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Toward Longer-Lasting Flowers: Structure of Plants

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How to make cut flowers and potted plants last longer is one of the foremost problems facing growers, wholesalers, retailers and consumers. This subject has been of interest to the florists' industry for many years. Many hours of research work have been expended investigating the problems. All kinds of results have been obtained with all types of interpretations. Sometimes interpretation of these results was based on scientific fact; sometimes folklore.

In the coming years we are going to see more flowers reach more consumers as a result of national and local flower promotion campaigns. With this in mind, one question will arise, particularly from the consumer—"How can I extend the life of cut flowers and potted plants?" One goal of Cooperative Extension and Cornell University is to provide flower producers, retail florists, wholesalers and consumers with current recommendations and background information on how long to prolong the life of cut flowers and potted plants.

The information contained in this series is a comprehensive compilation of many years of research reported in United States Department of Agriculture Bulletins, College Experiment Station Bulletins, Professional Journals and Research Reports. If additional information is desired, we will be pleased to supply you with a number of references.

Some topics to be considered in this series are:

Structure of Plants
Why Do Plants Wilt?
Why Do Flowers Die?
Effect of Gases
Grow Keeping Quality into Your Flowers
Keeping Quality Affected by Plant Diseases
Proper Stage of Harvest
Storage of Cut Flowers
Flower Deterioration in Storage: Causes
Flower Deterioration in Storage: Control
Dry Packaging
Preparation of Flowers for 31° Dry Storage
Handling Flowers Following 31° Dry Storage
Flower Preservatives

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Scholarships Awarded

This fall, scholarships were awarded to several undergraduates in the Department of Floriculture and Ornamental Horticulture because of outstanding academic achievement at Cornell University. The recipients include:

The A.M.S. Pridham Scholarship which is sponsored by the New York State Nurserymen's Association—$500.00 was awarded to D. J. Dalby, Niagara Falls, Ontario, Can.

The New York State Federated Garden Clubs Scholarship—$250.00 was awarded to Carol J. Ogden, Hamilton and L. P. Reistetter, Binghamton.

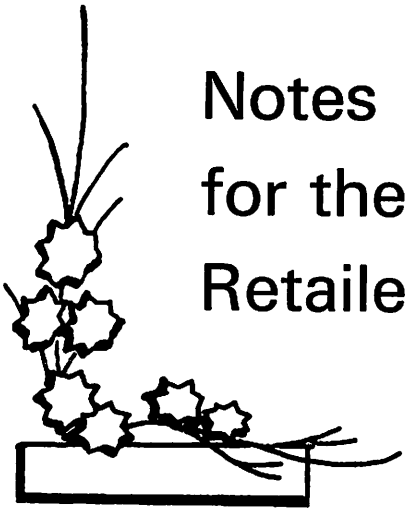
New York Florists' Club Awards—$200.00 was awarded to John R. Hockenhull, 2650 Hvidovre, Denmark; $150.00 to Margaret R. McEachron, Salem; and $100.00 to Craig A. Atwater, Clarence.

The F. F. Horton Scholarship—$100.00 was awarded to Margaret R. McEachron, Salem.

The Alfred C. Hottes Awards—$150.00 was awarded to Craig A. Atwater, Clarence; and $150.00 to William W. Longwell, Horseheads.

W. Atlee Burpee Award—$50.00 was awarded to John R. Hockenhull, 2650 Hvidovre, Denmark.

The George O. Adams Scholarship which is sponsored by the Western New York Nurserymen's Association—$300.00 was awarded to Gordon Carruth, Ithaca.



Containers for Plants

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Editor's Note: The following article is reprinted from Design & Environmental Analysis Extension Newsletter, April, 1970, College of Human Ecology, Cornell University.

The use of an appropriate container is an important aspect in the display of potted plants. With a display of one specimen or a combination of several, the plant materials are the most important items and the container is secondary. Essentially the container is used to keep the plant in a growing medium so that growth will continue.

Since the plant materials are the feature of a display, a perfectly plain container emphasizes the plants. A container with bright flowers, figures, or designs painted or molded on its surface will attract more attention to the container than to the plant. A plain, smooth, dull finish container is the most neutral for showing most plants effectively.

Like surface treatment, color can be too conspicuous on a container. Strong, bright colors such as red, yellow, and orange, and even bright blue and lavender are too eye-catching to be used, except with flowering plants with blooms of the same colors. Soft greens with a touch of yellow or blue, or gray greens are the most neutral colored containers. These colors tend to repeat stem and foliage colors and they blend in, rather than contrast, with the plant material.

As with color and texture, the less unusual shapes of containers are the most usable. Avoid unique shaped containers which call attention to their unusual form, especially those made to look like animals or people. These containers actually are objects in their own right and the plants are merely accessory items.

It is not essential that a container have drainage facilities. With a one- to two-inch layer of coarse sand or gravel in the bottom of the container and careful watering, the drainage hole is not necessary. This increases the possibilities when selecting a container.

A plant growing in a greenhouse-type clay pot can be more attractive if it is placed inside a jardiniere. This arrangement combines the good drainage aspects of the clay pot with the attractiveness of the jardiniere selected. The space between the two may be kept free for air circulation, or it may be filled with moist peat or sphagnum moss to slow the drying of the growing medium, reducing frequency of watering.

Flowers Deductible as Business Gifts

Here's a reminder from the July 15th issue of "The American Florist"—Dateline—you might want to pass along to customers: *Flowers can be sent as business gifts to customers, business associates, clients, employees and others and deducted from income tax.* Deductions are generally limited to $25 a donee each year. "Incidental" charges—packaging, insurance, mailing and delivery—can be omitted from the donor's cost. Example: If a customer buys a $25 floral gift and pays an additional $2 for packaging and delivery, he can deduct the entire $27 by treating the $25 as a business gift and the $2 as an otherwise deductible expense. A cost will not be considered "incidental," if it adds substantial value to the gift.

In summary: (1) more than one gift can be made to a person in a year but the total amount that can be deducted for that one person's gifts can't exceed $25; (2) the $25 limit per person can't be bypassed by making a gift to the person's husband, wife or child; (3) the $25 limit can't be bypassed by making a gift to a donee's corporation in cases where the donee owns and operates other businesses as corporations.

Florists specialize in the handling of flowers

An outstanding feature of the florist industry is that flower growers, wholesale florists, and retail florists tend to specialize in the handling of flowers rather than to handle a diversity of products. Of no less importance from the standpoint of market structure is that the wholesale trade in flowers is conducted almost wholly among the growers, wholesalers, and retailers. Retail florists, rather than nonflorist handlers such as supermarkets, are the principal outlets for cut flowers and flowering plants, selling more than 95 percent of all cut flowers and a high proportion of all potted, flowering plants.

Editors Note: To list events in *The Florist's Calendar*, send program title, dates, and location to Editor, *New York State Flower Industries Bulletin*, Department of Floriculture, Cornell University, Ithaca, N. Y. 14850.

April	
13 & 14	Flower Growers Day at Penn State, Nittany Lion Inn, University Park, Penna.
20 & 21	Roses Inc. Regional Meeting, Sheraton Inn, Ithaca
July	
25-28	SAF Convention, Leamington Hotel, Minneapolis, Minn.
October	
2-4	NYSFI Convention, Hotel Syracuse, Syracuse

Toward Longer-Lasting Flowers: Structure of Plants

(continued from page 1)

Toward Greater Acceptance of Preservatives
Better Packaging=Better Product
Shipping Containers
Handling Practices—Grower, Wholesaler, and Retailer

Structure of Plants

Horticultural plants vary greatly in form, structure, and habit; however, they all exhibit one basic configuration. They have roots, stems, leaves, and flowers. An understanding of the general activities and functions of each of the major parts of the plants will serve as background information when trying to understand the various concepts of post-harvest physiology of cut flowers and potted plants.

Cells and Tissues: All plants are composed of organs, for example, a leaf. A leaf is made up of tissues, for example, the water-conducting system. The tissues are composed of individual cells. The cell is the structural unit of the plant. It is the smallest unit of living matter capable of continued independent life and growth. The cells in some tissues are arranged with a resemblance to bricks in a brick wall. Many of the cells within particular tissues and organs have specific shapes and specific functions.

Stems: The chief functions of stems are mechanical support for themselves and for the leaves, flowers, and fruits; conduction of water, inorganic salts, and foods; storage of carbohydrates and other foods in the pith, cortex, phloem, parenchyma, and wood rays; storage of water in plants like cacti; photosynthesis in green stems; and a means of reproduction of many kinds of plants.

Leaves: Leaves are generally the most conspicuous part of plants. They are borne on petioles which are attached to the nodes of stems. Green leaves owe their color to a complex pigment called chlorophyll. The two chief parts of the leaf are the leaf blade and the petiole. The usually green, flat, extended portion of the leaf is called the blade. The three main types of tissue in the leaf are the epidermis, mesophyll and vascular bundles. The epidermis is usually a single layer of interlocked cells that normally contain no chloroplasts. These cells are continuous over both leaf surfaces except for the stomates which are specialized cells and are present to allow gases to enter and leave the leaf. The mesophyll layer is a group of specialized cells between the epidermal layers where photosynthesis takes place. The vascular bundles are specialized strands of tissue that function both in support and in conduction of water and food.

Roots: Roots anchor the plant, absorb minerals and water from the soil, transport materials from the region of absorption to the base of the stem, and they may serve as food storage organs. The root has two specialized structures which should be mentioned. One is the root cap which is a thimble-shaped cap of specialized cells which covers and protects the growing tip. In many species, the cells of this structure are loosely attached and the outermost cells are continually worn away. This group of slimy cells facilitates root tip growth through the soil. The second structure is the root hair. The root hairs are specialized structures that absorb water and nutrients into the roots.

Flowers: The basic role of flowers is that they contain the structures for sexual reproduction. They are essential to the production of seed. Many flowers, particularly those of floricultural crops, have aesthetic value. The three main parts of the flower are the sepals which make up the calyx; the petals which make up the corolla; and the sexual organs, stamens and pistil.

NYFSI Reports

Vining Appoints Committees

Pierre J. Vining, better known in the trade as "Pete", of Syracuse Floral Supply Corporation, Syracuse and the 1971 General Convention Chairman, appointed many industry persons to serve as chairmen of committees for the Convention. These committee chairmen will appoint additional people to help carry out the 1971 Convention objectives. Some of the appointments to date are as follow:

General Chairman—
Pierre J. Vining, Syracuse Floral Supply Corp.

Retail Program—
Mary Sheehan, Pires Florist, Norwich.

Floral Design School—
Jay Turner, Jay's Glad Haven, Pulaski.
Mary Messina, Carm's Florist, Baldwinsville.

Growers Program—
Robert Hollenbeck, Pedrick Glass Gardens, Scotia.

Wholesalers—
Bruce Beck, Beck's Wholesale, Albany.

Trade Fair—
Richard Chapin, Chapin Florist, Watertown.

New Varieties Exhibit—
Harold Gardner, Henry F. Mitchell Company, Averill Park.

Publicity—
Carmen Cosentino, Cosentino Florist, Auburn.
Vice-Chairman—Clem Haines, Indiana Glass Co., New York.

Your Board of Directors Meet

Your New York State Flower Industries Board of Directors recently met with President Kasting presiding. Some of the business transacted is as follows:

Peter Vining, Convention Chairman, reported plans for the 1971 Convention, October 2-4 are well under way. Preliminary information will be released shortly. Vining stated "This year's convention will be an outstanding one and all industry members should plan to attend." Kasting also appointed Gisbert Auwaerter, Bayport; Don Vandenberg, Liberty; Fred Yamaguchi, Melville; John Brookins, Orchard Park; and Paul Newman, Olean to assist the Chairman of the Growers Program.

A membership report was given by Charles Wilton, Secretary-Treasurer. The membership now totals 1270 members.

Mel Dauernheim, Wantagh, reporting for the Conference Board stated that "agriculture is the largest business in New York State and 50% of the people in New York State derive their income from some phase of agriculture."

Mr. Kasting, Sr., Buffalo, reported a 45% dividend refunded to members of the insurance group.

The State Fair Committee, reported Carmen Cosentino, is making plans for an exhibit at the New York State Fair in Syracuse next September.

The Board of Directors provided the Department of Floriculture, Cornell University, with a $1,000 grant which is used at the discretion of the Department Chairman for research, teaching or extension needs in the area of floriculture.

Nitrogen Fertilizers and Their Influence on the Growth of Poinsettias

J. W. Boodley
Department of Floriculture, Cornell University

Poinsettia nutritional requirements are similar to most floricultural crops. The need for large amounts of nitrogen has been shown by many researchers. This nitrogen has been supplied in various fertilizer forms. Among these ammonium nitrate, ammonium sulfate, potassium nitrate and calcium nitrate along with various commercial formulations of 20-20-20 and other analyses have all been recommended.

Because poinsettias have certain root rot problems, the recommendations for a growing medium have been to provide one that has good drainage, good aeration, holds nutrients and has a pH around 5.0–5.5. This last recommendation is made on the basis that *Thielaviopsis basciola*, one of the root rot diseases, does not grow well at a low pH. Therefore, by keeping the growing medium on the acid side, some biological control of *Thielaviopsis* has been obtained.

The choice of ammonium sulfate as a fertilizer would be a logical one in that it has an acid reaction in the soil and would help to keep the pH on the acid side and thus control *Thielaviopsis*. Since the ammonium must be converted to nitrates for plant use through the process called nitrification some consideration was given as to factors affecting this conversion. Temperature plays a large role in the nitrification process, the warmer the temperature the more rapid the process proceeds. Because poinsettias are grown at minimum night temperatures of 62°F and some of the newer cultivars are grown at a minimum 65°F, there should be no problems due to slow conversion of ammonium to nitrate nitrogen.

The Cornell peat-lite mixes have found wide use as a successful medium for producing a top quality crop. A naturally acid medium, until the limestone is added, the mixes can be more easily manipulated nutrient-wise than soils.

However, the results of some previous work with bedding plants in the mixes had suggested that ammonium toxicity could be a problem if only ammonium nitrogen sources were used for feeding the plants. To test whether ammonium toxicity was a problem two experiments were made: the first, during the normal fall production season of 1967 with the cultivars 'Paul Mikkelsen' and 'New Ecke White' and the second, with 'Paul Mikkelsen' in the spring of 1968 with flowering programmed for May 9, 1968. These studies gave us plants growing under conditions of reduced light intensity during fall; and under increasing light intensity during the spring period. These conditions play a significant part in the results obtained.

Because of excessive tip splitting of 'Paul Mikkelsen' in the fall crop, only the results for 'New Ecke White' are reported.

Fall 1967

Procedures

Cuttings of 'New Ecke White' were propagated September 18 and placed under low pressure intermittent mist fertilizer. The cuttings were rooted under long day conditions and potted October 16. The plants were grown as single stem, one plant to a 5 inch plastic pot.

The potting medium was a modified peat-lite mix made up as follows:

1 bushel sphagnum peat moss
1 bushel #4 vermiculite
ground limestone at rate equal to 2 lbs/cubic yard
gypsum at 3 lbs/cubic yard
20% superphosphate at 5.5 lbs/cubic yard
1-2¼" potful of granular Aquagro wetting agent
1 level teaspoonful of Geigy NaFe chelated iron

The choice of gypsum was to keep the pH of the medium within the recommended level of 5.0–5.5 and still supply calcium for plant growth.

The nitrogen sources used for liquid feeding were:

Sodium nitrate
Ammonium sulfate
Ammonium nitrate

Fertilization was begun 1 week after planting and feedings were made weekly thereafter. Two levels of nitrogen, 400 ppm and 800 ppm, were applied. A 400 ppm level of potassium from potassium chloride was also applied once weekly. Additional waterings of plain tap water were made as needed.

The plants were placed on raised benches in a fan and pad cooled greenhouse where night temperatures were maintained at a minimum of 65°F. Day temperatures were 70–72°F. There were 10 pots in each treatment.

The results of this experiment can best be described in diary fashion.

October 23—Feeding was begun. Observations were made daily and it became apparent that the choice of fertilizer was having a significant effect on the plants.

November 17—The following observations were noted:

Ammonium sulfate, 800 ppm—Basal leaves show a yellowing and a chlorotic pattern with the margins of the leaves dying and rolling inward concavely. The chlorosis is interveinal and looks somewhat like magnesium deficiency, but is much more subtle in appearance.

The leaves on the lower half of the plant hang limply and appear to be flaccid and wilting. Leaf drop has become quite pronounced. The leaves are very loosely held to the plant and are easily pulled off. It appears that an abscission layer seems to have formed, since no latex exudes from the leaf scar when the leaf is removed. The flagging of the leaves suggests the possibility that water relations within the plant have been seriously affected. However, examination of the roots shows no visible damage to the plants.

At this time the plants in the remaining fertilizer treatments were all about equal in appearance.

January 10, 1968—Data were taken on the mature crop.

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