HortScience 17(4):593–595. 1982.

Fresh Flower Merchandising in Loose Bunches[1]

J. L. Robertson and L. H. Chatfield[2]
Department of Horticulture, Ohio Agricultural Research and Development Center, Wooster, OH 44691

Additional index words. conjoint analysis, marketing

Abstract. **Color and bunch composition were the most important factors influencing the consumer's purchase decision of loose-bunch merchandising of fresh flowers. Roses had significantly more product appeal than carnations and Marguerite daisies. Price was judged relatively more important for the mixed loose bunches where consumers selected the loose bunch with roses at $5.95 over the loose bunch with 5 roses at $7.95. The addition of a yellow hybrid tea rose increased the marketability of a loose bunch almost as much as the addition of an orange and peach sweetheart and floribunda rose, respectively. For mixed loose bunches, $5.95 to $7.95 was the optimum price range. For the homogeneous bunches, $2.95 to $4.95 was the most popular price range.**

Flowers merchandised in loose bunches have less consumer appeal than flowers merchandised in arrangements (1). Lower price is not a sufficient reason for consumers to select flowers in a loose bunch. However, the loose bunch has remained an extremely marketable item, particularly with the more frequent flower buyer (4). Roses added to loose bunches of chrysanthemums and carnations increased marketability (1, 4). Since product marketability was enhanced by changing flower composition, an attempt was made to identify those factors most important in maximizing the effectiveness in the pricing, composition, and sizing of flowers merchandised in loose bunches.

The study was conducted in April and May, 1979. A stratified sampling of Columbus, Ohio residents was selected by a Columbus-based marketing research firm. The sampling consisted of equal numbers of male and female participants between the ages of 20 and 50, having a total family income of $10,000 or above. The screening process provided a representative sample of the potential population of persons most likely to be flower purchasers. Consumers participated in 3 separate loose-bunch merchandising experiments in a laboratory setting.

According to conjoint methodology, product characteristics were varied systematically, using an orthogonal array, to determine the independent contributions of the of factors studied. Loose-bunch products were prepared on the basis of 3 levels for each of the 3 factors studied, resulting in a 3-way design of 27 product combinations. A fractional factorial design was used, so that participants viewed and ranked only 9 of the 27 product alternatives. A multiple regression program was used to compute utility values for each of the 27 factor attributes studied. The utility values represented the amount of influence each factor had on the consumer's evaluations. Utility values were relative to the merchandising factors in each experiment, and the lowest value for each factor was adjusted to a 0 base, thus making it possible to compare utility ranges from factor to factor to determine each factor's percentage of relative importance.

Not all levels of each factor were presented to the participant consumers (2, 3). Combining the highest and lowest levels from each factor for all 3 factors allows the development of the relatively most and least attractive product combinations. Interactions between factors were assumed to be controllable.

In all 3 experiments, the factors studied were flower-type or bunch-type composition, color, and price. In experiment 1, flower composition consisted of homogeneous bunches of Marguerite daisies, standard carnations, and hybrid tea roses. Bunches for all flower types were uniformly white, pink, or yellow and were scaled at 3 price levels: $3.95, $5.95, and $7.95. The retail prices used in the experiments were calculated by using a 50% mark-up over average wholesale prices of the flowers at the time of the research. The $3.95 bunch contained either 10 daisies, 4 carnations, or 3 roses. The $5.95 bunch contained either 15 daisies, 7 carnations, or 6 roses, and the $7.95 bunch contained either 20 daisies, 10 carnations, or 9 roses.

About 60% of the consumer's purchase choice was based on the composition of the bunch (Table 1). Hybrid tea roses and carnations had nearly equal value, but consumer segmentation revealed that the higher-income and younger age group valued the roses more than the carnations (Fig. 1). The Marguerite daisies had much less appeal and were not competitive, even though the consumer could get almost 3 times as many daisies as roses and carnations.

Both color and price had equal influence on younger persons and lower-income groups. The yellow color was most valued, while pink was favored the least for all consumer groups. Considering the relationship between color and composition, the yellow hybrid tea roses had a significant influence on the consumer's selection of roses, as almost 25% of the entire consumer group ranked the yellow roses as their first purchase choice.

When consumers were segmented according to flower buying frequency and flower budget, low-frequency and low-budget buyers generally chose the lower price. In summary, the ideal product offering for the entire consumer group was the yellow hybrid tea rose, priced at $5.95 or $7.95.

Experiment 2 comprised homogeneous bunches of Marguerite daisies, sweetheart roses, and miniature carnations. The colors were the same as in experiment 1 and were priced at $2.95, $4.95, and $6.95. The $2.95 loose bunch included either 2 stems of miniature carnations, 8 Marguerite daisies, or 4 sweetheart roses. The $4.95 bunch included

Table 1. Relative importance of purchasing components for loose bunch products, Experiments 1, 2 and 3.

	Distribution (%)								
	Experiment 1			Experiment 2			Experiment 3		
Consumer groups	Composition	Color	Price	Composition	Color	Price	Composition	Color	Price
Entire consumer group	64	29	7	38	50	12	13	38	49
Sex									
Male	60	26	14	31	47	22	8	39	53
Female	55	27	18	42	48	10	17	42	41
Age									
<35 years	46	27	27	41	45	14	12	46	42
>35 years	64	27	9	40	48	12	17	35	48
Income									
<$25,000	48	27	25	44	46	10	16	42	42
>$25,000	69	23	8	31	51	18	13	43	44

[1]Received for publication April 19, 1981. Approved for publication as Journal Article No. HSMS 4455 of The Ohio Agricultural Research and Development Center, Wooster, OH 44691. Research supported in part by a grant from The Society of American Florists' Endowment.

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[2]Associate Professor of Horticulture and Technical Assistant, respectively. Mailing address: Department of Horticulture, The Ohio State University, 2001 Fyffe Ct., Columbus, OH 43210.

either 3 stems of miniature carnations, 12 Marguerite daisies, or 7 sweetheart roses, and the $6.95 bunch contained either 4 stems of miniature carnations, 18 Marguerite daisies, or 10 sweetheart roses.

In experiment 2, sweetheart roses and miniature carnations were substituted for standard roses and carnations. The composition of the loose bunches included single colored miniature carnations, Marguerite daisies, and sweetheart roses. All loose bunches contained leather leaf. Again, there were 3 color categories: pink, white, and yellow, and prices were $2.95, $4.95, and $6.95.

Color accounted for over 50% of the consumer purchase choice, with pink holding the greatest value (Table 1). White was valued much less than the pink and the yellow-orange-peach category. Flower type or composition was the second most important purchasing component, accounting for about 40% of the purchase choice. The relationship between color and bunch composition showed that pink was the most attractive color, although the sweetheart rose had significantly more appeal than the other flower types (Fig. 2).

The $2.95 and $4.95 bunches compared almost equally in value across all consumer groups. All utility scores were relatively low, indicating little price sensitivity within the $2.95 to $6.95 price range.

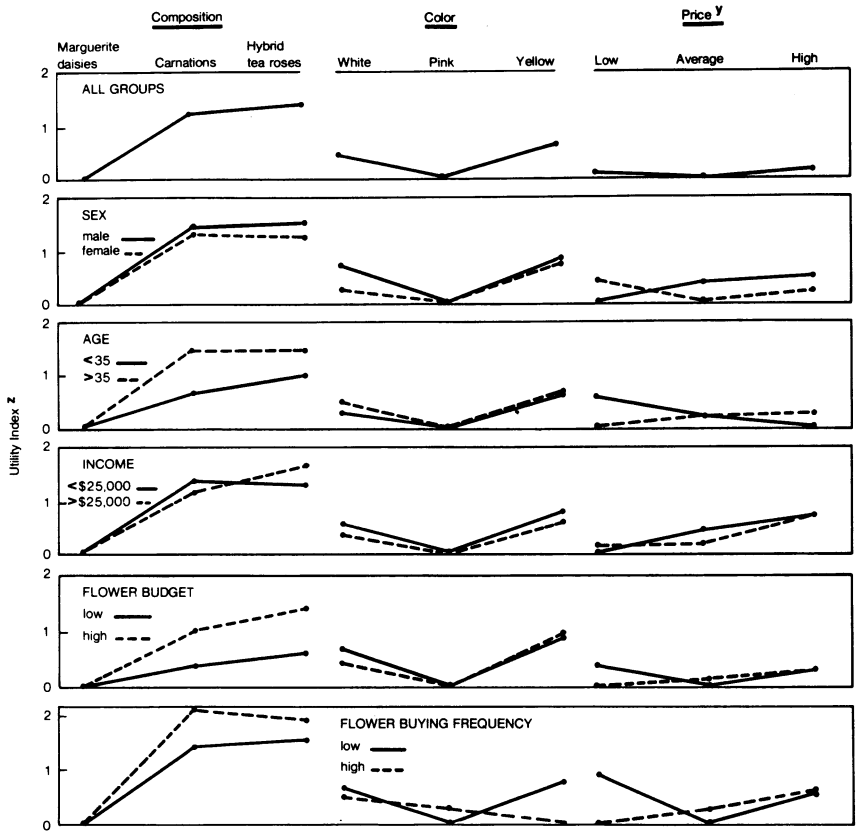
All groups but females were willing to pay the highest ($6.95) price for the pink sweetheart roses. The pink sweetheart roses at all price levels held more value than any other flower type or color, except among females, where the orange sweetheart rose scored the highest.

After the sweetheart rose, the miniature carnation scored highest for females, younger persons, and persons with income less than $25,000, while the Marguerite daisy scored highest for males, older persons, and persons with higher incomes. The ideal product offering was the pink or orange sweetheart roses, priced at $2.95 or $4.95.

Experiment 3 was designed to test the inclusion of different types and colors of roses in mixed, loose bunches. All mixed, loose bunches were composed of white daisy pompon chrysanthemums, a carnation, baby's breath and leather leaf, with the addition of either hybrid tea roses, sweetheart roses, or floribunda roses. Rose colors were red, pink, and either yellow, peach, or orange, depending on cultivar. Prices were $3.95, $5.95, and $7.95. For the $3.95 product, 1 rose was added to the mixed bunch, while 3 roses were added to the $5.95 bunch and 5 roses were added to the $7.95 product.

The sweetheart rose held the greatest value, but the rose type was the least important factor in the consumer's purchasing decision (Table 1). Color and price dominated. The yellow-orange-peach roses had the most value, followed by red and pink.

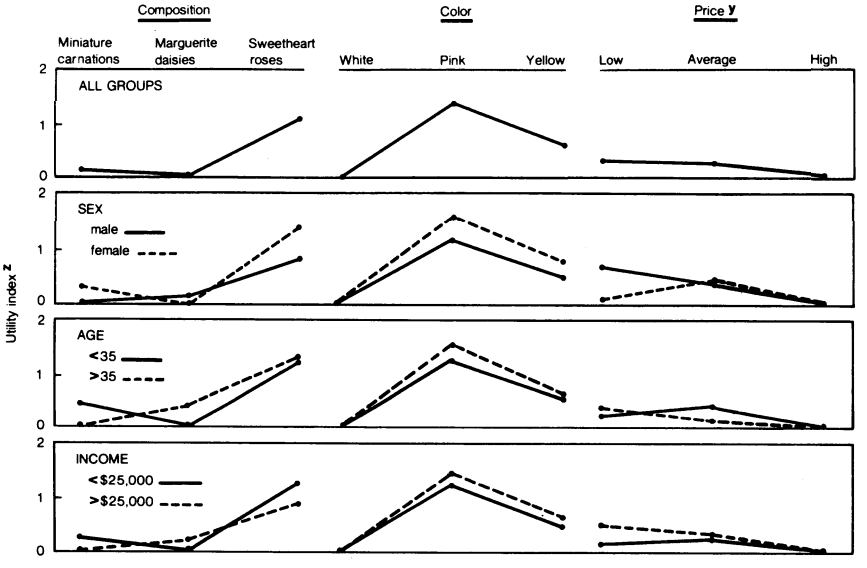
Consumers expressed strong preference for yellow, peach and orange hybrid tea, and floribunda and sweetheart roses, respec-



z Utility index represents a relative utility score for purchasing components in each experiment where the lowest component value was set at a base value of 0.

y Low=$3.95; Average=$5.95; High=$7.95.

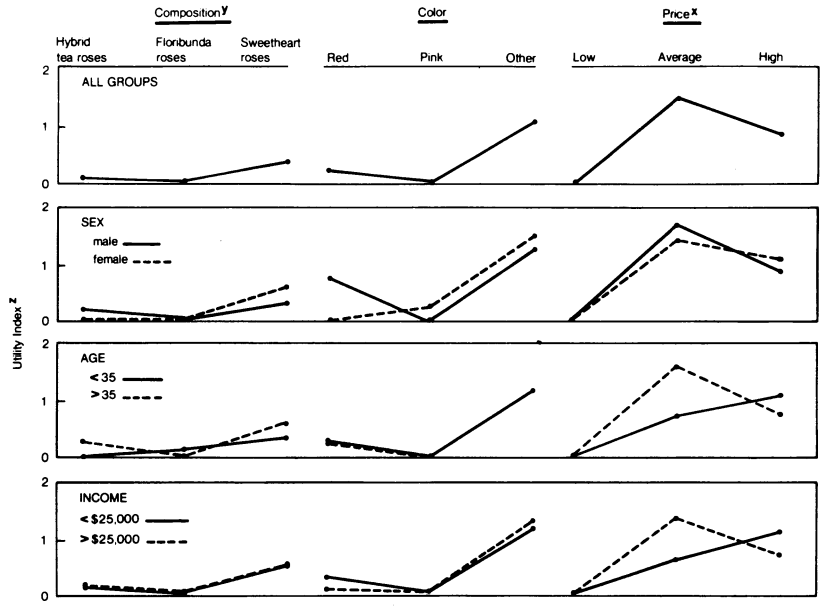
Fig. 1. Relative utility scores for composition, color, and price levels of loose bunch products, experiment 1.



z Utility index represents a relative utility score for purchasing components in each experiment where the lowest component value was set at a base value of 0.

y Low=$2.95; Average=$4.95; High=$6.95.

Fig. 2. Relative utility scores for composition, color, and price levels of loose bunch products, experiment 2.



[z] Utility index represents a relative utility score for purchasing components in each experiment where the lowest component value was set at a base value of 0.

[y] All product choices contained daisy pompom chrysanthemums, carnation, baby's breath, and leather leaf.

[x] Low=$3.95; Average=$5.95; High=$7.95.

Fig. 3. Relative utility scores for composition, color, and price levels of loose bunch products, experiment 3.

tively. The pink roses were judged the least attractive. Males were the only segment to have a strong preference for red roses mixed in the loose bunch.

The $5.95 loose bunch was the most acceptable, and the $7.95 loose bunch met price resistance (Fig. 3). The ideal product offering was the orange sweetheart rose in a mixed bunch and priced at $5.95.

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HortScience 17(4):595–596. 1982.

Effects of Temperature on the Germination of Selected Wildflower Seeds[1]

M. J. Kaspar and E. L. McWilliams[2]

Department of Horticultural Sciences, Texas A&M University, College Station, TX 77843

Additional index words. Coreopsis tinctoria, Ipomopsis rubra, Linum perenne, Asclepias tuberosa

Abstract. **Seeds of *Coreopsis tinctoria* Nutt., *Ipomopsis rubra* (L.) Wherry, *Linum perenne* L., and *Asclepias tuberosa* L. were germinated under constant light at 155 ± 10 $\mu Em^{-2}sec^{-1}$ on a thermogradient plate to determine optimum temperatures for germination. Optimum temperatures were 30°C for *C. tinctoria*, 25° for *L. perenne* and 30° for *A. tuberosa*. *I. rubra* exhibited poor germination at all temperatures in light. *C. tinctoria*, *L. perenne* and *A. tuberosa* germinated within temperature ranges of 15° to 35°, 15° to 25°, and 25° to 35°, respectively. *A. tuberosa* was the slowest germinating of the 3 species.**

Wildflowers are used widely in low maintenance landscapes such as roadsides, municipal open spaces, and as bedding plants and cut flowers. Several seed companies now specialize in the production of wildflower seeds. Little information (1) is available on the germination of wildflowers. This study considers the effect of temperature on percent germination under continuous light.

Seeds of *Coreopsis tinctoria* (golden wave), *Ipomopsis rubra* (standing cypress), *Linum perenne* (blue flax), and *Asclepias tuberosa* (butterfly flower) were obtained from Environmental Seed Producers, Inc. (ESP), El Monte, Calif. Before shipment from California, the seeds were stored in cloth bags at 18° to 21°C. Initial seed germination of *C. tinctoria*, *I. rubra*, *L. perenne* and *A. tuberosa* was 94%, 43%, 92%, and 69%, respectively. After the seeds were received, they were stored at 10° for 2 weeks. Fifty seeds of each species were placed on three 4.25-cm Whatman filter papers moistened as needed with distilled water in plastic Petri dishes. Petri dishes were oriented on the thermogradient plate at 15°, 20°, 25°, 30° ± 1°, and 35° under continuous Cool White fluorescent lamps at 155 ± 10 $\mu Em^{-2}sec^{-1}$. Filter paper surface temperatures were measured daily with a Bailey Bat-4 thermometer. Germination was monitored daily for 14 days by noting radicle length greater than 1 mm; germinated seedlings were removed from the Petri dishes. The experiment was repeated 3 times.

Arc-sine transformations were made on the final percentages, and means were compared using Duncan's multiple range test. Mean days to germination (MD) were calculated for each species at each temperature in order to quantify germination rate (1, 3). Mean days represent the average number of days required for radicle emergence. The optimum germination temperature of each species may be defined as that temperature at which the highest percent of germination is attained in the shortest time, below and above which germination is delayed but not prevented (1, 2).

It has been shown that under different time intervals a different temperature may be optimal according to the usage of the term (2). For the selected species in this study, 2 weeks was determined to be sufficient time for germination to occur. Also, it should be recognized that optima defined under constant temperature may give misleading information about field germination under varying diurnal temperature fluctuations (1). The range of temperatures at which the highest percent germination occurs is shown in Fig. 1; the one temperature among the various treatments (15°,

[1]Received for publication Nov. 21, 1981.

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[2]Graduate Student and Professor, respectively.