quality of Growth

Since the Donna Lee variety had a tendency to produce smaller flowers of a poorer quality during the period of the test, the data given in table 2 include those for White Patrician only. The method of determination of quality was that described by Holley, et al (Bulletin 27), the grades corresponding to those used in Colorado.

Table 2.--The effect of mosaic on quality of production of White Patrician carnations between November 1, 1949 and April 30, 1950.

Treatment	Split	Short	Standard	Fancy	Special	Total
Healthy	15.6	1.6	32.2	72.8**	43.6**	165.8
Mosaic	26.4**	6.6**	74.4**	64.0	15.2	187.8

**A difference of 5 flowers is significant with odds of 99:1.

In the table are given the average number of blooms produced in the five grades from five plots of 28 plants each in each treatment. According to these data the number of splits produced in plots infected with the mosaic virus were highly significant over those in the healthy plots. There was also a highly significant increase in the number of flowers in fancy and special grades among those taken from the healthy plots. Differences in total production were not significant. The results with Donna Lee followed the same pattern, with a high degree of significance.

In conclusion, therefore, it has been shown that carnation mosaic virus may:

1. Not effect yield.
2. Hasten the peak cut.
3. Increase the production of splits.
4. Decrease quality production by at least one grade, with more shorts and standards being produced.

In view of this evidence it follows that carnation mosaic is detrimental and costly to production, and that increased efforts to investigate the properties and methods of control of this disease are thoroughly justified. It emphasizes, moreover, the need for increased efforts toward the use of indexed stock and the elimination of mosaic from carnation greenhouses.

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NEW MEMBERS

Francis V. Cash, 2151 West 56th Ave., Denver, Colorado.
William Booth, Denver Wholesale Florists Company, Denver 1, Colo.
J. L. Dillon Inc., Bloomsburg, Penna.
Robt. L. Criswell Greenhouses, Martinsburg, West Virginia.
Clifton W. Heller, Winkelhaus Greenhouses, Howell, Michigan.
Laisy Greenhouses, N. Olmstead, Ohio.
Bachman's Inc., Minneapolis, Minnesota.
Carbide and Carbon Chemicals Company, Yonkers 3, New York.

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The Ohio Short Course - 1952

It was my privilege to attend the Ohio State Short Course recently and to renew acquaintances and swap ideas with many friends from far and near. I would estimate that there were well over 400 in attendance from all sections of the country. The organization of the sessions and material presented were excellent. A few highlights -

In the research greenhouses at Ohio State:

High potassium (40-60 ppm) in the soil caused faster blueing of Better Times after they were cut.

Krilium (Monsanto soil addative CRD-186) when added to their soils greatly increased the aggregation of heavier soils but the value of the aggregation is being questioned. Apparently the roses growing in these soils are just as good without this high aggregation. At the Joseph H. Hill Co. in Richmond, Indiana, experience with Krilium loosened a well prepared new soil but the production was considerably below an untreated soil which had been in the greenhouse for many years. If Krilium fits into the greenhouse picture, and where, is still to be determined.

African Violets were being produced at Ohio State in an ordinary basement. The plants were being grown with 100, 300, and 600 foot candles for 6, 12 and 18 hrs. duration. Temperature was almost constant at 60° F. and the humidity was more constant than can be maintained in a greenhouse. Their conclusions were that 300 foot candles of light for 12 hours seems to be the most practical. All six hour treatments were causing light green foliage. The amount of flowering and the color of the foliage was almost proportional to the intensity of the light and the duration. We were reminded of the battery method of producing broilers.

Ken Nelson and others are working on carnation timing and have been for several years. Their results for a Christmas crop are similar to the ones we have obtained. Return crops and late pinches are much slower because of the low light intensity in the midwest during January and February.

D. C. Kiplinger reported on some of the research recently completed as follows:

1. Percentage of blind wood on roses was not affected by nitrate or potash nutrition. It remained rather close to 65% of the shoots flowering and 35% remaining blind.
2. Keeping quality on roses seemed best where medium levels of nitrate and potash were maintained. High potash was inducive to poor keeping.
3. Their work has shown that poinsettias should be fed well and started in a soil containing plenty of organic matter.

U. L. Patterson of Shelby, North Carolina presented some excellent material on summer pot plants

Gloxinias are grown from seed for the earliest plants. He finds Panzer Red to be his best seller but also grows Zinit(?), a blue variety. He sows in August for March flowering and October for Mother's Day. He lights seedlings sown after October with about the same amount of light required for chrysanthemums. Patterson's tips for germination of gloxinia seed are:

1. Leach most of nitrates out of soil mixture.
2. Give light during germination -- do not cover with paper.

He uses a 60-65°F. night temperature throughout. Later crops of gloxinias are grown from bulbs or seed.

Kalanchoes for Summer

Seed are sown in September and seedlings lighted through short days until after April 15. Seedlings are potted 3 to a 2¼" pot then panned later as poinsettias. Flowering plants may be had 9-10 weeks after short day treatment is given. Four weeks of shading are sufficient to set buds anytime of the year. Buds will mature regardless of daylength, once they are set. Patterson grows the plants out of doors under netted shade in summer for sturdier plants. Plenty of water and feed required. Since Kalanchoes are sensitive to almost all spray materials, he advises reducing to ½ or 3/4 strength. Tom Thumb variety is used entirely with sowings made every six weeks from June to Valentine's Day.

Tuberous Begonias

The Camellia flowered varieties are best sellers in Carolina and the southeast. Copper and scarlet sell best followed by pink, white and some yellow. Tuberous begonias go dormant in temperatures below 60°F. and with days shorter than 12 hours. Patterson has found the sales very good during the fall months. To get fall plants, he stores the tubers at 40-45° in boxes of dry peat. He has stored tubers for as long as 10 months. If they sprout in storage, cut the sprouts off at potting time. Tubers out of storage are much faster than new bulbs for spring plants. October and November have been found to be the best fall months and May and June the best spring months to have plants in bloom.

Year Around Production of Norwegian Begonias

The Norwegian begonias are of the Melior or Lady Mac type but have a much greater keeping quality. They will flower normally for Christmas but Patterson has found that they are in greater demand every month except Christmas. They are day-length sensitive so their flowering can be controlled. These begonias grow well at 55°F. Patterson likes the following varieties:

Tove - tall but good keepers
Carolina - best pink
Red Solbacker - a superior variety - good keeper
Skaane - excellent and compact - deep pink

They propagate about every week in the year from either leaves or top cuttings. Small young leaves, about the size of a quarter, are preferable. Keep pH of water and propagating medium down to 6.5 - 7.0. Norwegian begonias are very sensitive to short-day treatments. Seven weeks for July and August plants. Start shading about 10 weeks before plants are wanted in bloom and shade until color shows.

Nematodes, root and foliar, and Botrytis are main troubles. Patterson has controlled nematodes with all the new systemics such as Systox, Pestox and Octamethyl bombs. He suggested plenty of air during the summer and shading during the early morning to help reduce Botrytis. A fermate spray helps also. An excellent article on these bogonias by Siguert Jorgensen and O. W. Davidson is included in the N.J. Plant and Flower Growers Association Bulletin. Vol. 1 No. III.

Late Hydrangeas

The Patterson concern is producing hydrangeas for summer sales by use of a storage idea long in use in Scandanavia. The plants are buried with sand after they are dormant and left until April or May. A location for this sort of storage must be cold and must remain cold late in the spring. They excavate about a foot deep, put two inches of sand in the bottom of the trenches then lay the dormant plants in on their sides and cover with six inches of sand. The sand is then covered with a foot of sawdust and boards are placed over the sawdust. In a colder location plants will remain dormant until May. A diagram of this method is shown in Post's "Florist Crop Production and Marketing," page 575.

Flowing time out of storage is 80 to 90 days. They are planning to bury their Easter and Mother's Day hydrangeas but in a warmer location so they can get them out during the winter. Mold and other troubles are almost eliminated as is any type of care during storage.

Most enjoyable visits to Yoder's and Hill's of Richmond climaxed the trip but an account of these will have to wait until later.

Your editor, W D Holley

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FIRST CLASS