

# A Comparison of 13 White Sim Clones for Colorado

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During the fall months from September to December, U.S. carnation markets are almost always short of Blue or Fancy grade flowers. There are several reasons for this. New crops on young plants must be cut above breaks so there are lots of short flowers in the market. Older plants usually produce heavily in summer so are in low production and between crops. The last half to one-third of crops on older plants are often lower grade flowers. To find out how much the grade of flowers from older plants could be affected by clonal selection the following experiment was completed.

Rooted cuttings of 13 clones and cultivars were planted in the CSU greenhouses on January 4, 1969. The clones included were Colorado State University clones of White Sim designated WS 2, WS 3, and WS 9; CSU clones of White Pikes Peak designated WP 1,

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<sup>1/</sup> This is part of the information obtained by Danny L. Rundle from a research problem during his senior year as an undergraduate at Colorado State University.

WP 2, WP 5A, WP 8, and WP 12. Yoder Bros. of California supplied the cultivars Alaska (A), Gay White (GW), Improved White (IW), and Ohio White (OW). Denver Wholesale Florists Co. supplied cuttings of Elliot's White Sim (EW).

Spacing was 3/ft<sup>2</sup> and the plot arrangement was one 7 plant row per clone, replicated 7 times. Plants were pinched once and the first and over half of the second crop of flowers harvested before yield and grade records were started. From September 1 to December 31 flowers were graded as they were cut. Since this period following heavy summer flowering is a difficult time to produce top grade flowers on older plants, it was reasoned that comparisons between clones would be best at this time.

## Results

Yield of the 13 clones by months is shown in Table 1. All clones produced the most flowers in September (completion of 2nd crop) and were out of crop in October and November, followed by a slight increase in December with the beginning of the 3rd crop. Exceptions to this trend were Alaska and Gay White. These two varieties were slower to finish the 2nd crop (note September yield) so were the top two producers for the period. WP 2 was the only other clone that did not follow the general trend, it having lowest production in November and December, indicating a slower return of 3rd crop for this clone.

Table 1. Yield by months for 13 clones of White Sim carnation planted January 4, 1969. Figures are total for 7 replications of 7 plant plots.

CLONE	SEPT.	OCT.	NOV.	DEC.
WP1	50	31	31	27
WP2	59	35	12	20
WP5A	73	47	37	23
WP8	65	28	37	30
WP12	63	35	28	28
WS2	54	34	26	30
WS3	66	31	32	27
WS9	66	34	25	32
EW	82	43	37	33
GW	115	53	45	40
OW	71	32	21	32
IW	70	25	27	29
A	109	64	41	19

The 4 month yield by grade is shown in Table 2 and the percent yield by grade is calculated in Table 3. Some of the 13 clones produced very few design grade flowers during this period while others produced from 12 to 22% designs. Production in the Blue grade varied all the way from 10% for Ohio White to

33% for Gay White and Alaska. While these two varieties performed best in this fall period, production of malformed flowers during the first and the early part of the second crop make them less desirable than would be apparent from these data. As was mentioned previously, both varieties require more time to flower under most conditions.

Table 2. Grade of flowers produced by 13 clones of White Sim from September 1 to December 31, 1969. Yield was distributed as in Table 1.

CLONE	DESIGN	GREEN	RED	BLUE	TOTAL	MEAN GRADE
WP1	9	39	68	23	139	3.76
WP2	2	15	79	30	126	4.09
WP5A	8	40	86	46	180	3.94
WP8	8	29	82	41	160	4.33
WP12	7	35	65	47	154	3.99
WS2	7	48	67	22	144	3.72
WS3	15	38	69	34	156	3.78
WS9	22	34	81	20	157	3.63
EW	36	46	79	34	195	3.57
GW	24	49	97	83	253	3.94
OW	19	57	64	16	156	3.49
IW	9	37	67	38	151	3.89
A	53	28	75	77	233	3.76

Table 3. Percent yield by grade for 13 clones of White Sim calculated from Table 2.

CLONE	DESIGN	GREEN	RED	BLUE
WP1	6.5	28.1	48.9	16.6
WP2	1.6	11.9	62.7	23.8
WP5A	4.4	22.2	47.8	25.6
WP8	5.0	18.1	51.3	25.6
WP12	4.6	22.7	42.2	30.5
WS2	4.9	33.3	46.5	15.3
WS3	9.6	24.4	44.2	21.8
WS9	14.0	21.7	51.6	12.7
EW	18.5	23.6	40.5	17.4
GW	9.5	19.4	38.3	32.8
OW	12.2	36.5	41.0	10.3
IW	6.0	24.5	44.4	25.2
A	22.7	12.0	32.2	33.0

Table 4. Results of statistical analysis of yield and grade data shown in previous tables. Clones connected by solid lines are not sufficiently different to be significant at the 5% level.

RED AND BLUE PRODUCTION			TOTAL YIELD		
CLONE	MEAN	NON-SIGNIFICANCE	CLONE	MEAN	NON-SIGNIFICANCE
GW	25.71	                       	GW	36.14	                       
A	21.71		A	33.29	
WP5A	18.86		EW	27.86	
WP8	17.57		WP5A	25.71	
EW	16.14		WP8	22.86	
WP12	16.00		WS9	22.43	
WP2	15.57		OW	22.29	
IW	15.00		WS3	22.29	
WS3	14.71		WP12	22.00	
WS9	14.43		IW	21.57	
WP1	13.00		WS2	20.57	
WS2	12.71		WP1	19.86	
OW	11.43		WP2	18.00	

The data were analyzed using Duncan's multiple range test and the results of this analysis are shown in Table 4. Clones connected by a solid line are not statistically different. On the left side of Table 4 the mean yield of Blue and Red grade flowers per 7 plant plot are ranked from highest to lowest. While the 13 clones produced different numbers of top grade flowers (Tables 1, 2, and 3), most of them were not sufficiently different in this respect for one to be able to say that 19 times out of 20 these results could be repeated under these conditions. GW, A, WP 5A, and WP 8 were significantly better than most of the other clones; EW, WP 12, WP 2, IW, WS 3, and WS 9 were average; and WP 1, WS 2, and OW were the lowest in production of Red and Blue grade flowers.

A similar story existed with total yield. GW, A, EW, and WP 5A were highest for yield; WP 1 and WP 2 were lowest, and the balance of the clones were not significantly different in yield for this 4 month period. Looking at Table 4 another way--those clones near the top in both yield and grade of flowers were GW, A, EW, WP 5A, and WP 8. A Colorado grower seeking highest September to December yield of top grade flowers from older plants should select from these clones.

## Conclusion

This study is the first to our knowledge to document the statistically significant differences between selections from within a cultivar of carnation. WP 5A and WP8 produced more flowers than WP 1 and WP 2, but only WP 5A produced more Blue and Red grade flowers than WP 1. All of these are relatively recent selections from the cultivar White Pikes Peak.

Finally, Gay White showed considerable promise in this experiment. Its major fault is the production of malformed flowers. Sufficient variability was observed between individual plants that some of our best varieties of the near future could come from selections taken from this cultivar.