Colorado Flower Growers Association

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PRODUCTION CYCLES ON ROSES

by W. D. Holley, William Sauer and Walter F. Larsen

Roses can be thrown into production cycles which will repeat at regular intervals throughout the cropping year. These cycles are easily created by pinching the larger canes (3/16 inch and up) in late summer and fall. The soft pinching, which produces these cycles, builds a vigorous plant after pruning, and reduces the fall production except for specific peak periods.

Three-year old Better Times roses were knife pruned beginning May 26, 1952. All returning shoots from the prune were soft-pinched beginning June 20. The crop was not well broken up following pruning, but an attempt was made to spread out the pinching operation to produce a steady crop.

Four greenhouse benches were divided into 5 plots of 16 plants each, with several buffer rows between plots. The roses were grown at a night temperature of 60-62° F and a day temperature of 66° on cloudy days and 70-80° on sunny days. The following treatments were arranged at random on each bench:

1. Steady production throughout the year. Crop was broken up by spreading the pinch following pruning. No holiday pinching.
2. Soft-pinch one large cane per plant for 3 main holidays (Christmas, Nov. 2; Easter, Feb. 13; Mother's Day, March 24).
3. No holiday pinching. Instead a production cycle was started by pinching one large cane per plant on Aug. 8 and again on Sept. 15. No later pinching was done.
4. Same as treatment 3 except pinches were made Aug. 23 and Oct. 4 to produce a Thanksgiving cycle which also hits the 3rd week in January and other short markets. No pinching was done after Oct. 4.
5. An attempt was made to refine treatment 3 for holiday cuts. In addition to the procedure followed in 3, the longer roses were cut to 3 5-leaf eyes during the 10-day period preceding the pinching time for holidays. On Oct. 30, Feb. 10, and March 23 these were undercut, removing the top eye which in some cases had begun growth.

   This treatment produced smaller holiday cuts than treatments 2 and 3 and was the only treatment which significantly reduced total production.

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RESULTS

The accompanying figure, although rather complicated, shows the production curves for the first 4 treatments from July 20, 1952, to May 9, 1953. Each curve represents the total production for 64 plants. All treatments were in somewhat of a cycle at the beginning of the period due to the soft pinch following pruning.

Treatment 1 (steady production) had a slight tendency to crop throughout the year but produced 25-30 roses per week when off crop. Average per plant was 25.9 roses.

Treatment 2 produced heavy crops for Christmas, Easter and Mother's Day. Average production per plant was 26.2.

Treatment 3 gave very high production the last week in October. Undoubtedly some of these roses would have to be thrown away under normal market conditions. However, this peak crop returned a Christmas crop similar to that from ordinary pinching methods in use today and continued to produce cycles for Valentine's Day, and the period from March 22 to April 4. Average number of roses per plant was 25.5.

Treatment 4 produced crops around Oct. 1, Nov. 9-22, Jan. 1-17, March 3 and the month of April. Average per plant was 27.0 roses. This treatment illustrates the ease with which roses can be placed in a production cycle.

There were no real differences between the total production for the 4 treatments. There may be a difference in dollar returns. A carefully planned series of production cycles which hit several good marketing periods can mean real money to the rose grower. There were 7 to 8 weeks between cycles except for the late spring period, which required 6 weeks.

THE RELATIONSHIP OF REDUCING SUGARS AND SUCROSE TO THE GROWTH AND PATHOGENICITY OF FUSARIUM OXYSPORUM F. DIANTHI

by Lester E. Dickens 1/

Fusarium wilt of carnations was reported in Connecticut as early as 1898, where it was first noticed in a fertilizer experiment. Certain varieties were observed to be particularly susceptible. Rooted cuttings from infected plants became infected with Fusarium. This is probably the first report of Fusarium being transmitted by cuttings.

It was reported in 1942 that Fusarium wilt was confined to a few varieties in the Long Island area and that complete loss of certain varieties often occurred. No conclusions were obtained concerning these differences in susceptibility.

It has been shown that the concentration and composition of nutrients play an important part in the growth of Fusarium. The presence of certain nutrients or combinations of nutrients within the plant may influence the growth of Fusarium and the susceptibility of the plant.

Fusarium cannot manufacture its own food; therefore, it must obtain it elsewhere, namely, from the plant. Sugars are the principal foods which are manufactured within the plant for its own use. The quantity of sugars present within certain plants may determine their degrees of susceptibility.

Six different isolates of Fusarium, which were isolated from diseased carnations in the Denver area, were used in this study. The following varieties of carnations were selected from mother blocks which had been previously cultured from indexed stock:

Colorado Gold	Arapahoe
Fanfare	Scarlet No. 18
Crowley's Pink Sim	Miller's Yellow

In the laboratory it was found that different sugars and concentrations of sugars produced marked effects on the growth of Fusarium. The effects of temperature and pH were also studied in the laboratory. The optimum temperature for the isolates of Fusarium in liquid culture was determined to be 82.4°F. The growth of Fusarium decreased sharply at 86°F and continued to decline at 91.4° F. The 6 isolates attained peak growth levels at pH 6.6. In addition, one isolate attained triple peak growth levels, and 2 isolates attained double peaks.

In the greenhouse the soil was steam pasteurized and inoculated with the 6 isolates in separate plots. The Fusarium treatments were replicated 4 times. Three plants of each of the 6 varieties were planted in each plot on July 17, 1952. The soil temperature was approximately 80° F soon after planting and gradually declined to 56° F through the winter months.

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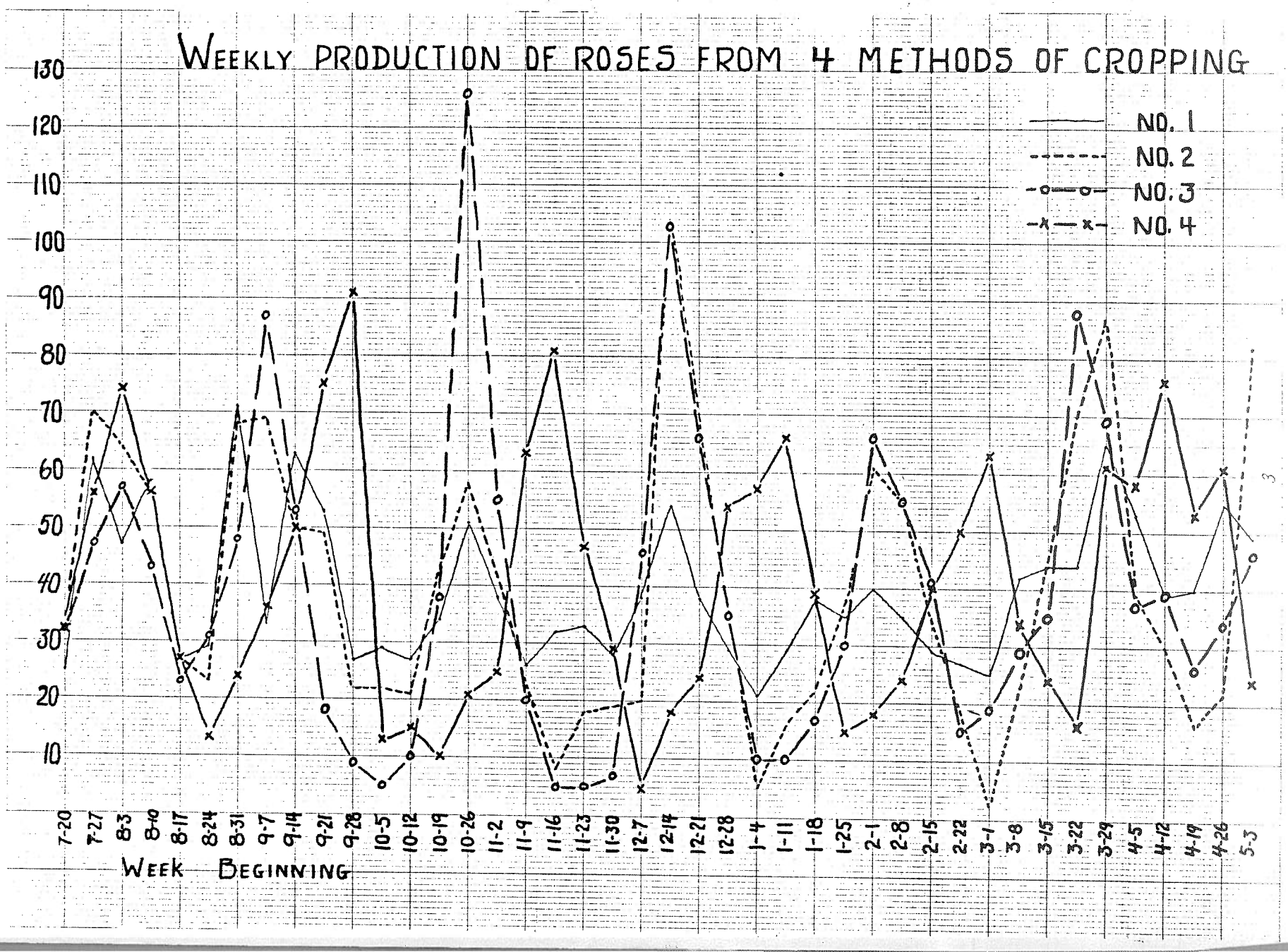
WEEKLY PRODUCTION OF ROSES FROM 4 METHODS OF CROPPING
NO. 1
NO. 2
NO. 3
NO. 4
130
120
110
100
90
80
70
60
50
40
30
20
10
7-20
7-27
8-3
8-10
8-17
8-24
8-31
9-7
9-14
9-21
9-28
10-5
10-12
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10-26
11-2
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11-23
11-30
12-7
12-14
12-21
12-28
1-4
1-11
1-18
1-25
2-1
2-8
2-15
2-22
3-1
3-8
3-15
3-22
3-29
4-5
4-12
4-19
4-26
5-3
WEEK BEGINNING

On March 5, 1953, the plants were removed from the bench and examined for wilt symptoms and vascular discoloration. The basal portions of the stems were sectioned and cultured on potato dextrose agar. Colonies of Fusarium appeared from most of the sections within 6 days.

Four hundred thirty-two plants were used to compare the susceptibility of the 6 carnation varieties and the pathogenicity of the isolates of Fusarium. There were 36 plants which showed no infection. These included 6 Colorado Gold, 12 Fanfare, 15 Pink Sim, and 3 plants of Arapahoe. The plants which showed no external symptoms but carried the Fusarium internally numbered 378, or 87 percent of the total plants tested. External symptoms were expressed by 18 plants represented equally by Arapahoe, Scarlet No. 18, and Miller's Yellow. The differences in susceptibility between varieties were analyzed statistically. Pink Sim, Colorado Gold, and Fanfare were the most tolerant to Fusarium. Scarlet No. 18 and Miller's Yellow were the most susceptible. Arapahoe was intermediate among the 6 varieties in its tolerance to Fusarium.

Quantitative analyses for sugars showed that Pink Sim, Colorado Gold, and Fanfare had the highest sugar content and were the least susceptible. Miller's Yellow and Scarlet No. 18 had the lowest sugar content and were the most susceptible. The sugar concentrations and average degree of susceptibility are shown in Table 1.

Table 1.--Summary of sugars found in the extracts of 6 carnation varieties.

Varieties	Total Sugar	Sucrose	Reducing Sugar	Average Susceptibility a/
	(percent)	(percent)	(percent)	
Miller's Yellow	1.9131	1.3151	0.5314	2.7916
Scarlet No. 18	1.9365	1.3315	0.5349	2.8333
Arapahoe	2.1538	1.3915	0.6890	2.4583
Pink Sim	2.1965	1.3826	0.7411	2.1250
Fanfare	2.6412	1.8257	0.7394	1.9166
Colorado Gold	2.8104	1.8743	0.8361	2.0416

a/ Susceptibility is based on an arbitrary infection index:
1. No external symptoms/negative culture plates
2. " " " /positive " "
3. " " " /vascular discoloration
4. External symptoms/vascular discoloration
5. Entire wilt

The sugar content of the carnation varieties appeared to be related to the resistance of the varieties, since it was found that the varieties with the highest sugar content were the least infected. It is likely, however, that other factors also contribute to the resistance of carnations to Fusarium wilt. For example, the growth of the 6 isolates was significantly affected by different carbohydrate-nitrogen ratios on artificial media. More work is necessary to correlate better the effects of nutrient levels on the resistance of carnation varieties to Fusarium.

THE PRODUCTION OF CARNATION CUTTINGS BY THE MOTHER BLOCK SYSTEM

by Gordon Koon, Pikes Peak Greenhouses, Inc.

In order that we might have some idea of how many cuttings we could take from a mother block, a record was kept as they were taken. The plants for the mother blocks were received as unrooted cuttings from Colorado A&M.

The Red Sim cuttings were rooted and potted until June 27, 1952, when they were benched at a spacing of approximately 8 x 8 inches. The block of Red Sim occupied a bench space 43 inches wide and 55 feet long, or 197 square feet of bench area. There were 486 plants in this block.

The White Sim plants were benched June 17 out of pots. The White Sim block occupied a gutter bench location 38 inches wide and 70 feet long, or 222 square feet of bench area. There were 510 plants.

METHODS

The plants were allowed to bud and were not pinched until color showed. This was done to make certain there was not a mixture of varieties In some instances, there were as many as 12 good breaks on a plant at the time of the first pinch. However, the plants were all pinched down to about the same level to get a uniform block. Top cuttings were taken from some of the side breaks even before the first pinch had been made. All cuttings taken were top cuttings until April 7th, when we began taking heels.

To date (June 19) the plants appear to be disease-free and no plants have died. The cuttings from these plants have been excellent and appear to be disease-free in the nurse beds and benches.

The man taking the cuttings placed them in a box that he kicked along the ground beside him. The girls made up the cuttings and bagged them for storage.

PRODUCTION OF CUTTINGS

Date taken	Red Sim	White Sim
Aug. 21	240	1215
Sept. 13	1372	1230
Oct. 2	855	373
Oct. 25	639	1000
Nov. 18	967	1846
Dec. 4	1023	1360
Dec. 30	1600	1300
Jan. 10	760	1440
Jan. 26	1300	340
Feb. 20	1733	2885
Mar. 14	1904	1806
April 7	3149	2492
April 23	2745	2672
May 12	3738	4850
June 4	2915	2428
Total cuttings	24,940	27,237
Square ft. bench area	197	222
Average per square ft.	127	123
Time to take	17 hours	20 hours
Average per hour	1467	1362
Time to make up	22 hours	25 hours
Average per hour	1134	1089

Ed. Note: For some time we have wanted figures such as these from a commercial range. Our records are on smaller blocks. Many thanks to Gordon for these accurate records.

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Your editor,

W. D. Holley