BASICS OF HANDLING CUT FLOWERS

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In recent years, more and more growers are producing field-grown cut flowers. Producing cut flowers does not always mean that consumers are provided with quality flowers. In fact, improper handling of the cut flowers after harvest accounts for the majority of loss in the cut flower industry. Understanding factors that affect the postharvest quality of cut flowers is an important as knowing how to produce them. In this first of two articles, I will discuss the basics of postharvest handling of cut flowers. In a future article I will discuss the best way of handling cut flowers for sale in roadside stands.

There are many factors that affect the postharvest quality and life of cut flowers. Each will be addressed separately below:

Maturity state of the flowers. Generally speaking, flowers should be harvested at the "earliest possible state" to ensure maximum postharvest life. Each plant species has a minimum harvest maturity stage in which flowers can be harvested without affecting their postharvest quality. Flowers of some plant species can be harvested at the bud stage with no reduction in quality and vase life. With other plant species, harvesting flowers at too immature a stage may result in disorders such as bent neck, improper development of pigmentation, or abnormal opening of the buds, and should be avoided. To ensure satisfactory postharvest quality of flowers, it is important to know the optimum stage of harvesting for each plant species. However, if flowers are to be stored, or shipped long distances, they are usually harvested at an earlier stage.

Temperature. Proper temperature management is the most critical factor for maintaining the quality and satisfactory vase life of cut flowers. Generally, the lower the temperatures, the longer the flowers last. Most flowers will retain their quality if stored at temperatures near the freezing point (32F). Other, however, typical of those originating from subtropical and tropical regions, develop chilling injury if stored at temperatures below 50F. Symptoms vary depending on plant species and may include darkening or water soaking of the petals and death of flowers. Flowers such as anthurium, bird-of-paradise, heliconia, certain orchids, as well as others that are susceptible to chilling injury should be stored at temperatures above 50F.

Water. Once harvested, flowers continue to transpire and will wilt rapidly. Most flowers do recover fully from wilting if recut and placed in a warm, rehydration solution. The pH of the rehydration solutions should be adjusted to near 3.5 as researchers have demonstrated that flowers absorb more water in acidic solutions than those at higher pH levels. Chemicals such as citric acid, 8-hydroxyquinoline citrate, or aluminum sulfate are generally used to lower the pH of the water. The amount of chemical needed will depend on the alkalinity of the water. Alkalinity is a measurement of the amount of calcium and magnesium carbonates in the water. Water with high alkalinity is highly buffered and will require more chemicals to lower the pH. The pH and the alkalinity of the water source should be analyzed to determine the proper amount of chemical needed to lower the pH to the desirable level.

In addition, it is important that the water have low microbial counts. Microorganisms and the substances that they produce can plug the xylem (water conducting tissue) of the plant, thus blocking the uptake of water. Researchers have shown that there is a strong inverse relationship between the number of microbes in the water and the longevity of cut flowers. In the Netherlands, vase solutions of cut flowers in the Aalsmeer auction are checked routinely for bacterial counts. Flowers held in water with bacterial counts above a threshold level are returned to the growers. It is very important that buckets used for cut flowers be cleaned and disinfected regularly and that germicides (chemicals that inhibit the growth of the microbes) be added to the solution. Cloudiness of the solution indicates the presence of high counts of microbes and that the solution should be replaced.

Another important factor that should not be overlooked is the specific ions contained in the water. Water quality that is good for human consumption may not be good for cut flowers, and in fact, can be very toxic. For example, levels of fluoride in the fluoridated municipal water are very toxic to flowers such as gerbera, gladiolus, and fressia and significantly reduces the vase life of these flowers. Water containing high levels of sodium and iron are also extremely toxic to some flowers and should not be used.

Food supply. Once harvested, cut flowers are typically placed in a low light or dark environment where photosynthesis (a biological process forming carbohydrates from CO_2 and H_20) is at a minimum. Yet, carbohydrates are needed for the cut flowers to continue to develop. Much of the carbohydrates needed come from starch and sugars stored in the stem, leaves, and petals but the levels may not be adequate. Most cut flowers readily absorb sugars dissolved in the water and will benefit if placed in solutions containing sugars. The least expensive and most accessible sugar is common table sugar and it is one of the components used in many commercially prepared preservatives.

Ethylene. Ethylene, an odorless and colorless gas, is a natural plant growth hormone that affects many physiological processes ranging from seed germination to senescence of plants. This plant hormone is produced by some flowers and ripening fruits and is produced in large quantity during combustion or organic matter, such as gasoline, firewood, and tobacco. Certain cut flowers are very sensitive to ethylene and minute amounts (levels as low as twenty parts per billion) can be very harmful. This level of ethylene is common in the supermarkets and in the atmosphere of large cities. Responses to exogenous ethylene vary with species, and include abscission, abnormal development of the flower buds, failure of the buds to open and death of the flowers. It is thus important that flowers sensitive to ethylene be handled in areas devoid of ethylene contamination. Typically, accumulation of ethylene is minimal in well-ventilated areas, making these species suitable for the handling of flowers. On the other hand, if flowers are handled in a closed environment, then, it is important to minimize contamination. Currently, there are chemicals in the industry that are used to protect flowers from ethylene. The use of STS (silver thiosulfate) on cut carnations more than triples the vase life of these flowers. The STS treatment consists of allowing the cut flowers to dehydrate slightly before placing them for a few hours in buckets containing solutions of STS. This practice, known as "pulse" treatment, protects the flowers from ethylene in the atmosphere, whether it be produced by the flower itself or from external sources. Due to the growing awareness of environmental issues, chemical companies are now searching for non-silver compounds to substitute for STS.

Other problems. Flower stems naturally bend away from gravity and this phenomenon is called "geotropism." Flowers like gladiolus, snapdragon, gerbera, tulip, and anemone bend upward when placed horizontally. This results in curved stems when they are later placed in a vertical position. These flowers should be handled upright whenever possible.

Mechanical damage to the leaves and flowers not only reduces the aesthetic value of the flowers but bruised petals and leaves are more prone to infection with disease organisms. With gentle and minimal handling, the quality of cut flowers should be better maintained.

Reference

Reid, M. S. Postharvest care of cut flowers. University of California-Davis.

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GGIA/ASLA's 4th
New Alliance Social
October 18, 1995
Atlanta Botanical Garden
6:30 - 9:30 p.m.

This year's New Alliance event, co-ordinated by Mel Garber of the University of Georgia and David Berry of Wight Nurseries, will continue the roundtable discussion format featuring four topics of interest to all groups. The goal of the New Alliance event is to promote a close working relationship between plant producers, landscape contractors and landscape architects. The discussions have resulted in several ideas of immediate benefit to the participants. Future benefits can result from the networking sessions before and after the discussions. Bring your ideas, brochures and business cards and be prepared to do some networking.

Perception of Turf as a High Maintenance/ High Water Use Item
Leader: Ken Morrow, Sod Atlanta
Co-Leader: Gil Landry, University of Georgia

The Future of Plant Purchases and the Relationship Between Growers, Landscape Architects and Landscape Contractors
Leader: Frank DeRosa, Shemin Nurseries
Co-Leader: Andy Hull, Post Properties

The Plant Specification Process: Selection and Substitution of Varieties
Leader: John Barbour, Bold Spring Nursery
Co-Leader: Alan Harris, Lifescapes

Irrigation Specifications and Coordinating Plant Needs
Leader: Bart Parker, The Morrell Group
Co-Leader: Bret Bowlin, Past President/MALTA

There will be a cash bar and hors d'oeuvres.
$10 admission, benefitting the Scholarship Fund
Call the GGIA Office (706) 492-4664 to make your requested reservations by October 13.

The event is sponsored by
- **Bold Spring Nursery**
- **Griffin Corporation**
- **Shemin Nurseries**

The sponsors will have a display in Day Hall and will be available to assist you.

This year's event includes participation from Metro Atlanta Landscape and Turf Association (MALTA), Georgia Commercial Flower Growers Association (GCFGA), and the Georgia Sod Producers Association.